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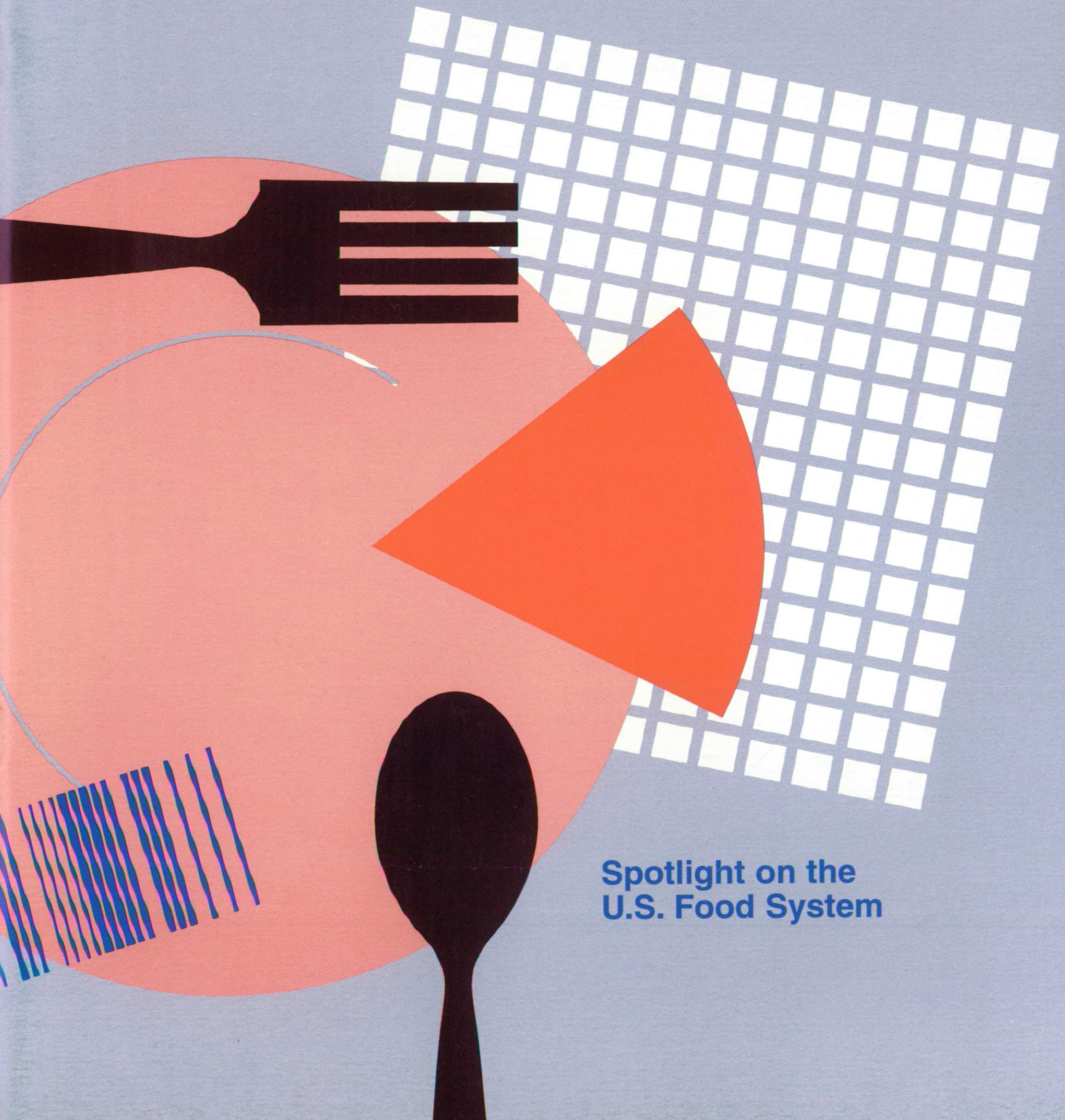

Spotlight on the U.S. Food System

...Upfront

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Spotlight on the U.S. Food System

In 1994, U.S. food manufacturers, retailers, wholesalers, and foodservice firms employed 12.8 million people and contributed about 9.5 percent to our gross domestic product. That's just a snapshot of the vital and dynamic U.S. food system. This issue of *FoodReview* presents an expanded analysis by USDA's Economic Research Service (ERS) of trends and developments throughout the food sector.

According to the first article, we're eating record-high amounts of meat and sugars. In 1994, Americans consumed an average of 194 pounds of meat (red meat, poultry, and fish) per person. Large supplies of beef and lower inflation-adjusted prices spurred a 2-pound rise in per capita consumption of beef—the first increase in 9 years. And, despite the vast array of sugar-free products on grocery shelves, Americans consumed an average of 148 pounds of caloric sweeteners per person in 1994.

Two articles look at U.S. food spending trends—first from a national perspective and then how food spending differs among households of different sizes, income levels, and race, as well as geographic location.

But where do these food dollars go? Nearly 80 percent of what consumers spend for domestically produced farm foods pays for labor, packaging, energy, and other marketing costs. Labor took the biggest chunk. This is especially true in the foodservice sector, where 1994's 5.2-percent increase in real spending contributed to strong employment and wage gains.

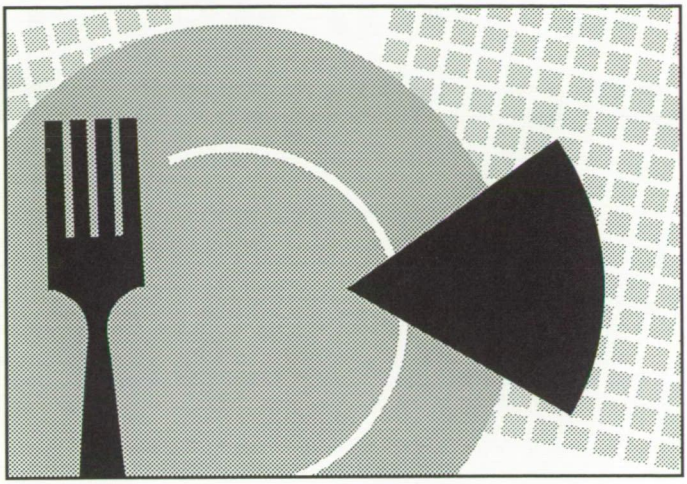
The U.S. food marketing system continues evolving as it responds to business conditions and consumers' desires. Such changes affect the structure of each sector. One article, for example, discusses how warehouse, superstore, and other alternative supermarket formats are gaining in popularity and eroding the market share of conventional supermarkets. Another article looks at the rapidly growing foodservice industry, showing some of the gainers and losers over the last decade. Other articles report trends in merger activities, new product introductions, and supermarket sales for specific product categories.

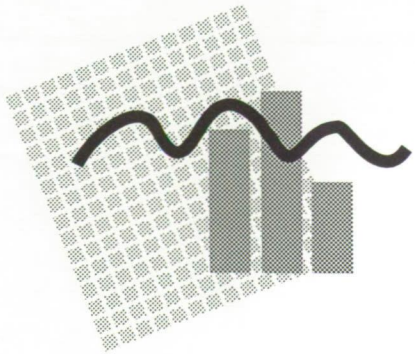
A view of the processed food sector's activity in global trade is also provided. In 1994, the United States exported $25.8 billion worth of processed food and beverages, a 10-percent jump from 1993. While minimally processed products, such as fresh and frozen meats, frozen fish, soybean oil, and canned fruits and vegetables, continue to dominate, many of the fastest growing processed food exports in recent years have been highly processed, brand-name products.

Knowing consumption trends overseas is important in spurring trade. One article reports how rapid income growth, especially in China and other Asian nations, has boosted world average caloric consumption. However, many of the least developed countries continue to struggle with extensive undernutrition.

Food safety is another important research area for ERS. Effective prevention and control hinges on a better understanding of pathogens in the food supply and how they affect society. According to the article on U.S. foodborne illness estimates, seven foodborne diseases alone cost an estimated $5.6 billion to $9.4 billion a year in medical charges and lost productivity.

Inside...





U.S. Per Capita Food Consumption: Record-High Meat and Sugars in 1994

Judith Jones Putnam and Lawrence A. Duewer
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It may be chic in the current milieu of diet-health mania to say one has cut back on meat and refined sugars, and people report as much in numerous consumer surveys. However, U.S. per capita food supply data indicate that Americans consumed record-high levels of caloric sweeteners and total meat (red meat, poultry, and fish) in 1994. And, forecasters predict still higher consumption in 1995 and 1996.

The American diet has changed considerably over the past decade. Beef consumption, for example, fell 14 percent between 1980-84 and 1990-94, while chicken consumption rose 37 percent and turkey 67 percent (table 1). Egg use also declined, while cheese consumption increased steadily. Consumption of fresh produce reached a record-high level in 1994 (with kiwifruit one of the biggest gainers, increasing 267 percent between 1980-84 and 1990-94).

Diet and health concerns, as well as changing relative prices and increases in real (adjusted for inflation) disposable income, compelled these changes in U.S. food consumption. New products—particularly more convenient ones—also have contributed to shifts in consumption, along with an aging population, expanded advertising campaigns, smaller households, more two-earner households, more single-person households, and an increasing proportion of ethnic minorities in the U.S. population.

USDA's Economic Research Service (ERS) estimates per capita food consumption, based on food disappearance data (see box). These data represent the amount of food available for human use. They are used as a proxy to estimate human consumption, even though the data may overstate what is actually eaten because they represent food supplies available in the market and do not account for waste.

Large Supplies and Lower Real Prices Boost Per Capita Meat Consumption

We are a nation of meat eaters—now more so than ever. In 1994, total meat consumption (red meat, poultry, and fish) reached a record 194 pounds (boneless, trimmed equivalent) per person, 14 pounds above the 1980-84 annual average (table 2). Half-pound hamburgers and "value-priced" buckets of fried chicken draw slews of customers to foodservice outlets. Rotisserie chicken and Buffalo wings have become so popular that they have made inroads across the country, even in pizzerias. Americans love to barbecue meat on outdoor grills—boosting per capita consumption in warm months—and, increasingly, on indoor grills year-round. A host of new lean-meat products cater to saturated-fat-wary consumers. Seasoned, ready-to-cook meats available in the fresh and frozen food cases and cooked meats in the self-serve and service delicatessens appeal to time-crunched consumers. ERS projections indicate that annual per capita meat consumption may jump another 6 pounds by 1996.

In 1994, Americans consumed an average of 64 pounds of beef (boneless, trimmed equivalent), 49.5 pounds of pork, 49.5 pounds of chicken, 15 pounds of fish and shellfish, 14 pounds of turkey, and just under 1 pound each of lamb and veal.

Red meat—beef, pork, lamb, and veal—accounted for 59 percent of the total meat supply in 1994, compared with 69 percent in 1980-84 and 74 percent in 1970-74. Chicken and turkey accounted for 33 percent of the total meat consumed in 1994, up from 24 percent in 1980-84 and 19 percent in 1970-74. In 1994, per capita consumption averaged 16 pounds less red meat, 30 pounds more poultry, and 3 pounds more fish and shellfish than in 1970-74.

Meat consumption and prices are determined by the complex interaction of supply and demand. In the short run, supplies are relatively

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fixed, and prices adjust so products clear the market. That is, what is produced is sold. When supplies go up, prices go down and consumers buy more. In 1996, per capita consumption of beef, pork, chicken, and turkey will likely increase to match record-large production of livestock meat and poultry. Yearly changes in consumption reflect mostly changes in supply rather than changes in consumer tastes. Longrun changes in meat consumption, on the other hand, reflect changing demographics, preferences, technology, and marketing practices in addition to relative prices and incomes. For example, an increase in the number and variety of low-fat and reduced-fat meat choices available likely boosted overall per capita meat consumption during the last decade.

Advanced feeding and management practices and a greater understanding of genetics have created leaner cattle and hogs. Retail beef and pork cuts now have roughly 30 percent less trimmable fat than in the early 1980's. The fat content of some of today's leanest beef and pork cuts compares favorably to a skinless chicken breast. For example, a 3-ounce serving of beef eye round or boneless pork tenderloin (each trimmed of visible fat, after cooking) has 4 grams of fat. That compares favorably to the same serving size of roasted, skinless chicken breast, which comes in at 2 grams of fat. By comparison, a 3-ounce serving of roasted, skinless chicken thigh totals 9 grams of fat. Moreover, researchers at the Sarah Stedman Center for Nutritional Studies at Duke University Medical Center, Durham, NC, have found that lean pork is just as effective as skinless chicken in keeping serum cholesterol levels in check.

Most retailers offer several kinds of ground beef with progressively lower fat content. For example, Giant Food, Inc., a large regional supermarket chain based in Landover, MD, sells five kinds: regular ground beef (on a raw basis, 72 percent lean, 28 percent fat; 20 grams of fat per 3-ounce cooked portion, broiled), ground chuck (78 percent lean, 22 percent fat; 18 grams of fat), ground round (86 percent lean, 14 percent fat; 12 grams of fat), ground sirloin (91 percent lean, 9 percent fat; 8 grams of fat), and Giant Lean (93 percent lean, 7 percent fat; 6 grams of fat). Ground sirloin and Giant Lean are lower in fat than regular ground chicken; the ground round is comparable to ground chicken; and the Giant Lean to regular ground turkey. Ground skinless turkey breast (98 percent lean, 2 percent fat; 1.5 grams of fat) is now available in grocery stores.

Many new packaged deli meats meet the definition of "lowfat" under the new nutrition labeling rules. A product labeled "lowfat" cannot contain more than 3 grams of fat in a serving.

Per capita consumption of beef reached an all-time high of 89 pounds (boneless, trimmed equivalent) in 1976, when beef supplies were at record levels because of a liquidation of the Nation's beef herd due to declining cattle prices and farm income from cattle.

Consumption dropped significantly in the late 1970's, remained flat in the early 1980's, and then, from a 1980's high of 75 pounds per capita in 1985, declined steadily to 61.5 pounds in 1993. In 1994, increasing supplies (fig. 1) and declining prices (fig. 2) spurred a 2-pound increase in per capita consumption of beef, the first increase in 9 years. In 1995 and 1996, average consump-

How Food Consumption Is Measured

USDA's Economic Research Service annually calculates the amount of food available for consumption in the United States. The U.S. food supply series measures national consumption of several hundred basic commodities. It is the only continuous source of data on food and nutrient availability in the country.

The food supply series is based on records of commodity flows from production to end uses. Therefore, the total available supply is the sum of production, beginning inventories, and imports. These three components are either directly measurable or are estimated by Government agencies using sampling and statistical methods.

The food available for human use reflects what is left from available supply after deducting exports, industrial uses, farm inputs, and end-of-year inventories. Human food use is not directly measured or statistically estimated. Instead, it is a residual component after subtracting out other uses from the available total supply.

The availability of food for human use represents disappearance of food into the marketing system, and it is often referred to as food disappearance. Food disappearance measures food supplies for consumption through all outlets—at home and away from home. Per capita food use, or consumption, is calculated by dividing the total annual food disappearance by the total U.S. population.

Food disappearance is often used as a proxy to estimate human consumption. Used this way, the data usually provide an upper bound on the amount of food available for consumption. In general, food disappearance data indicate trends in consumption over time rather than absolute levels of food eaten. Food disappearance estimates can overstate actual consumption because they include amounts that may not be used due to spoilage and waste accumulated through the marketing system and in the home.

tion will likely increase a half pound and a pound, respectively, to 65 pounds per person by 1996.

In contrast, per capita consumption of chicken, which remained flat in the early 1970's, steadily increased from 29 pounds (boneless equivalent) in 1976 to 49.5 pounds in 1994. Similarly, per capita consumption of turkey doubled from 7 pounds in 1976 to 14 pounds in 1994.

No Change in the Prevalence of Vegetarianism

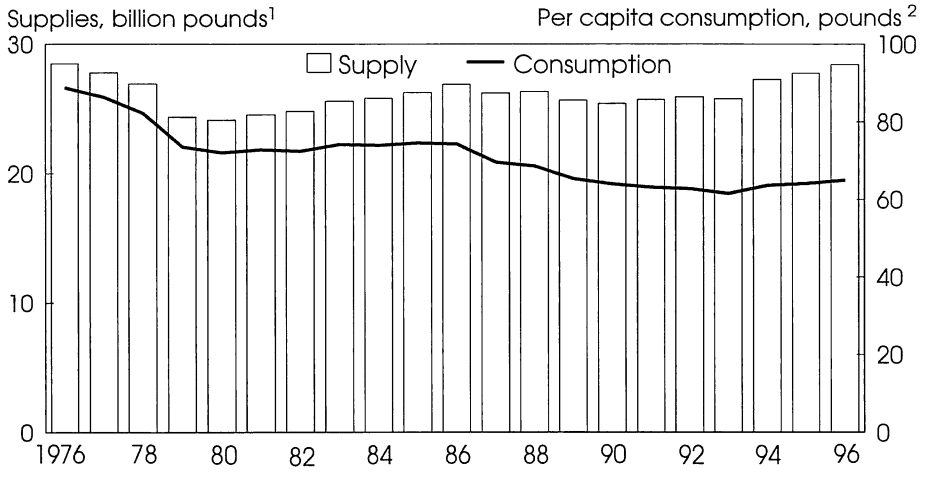
A deluge of newly published vegetarian cookbooks and the introduction of brand-name meatless vegetable burgers and sausage-style products across the marketplace suggests that vegetarianism may be a growing consumer movement. But surveys indicate that the proportion of true vegetarians—people who eat no red meat, poultry, fish, or shellfish—among Americans may be the same today as it was 16 years ago.

A 1992 survey conducted by the market research firm Yankelovich, Clancy, and Shulman and commissioned by *Vegetarian Times* magazine found 12.5 million in this country described themselves as vegetarians—nearly 5 percent of the population. There was only one catch, however; most of them actually ate poultry and fish, and even enjoyed red meat once in a while. The majority cited health concerns as the reason for adopting a semivegetarian diet.

In a 1992-93 national survey commissioned by the National Live Stock and Meat Board (NLSMB) and conducted by the market research firm MRCA Information Services, Inc., which tracks food consumption via its Menu Census diaries, 95 percent of the survey sample (2,000 households) classified themselves as "red meat eaters," 5 percent as "red meat avoiders" who never eat red meat, and about 2 percent as "vegetarians." When the diets of all study participants were analyzed, however, less than 1 percent consumed no red meat during the 14-day reporting period and an even smaller percentage consumed no meat, poultry, or fish. Red meat avoiders actually consumed an average of 2.3 ounces of red meat (beef, pork, lamb, veal, processed, and variety/other meats) a day. Red meat eaters consumed only 1.2 ounces more red meat than the red meat avoiders.

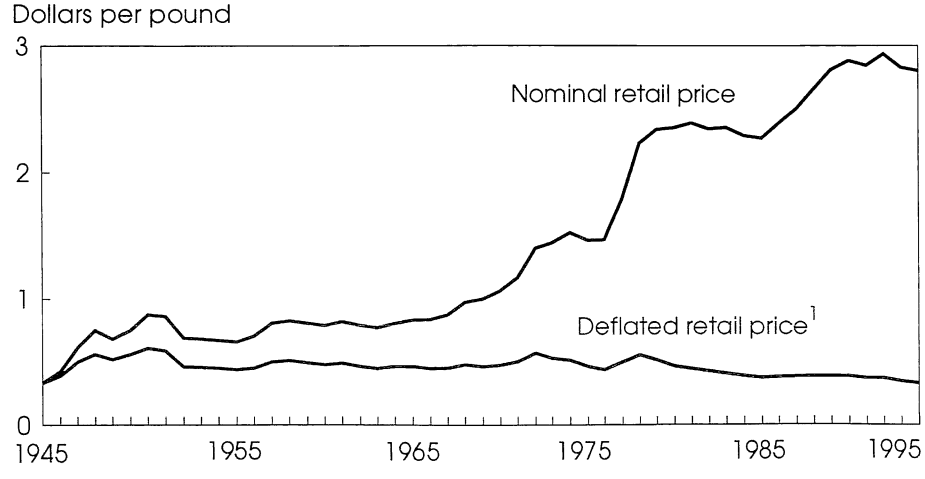
Results from a 1980 ERS survey match those of the NLSMB survey. Together, the 1980 and 1992-93 surveys indicate that the proportion of vegetarians among Americans has remained stable from 1980. About 2 percent of the people in ERS's nationally representative sample of 1,350 households described themselves as vegetarians and less than 1

Figure 1
U.S. Beef Supplies Forecast To Reach a Record High in 1996



Notes: 1995 and 1996 forecast. [1]Carcass weight. [2]Boneless, trimmed-weight equivalent.

Figure 2
The Inflation-Adjusted Retail Price for Choice Beef in 1995 Hit a 50-Year Low



Note: [1]Constant (1945) dollars.

Table 1
Consumption Statistics Show 10 Years of Change

Item	Per capita annual averages 1980-84	1990-94	Change, 1980-84 to 1990-94
	Pounds, unless otherwise specified		*Percent*[1]
Some Gainers...			
Frozen yogurt	0.3	3.3	1,000
Kiwifruit	.1	.5	267
Bottled water (gallons)	3.1	8.8	186
Mangoes	.3	.8	146
Oat products	3.8	9.0	137
Skim milk (gallons)	1.3	2.9	129
Noncitrus fruit juices (gallons)	1.7	3.6	112
Limes	.4	.9	106
Diet carbonated soft drinks (gallons)	5.7	11.5	101
Garlic	.8	1.6	97
Italian cheeses (mozzarella, etc.)	5.0	9.7	95
Durum flour (used to make pasta)	6.5	12.5	94
High-fructose corn syrup (HFCS)	27.4	52.8	93
Corn flour and meal	8.2	15.2	86
Sweet bell peppers	3.1	5.6	80
Cream and neufchatel cheeses	1.1	2.0	78
Chiles (hot peppers)	3.5	6.2	76
Rice	10.1	17.4	72
Dried prunes	.4	.7	70
Turkey[2]	8.4	14.1	67
Barley	1.0	1.6	65
Fresh broccoli	1.9	3.1	63
Fresh strawberries	2.4	3.6	53
Frozen broccoli	1.5	2.3	49
Yogurt (1/2-pint servings)	5.4	8.0	48
Fresh spinach	.5	.8	48
Cocoa beans (used to make chocolate)	3.8	5.5	45
Fresh grapes	5.1	7.3	45
Breakfast cereals	12.1	16.9	39
1-percent milk (gallons)	1.7	2.4	37
Chicken[2]	33.9	46.3	37
Sour cream (½ pints)	3.7	5.0	35
Corn hominy and grits	2.9	3.9	34
Frozen potatoes	19.8	26.5	34
Fresh onions	11.9	15.9	33
Cream (½ pints)	6.8	9.0	33
Spices[3]	1.9	2.5	31
Cantaloup	6.8	8.8	30
Fresh carrots	6.2	7.9	26
Regular carbonated soft drinks (gallons)	29.7	37.5	26
Dry edible beans	5.8	7.3	26
Candy	17.1	21.2	24
Shortening	19.0	23.3	22
Bananas	21.6	26.3	22
Tomatoes for canning	62.5	75.6	21
Fresh tomatoes	13.1	15.6	19
Fish and shellfish	13.0	14.9	15
White and whole wheat flours[4]	110.8	127.3	15
Salad and cooking oils	21.7	24.9	15
Some Losers...			
Veal[2]	1.4	.8	-40
Plain whole milk (gallons)	15.3	9.5	-38
Distilled spirits (gallons)	1.9	1.4	-27
Cottage cheese	4.3	3.1	-27
Canned green peas	2.5	1.8	-26
Fresh grapefruits	7.0	5.7	-18
Beef[2]	73.1	63.0	-14
Cane and beet sugar (refined)	74.7	64.4	-14
Eggs (number)	264.0	235.2	-11
Canned peaches	5.3	4.8	-10
Pickles	5.2	4.7	-10
Ice cream	17.7	16.1	-9

Notes: [1]Computed from unrounded data. [2]Boneless weight. [3]Excludes dehydrated onions and garlic. [4]Excludes durum wheat flour.

Table 2
Americans Are Consuming Record-High Amounts of Meat and Sugars

Item	Unit	Annual average consumption 1970-74	1980-84	1990-94	1993	1994
Total meat[1]	lb.	176.5	179.1	188.3	189.6	193.6
Beef	lb.	79.1	73.1	63.0	61.5	63.6
Pork	lb.	47.6	48.3	48.3	48.9	49.5
Chicken	lb.	27.4	33.9	46.3	48.5	49.5
Turkey	lb.	6.7	8.4	14.1	14.1	14.2
Fish	lb.	12.1	13.0	14.9	14.9	15.1
Eggs	no.	299	264	235	236	238
Shell	no.	265	229	181	179	177
Processed	no.	34	35	54	57	61
Beverage milk[2]	gal.	30.7	26.7	25.3	24.9	24.7
Plain	gal.	29.0	25.2	23.8	23.4	23.2
Whole	gal.	23.9	15.7	9.8	9.4	9.1
2-percent	gal.	4.0	6.8	9.0	8.9	8.7
1-percent	gal.	.5	1.7	2.4	2.4	2.4
Skim	gal.	1.5	1.3	2.9	3.1	3.3
Yogurt	½ pt.	2.3	5.4	8.0	8.2	8.7
Fluid cream[3]	½ pt.	9.7	11.3	14.8	15.1	15.2
Cheese	lb.	12.9	19.5	25.7	26.3	26.8
Frozen dairy products	lb.	28.1	26.7	29.2	29.3	30.0
Salad and cooking oils	lb.	16.7	21.7	24.9	25.1	24.3
Shortening	lb.	17.2	19.0	23.3	25.1	24.1
Margarine	lb.	11.0	10.8	10.7	11.1	9.9
Fruits[4, 5]	lb.	229.0	260.0	269.1	278.4	279.5
Fresh	lb.	97.7	107.7	121.0	124.9	126.7
Citrus	lb.	27.9	24.7	23.1	24.4	26.0
Noncitrus	lb.	69.8	83.0	97.8	99.0	101.7
Processing	lb.	131.3	152.3	148.2	153.4	152.8
Vegetables[4]	lb.	335.6	339.0	394.2	402.0	398.3
Fresh	lb.	148.2	148.6	168.7	172.0	170.8
Potatoes	lb.	55.5	48.4	48.2	49.9	50.2
Processing	lb.	187.4	190.4	225.5	230.0	227.5
Tomatoes for canning	lb.	63.0	62.5	75.6	76.4	75.3
Potatoes for freezing	lb.	31.7	39.7	53.0	54.5	57.8
Flour and cereals[6]	lb.	135.1	147.0	191.6	195.8	198.7
Wheat flour	lb.	111.0	117.3	139.8	143.3	144.5
Corn products	lb.	10.2	14.1	23.1	23.5	23.7
Rice	lb.	7.2	10.1	17.4	17.6	19.0
Caloric sweeteners[7]	lb.	123.7	122.4	141.6	144.4	147.6
Refined sugar	lb.	100.5	74.7	64.4	64.3	65.0
Corn sweeteners	lb.	21.7	46.4	75.8	78.7	81.3
High-fructose corn syrup (HFCS)	lb.	1.5	27.4	52.8	54.8	56.9
Candy	lb.	19.0	17.1	21.2	21.7	22.1
Carbonated soft drinks	gal.	26.2	35.4	49.0	50.2	52.2
Regular (nondiet)	gal.	23.8	29.7	37.5	38.5	40.3
Diet	gal.	2.4	5.7	11.5	11.7	11.9
Coffee	gal.	33.1	26.4	24.8	23.5	21.1
Bottled water	gal.	NA	3.1	8.8	9.4	10.5
Beer	gal.	19.5	24.3	23.1	22.6	22.5
Fruit juice	gal.	6.0	7.4	8.0	8.4	8.6
Fruit drinks and ades	gal.	NA	NA	6.0	6.0	5.7
Canned iced tea	gal.	NA	NA	.3	.4	.6

Notes: NA = Not available. [1]Boneless weight. Includes lamb, mutton, and veal. [2]Includes flavored milk and buttermilk. [3]Heavy cream, light cream, half and half, sour cream, and eggnog. [4]Farm weight. [5]Totals may not add due to rounding. [6]Includes oat, barley, and rye products. [7]Dry weight. Includes honey, molasses, refiner's syrups, and caloric sweeteners added to commercially prepared foods and beverages.

percent actually ate no meat of any kind.

When Kraft Foods asked 1,000 people which one food they would never give up, meat ranked first among responses, followed by fruits and vegetables, bread, pasta, ice cream, potatoes, pizza, milk, chocolate, and cheese.

Still, many consumers question whether their diets would be healthier without meat, particularly red meat: one-third of the adults in the NLSMB survey said their diets would be healthier if they did not eat red meat and another third were not sure.

Studies do show that vegetarians are less at risk for heart disease, diabetes, and various cancers (notably of the colon) than is the average American. They tend to have lower blood pressure and cholesterol levels, are closer to healthy body weights, and do more vigorous exercise. Reducing the intake of animal protein decreases the intake of saturated fat that is contained in animal products. Likewise, the increase in grains, legumes, and vegetables that accompanies vegetarian diets increases the content of fiber and some vitamins and minerals in the diet.

For the first time, the *1995 Federal Dietary Guidelines for Americans*—the fourth edition issued since 1980—acknowledges the health benefits of a vegetarian regimen. The new guidelines bulletin includes the following statement concerning vegetarianism:

> "Most vegetarians eat milk products and eggs, and as a group, these lacto-ovo-vegetarians enjoy excellent health. Vegetarian diets are consistent with the *Dietary Guidelines for Americans* and can meet Recommended Dietary Allowances for nutrients. You can get enough protein from a vegetarian diet as long as the variety and amounts of foods consumed are adequate. Meat, fish, and poultry are major contributors of iron, zinc, and B vitamins in most American diets, and vegetarians should pay special attention to these nutrients. Vegans eat only food of plant origin. Because animal products are the only food sources of vitamin B12, vegans must supplement their diets with a source of this vitamin. In addition, vegan diets, particularly those of children, require care to ensure adequacy of vitamin D and calcium, which most Americans obtain from milk products."

Long-Term Decline in Egg Consumption Levels Off in the 1990's

U.S. per capita consumption fell to a record low of 234 eggs in 1990 and 1991, down from an all-time high of 403 eggs in 1945. Between 1950 and 1990, per capita consumption declined about 4 eggs per year. But since 1991, consumption inched up each year, reaching 238 eggs per person in 1994 (table 2). During the 1990's, the continuing decline in shell-egg consumption has been more than offset by gains in processed-egg consumption.

Per capita consumption of processed egg products—used mainly in manufactured foods or sold to foodservice operations in liquid form—is projected to double in 1995 from 1981's total of 32 eggs. This 1995 forecast corresponds to 27 percent of total egg use, compared with only 13 percent in 1980-84. If this trend continues, a third of all eggs will be consumed in processed form by 2000.

Several factors are behind the steady growth of processed eggs products. The traditional market for processed eggs—as ingredients in foods such as pasta, cake mixes, and other baked goods—has continued to grow. And the increased safety and convenience of liquid egg products is encouraging use of pasteurized egg products in institutional food service and restaurants.

Declining wholesale and retail egg prices may have spurred egg use in recent years. The average retail price for a dozen large, Grade A eggs declined from $1.01 in 1990 to $.86 in 1994. Changing consumer attitudes toward eggs may also be responsible. New test results show eggs to contain less cholesterol than previously documented, leading the American Heart Association to increase its maximum recommended consumption from three eggs per week to four. Medical research shows a weaker link between cholesterol consumption and heart disease than had been hypothesized. Also, various research studies indicate that some consumers are indulging themselves in more traditional and flavorful foods, such as eggs, cream, butter, cheese, regular (nondiet) carbonated soft drinks, and chocolate candy.

Americans Drink Less Milk, Eat More Cheese

In 1994, Americans, on average, drank 20 percent less milk and ate more than twice as much cheese (excluding cottage types) as in the early 1970's (table 2).

Annual per capita consumption of beverage milks declined from 31 gallons in 1970-74 to 25 gallons in 1994. Consumption of soft drinks may be displacing beverage milk in the diet. Price partially explains the switch to soft drinks. The 1980-94 increase in the Consumer Price Index for fresh milk and cream (42 percent) outpaced that for carbonated soft drinks (34 percent). Big increases in eating away from home, especially at fast food places, and in consumption of salty snack foods favored soft drink consumption. A threefold increase in per capita consumption of yogurt since the early

1970's—to nearly 9 half-pint servings per person in 1994—partially offset the decline in beverage milks.

The trend in beverage milk is toward lower fat drinks. While whole milk (plain and flavored) represented 78 percent of all beverage milk consumption in 1970-74, its share dropped to 37 percent in 1994. In 1994, reduced-fat milk accounted for 50 percent of all beverage milk, and skim milk constituted 13 percent, compared with 18 percent and 5 percent, respectively, in 1970-74. In 1994, skim milk (average fat content of 0.2 percent) was the only beverage milk for which per capita consumption increased; 1-percent milk held steady, while consumption of 2-percent, buttermilk (average fat content of 1.0 percent), and whole milk (average fat content of 3.3 percent) declined.

Relative prices and advertising have influenced the shift to lower fat milks. Since 1980, the price of a half-gallon of lowfat milk has averaged a few pennies below that of whole milk. A major print advertising program that features celebrities, models, and sports stars wearing "milk mustaches" has improved the overall image of milk, especially reduced-fat and skim milks.

Preliminary research indicated that major contributing factors to a decline in milk consumption were concern about fat and a belief that lower fat milks contain fewer nutrients than whole milk. Follow-up research showed that more people now know that skim and reduced-fat milk are as high in calcium, vitamins, and nutrients (except fat) as whole milk.

While Americans are switching to lower fat milk, they are also using more fluid cream products (half-and-half, light cream, heavy cream, eggnog, sour cream, and dips). Per capita consumption of fluid cream jumped from an annual average of 10 half pints in 1970-74 to 15 half pints in 1994.

Even as coffee espresso bars and coffee houses have proliferated, per capita consumption plummeted from 27 gallons in 1991 to 21 gallons in 1994—the lowest level since 1910.

On balance, however, per capita consumption of milkfat from all fluid milk and cream products declined 36 percent between 1970 and 1994, from 9.1 pounds per person to 5.8 pounds. Of that 5.8 pounds, whole milk contributed 2.6 pounds; reduced-fat milks, 1.8 pounds; and fluid cream products, 1.3 pounds. Skim milk and yogurt each added 0.05 pound of fat to the average diet in 1994.

Average consumption of cheese—excluding full-skim American and cottage, pot, and baker's cheeses—more than doubled from 12.9 pounds per person per year in 1970-74 to 26.8 pounds in 1994. The growth is concentrated in the ingredient and away-from-home markets. Rapidly expanding pizza sales and lifestyles that emphasize convenience foods are probably major forces behind the higher consumption. Advertising and new products—such as boxed cheesy scalloped potato mixes, frozen broccoli-and-cheese combos—also had an effect.

Fruits and Vegetables—The Array of Choices Widens

As Americans increasingly embrace national health authorities' recommendation of consuming five fruits and vegetables a day, their array of choices continues to widen. Fresh-cut fruits and vegetables, prepackaged salads, locally grown items, and exotic produce—as well as hundreds of new varieties and processed products—have been introduced or expanded in the last decade.

Per capita use of fruits and vegetables rose in the early 1980's in response to higher consumer incomes, increased ethnic diversity, and burgeoning interest in healthful diets. By 1994, per capita consumption was 14 percent higher than in 1980. This trend is likely to continue expanding into the next decade as consumers heed nutritionists' message on healthful eating.

Supermarket produce departments carry over 400 produce items today, up from 250 in the late 1980's and 150 in the mid-1970's. Also, the number of ethnic, gourmet, and natural foodstores—which highlight fresh produce—continues to rise.

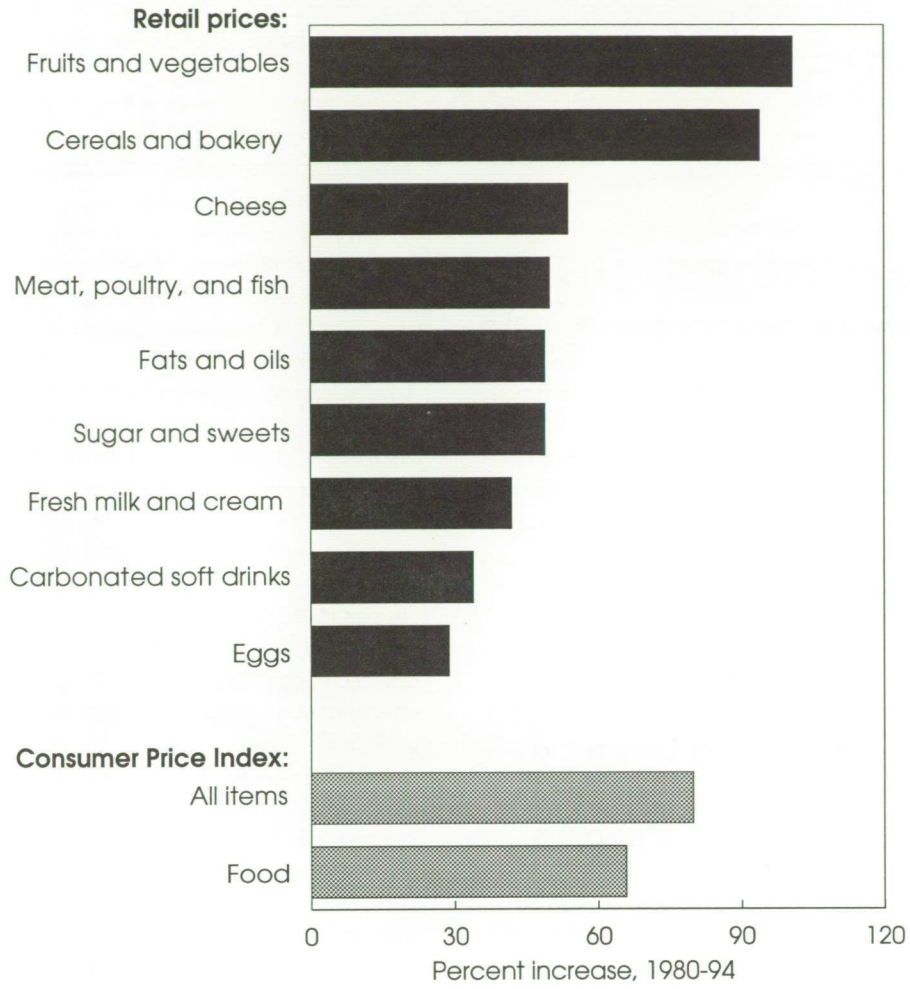
Consumers increasingly have more access to fresh, local produce as well. The number of farmers' markets has grown substantially throughout the United States over the last several decades, up from 1,755 in 1993 to around 2,116 by the end of 1995, according to USDA surveys.

While the overall market for fruits and vegetables has expanded in the last 15 years, the mix has changed. Shifts have taken place among traditional produce items and between fresh and processed forms. Traditional varieties have lost market share to specialty varieties, and exotic produce has gained favor.

Americans are eating more apples, grapes, bananas, and other noncitrus fruits, and fewer grapefruits and oranges. Americans consumed 127 pounds of fresh fruits in 1994, up more than 12 percent from 1980-84 and up 24 percent from 1970-74 (table 2).

Freeze-injured supplies of grapefruit in 1990 and oranges in 1991 raised prices so much that, even after adjusting for inflation, consumer prices were higher than in the

Figure 3
Fruits and Vegetables Have Led Retail Food-Price Increases



early 1980's. On the other hand, improved technology and expanded storage facilities make high-quality U.S.-produced fresh apples and pears available year-round. Imports popularized new varieties—such as Granny Smith apples—and augmented winter supplies, which had been dominated by citrus fruits.

While prices of citrus fruits climbed during the 1980's, prices of many noncitrus fruits dropped. Inflation-adjusted retail prices of Red Delicious apples were 24 percent lower in 1990-94 than in 1980-84. Banana prices dropped 10 percent. Prices for d'Anjou pears and Thompson seedless grapes also fell.

Gains in U.S. production were largely responsible for lower apple and pear prices. Increased production in other countries encouraged U.S. imports and lowered banana and grape prices. Bananas—nearly 28 pounds per person are consumed annually in the United States—continue to be the most popular fresh fruit, and nearly all of the U.S. banana supply is imported.

Exotic or specialty produce—kiwis, mangoes, carambola, jicama, broccoflower, and other new or unusual items—mostly remain in a small but rapidly expanding niche market. Some minor fruits that jumped to record-high consumption in 1994 were kiwifruit, up 439 percent since 1980-84 to more than half a pound per person, and mangoes, up 205 percent to 1 pound.

Americans consumed, on average, about 20 percent more fruit or fruit juice in 1994 than in 1977-78, according to USDA nationwide food consumption surveys. However, nearly half in 1994 ate no fruit on a given day; dietary guidelines recommend 2 to 4 servings of fruits a day. Consumption of vegetables increased slightly between 1977-78 and 1994. However, Americans still eat lower than recommended levels of nutrient-packed dark-green and deep-yellow vegetables.

Salads are becoming more popular. Consumption of fresh salad vegetables rose between 1980 and 1994: bell peppers up 130 percent; garlic, 126 percent; broccoli, 101 percent; mushrooms, 64 percent; spinach, 46 percent; cucumbers, 37 percent; carrots, 29 percent; cauliflower, 23 percent; and tomatoes, 22 percent. Specialty lettuce varieties—red and green leaf, romaine, and others—are eroding the market share of iceberg lettuce.

Consumption of frozen french fries has soared, and now surpasses fresh potatoes. A staple commodity in the United States, potatoes account for about one-third of total per capita vegetable use. The popularity of fast-food restaurants lies behind most of the shift toward frozen potato use. In 1994, foodservice outlets sold about 89 percent of the supply of frozen french fries.

Average Grain Consumption Up From 1970's, But Far Below Early 1900's Highs

Per capita use of flour and cereal products reached 199 pounds in 1994 from an annual average of 147 pounds in 1980-84 and 135 pounds in 1970-74. The increase, however, is far below the 291 pounds consumed

per person per year in 1909-13 (the earliest years for which data are available. The expansion in supplies reflects ample grain stocks, strong consumer demand for variety breads and other instore bakery items, and increasing sales of fast-food products made with buns, doughs, and tortillas.

Wheat is the major grain product eaten in the United States, with wheat flour and other wheat products representing 73 percent of U.S. grain consumption in 1994. However, wheat's share of total grain consumption declined 8 percentage points since 1980, as rice, corn products, and oat products gained momentum.

USDA nationwide food consumption surveys also indicate that Americans are eating more grain products. Consumption of grain mixtures—such as lasagna and pizza—increased 115 percent between 1977-78 and 1994. Consumption of snack foods—such as crackers, popcorn, pretzels, and corn chips—have soared 200 percent, and ready-to-eat cereals were up 60 percent. One of the biggest changes within the grain mixture group was the explosion in consumption of ethnic foods, especially Mexican foods. Mexican foods were consumed four times more often in 1994 than in the late 1970's.

Still, Americans, on average, are eating a serving or less a day of whole grain foods, far below the minimum three per day recommended by the American Dietetic Association (half of the recommended 6 to 11 servings a day should be whole grain). Many Americans do not know how to identify and prepare whole grains, aside from the familiar whole-grain breads, brown rice as a side dish, or rolled oats as a breakfast cereal. Other whole grains, such as cracked wheat and barley, are too often overlooked as potential main or side dishes. Others, such as kasha or bulgur, may sound mysterious. And many special grains, such as amaranth, millet, and quinoa, are found only in health food stores. Yet whole grains are high in complex carbohydrates, low in fat, and rich in some B vitamins. Many are fairly good sources of calcium and iron. The average cup of cooked whole grains (equal to 2 servings) contains only about 200 calories.

Annual per capita consumption of regular (nondiet) carbonated soft drinks jumped 43 percent between 1986 and 1994, to 40.3 gallons (equivalent to 645 8-ounce servings) per person.

We're Cutting Down on Fat, But Eating Record-High Amount of Sugars

USDA food consumption surveys indicate that Americans got 33 percent of their calories from fat in 1994, down from 40 percent in 1977-78, but still above the recommended limit of 30 percent. Still, about one in three adults in 1994 were overweight based on self-reported height and weight, compared with one in five in the late 1970's. Survey data from the National Center for Health Statistics show a similar pattern.

Why then, if the percentage of fat in the diet is decreasing, is obesity increasing? Experts believe that a number of factors contribute to the increase in body weight, including a sedentary lifestyle, an accessible abundance of food, and an excess calorie intake. Thirty percent of the men and 45 percent of the women in USDA's 1994 survey reported that they rarely or never exercised (the new Dietary Guidelines advise doing 30 minutes of moderate physical activity on most—preferably all—days of the week). And, people ate more calories—an average 1,949 calories a day in 1994, up 6 percent from 1977-78.

Even when people eat less high-fat food, they still can gain weight from eating too much of foods high in starch, sugars, or protein. Upsizing of food portions is increasingly common in restaurants, grocery stores, and homes. For example, a giant bagel, a 5-ounce muffin, or a two-cup serving of plain pasta each provide many more calories than an "average" serving from the bread group. Reducing calorie intake requires eating less fat and controlling portion sizes. The pattern of eating may also be important. Snacks provide a large percentage of daily calories for many Americans.

The *Dietary Guidelines for Americans* caution about eating sugars in large amounts and about frequent snacks of foods and beverages containing sugars that supply unnecessary calories and few nutrients. To maintain body weight when cutting fat intake, nutritionists recommend replacing the lost calories from fat with equal calories from fruits, vegetables, and grain products, especially whole grains. For very active people with high caloric needs, sugars can be an additional source of energy. However, because maintaining a nutritious diet and a healthy weight is very important, the guidelines caution that sugars should be used in moderation by most healthy people and sparingly by people with low calorie needs.

In 1994, each American consumed, on average, a record 148 pounds worth of caloric sweeteners. Per capita consumption of caloric sweeteners (dry-weight basis)—mainly sucrose (table sugar made from cane and beets) and corn sweeteners (notably high-fructose corn syrup, or HFCS)—increased 25 pounds, or 21 percent between 1980-84 and 1994 (table 2).

A striking change in the availability of specific types of sugar occurred in the past two decades. Sucrose's share of total caloric sweetener use dropped from 81 percent in 1970-74 to 44 percent in 1994, while corn sweeteners increased from 18 percent to 55 percent. All other caloric sweeteners—including honey, maple syrup, and molasses—combined to maintain a 1-percent share.

Refined and processed sugars added to foods and beverages contributed 75 percent of the total sugars available in the 1990 food supply (the latest year for which nutrient availability data are available); fruit, 12 percent; dairy products, 10 percent; and vegetables, 3 percent. Carbonated soft drinks contributed 21 percent of the refined and processed sugars in the American diet in 1990.

Per capita consumption of regular (nondiet) carbonated soft drinks jumped 13 percent between 1990 and 1994, to 40 gallons (equivalent to 645 8-ounce servings) per person. That compares with 30 gallons (equivalent to 478 8-ounce servings) in 1980 and 22 gallons (equivalent to 355 8-ounce servings) in 1970. This increase is due in part to packaging and selling practices of soft drinks. For example, the familiar 6-1/2-ounce contoured bottle of Coca-Cola (introduced in 1916) used to be the pause that refreshed. In 1980, 7-Eleven introduced the 32-ounce Big Gulp. In 1992, that chain gave us the 64-ounce Double Gulp. That's almost 10 times bigger than the original Coke. In the latest trend of 1995, the typical 16-ounce soft drink bottle gave way to the 20-ounce bottle in eating places and in grocery store six-packs.

In 1994, Americans drank the equivalent of nearly 11 teaspoons of sugar and 170 calories per person per day in carbonated soft drinks, and still more in fruit drinks and ades, sweetened iced teas, and other sugared beverages. (HFCS—more than 70 percent of which is used in beverages—has replaced sucrose as the main soft drink sweetener. Sugared colas contain the equivalent of 9 teaspoons of sugar, or 145 calories per 12-ounce serving.)

Daily U.S. consumption of caloric sweeteners amounted to the equivalent of two-fifths pound—or 45 teaspoons—of sugar per person per day in 1994. Although the Dietary Guidelines do not include any quantitative recommendation for sugar, USDA's *Food Guide* provides examples of upper limits of added sugars. It suggests that people on a 1,600-calorie diet limit their intake of added sugars to 6 teaspoons per day. The daily suggested limit increases to 12 teaspoons for those consuming 2,200 calories, and 18 teaspoons for those consuming 2,800 calories.

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1994 Spending for Food Away From Home Outpaces Food at Home

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Food spending in the United States rose to $647 billion in 1994, a 5.3-percent increase over 1993 (table 1). Expenditures for eating out (food away from home) led the way, rising 6.1 percent to $303.2 billion. Retail food expenditures (food at home) rose 4.6 percent to $343.7 billion. Adjusted for inflation, however, total food spending rose 2.6 percent in 1994—up 1.0 percent for food at home and up 4.3 percent for food away from home.

Personal food spending increased less than that for most other major categories of personal consumption since the 1990-91 recession, as is typical. Personal food spending differs from total food spending because it excludes expenditures by governments and businesses. Personal expenditures for all food rose 5.7 percent in 1994, while spending on transportation, cars, and gasoline went up 6.7 percent, and medical care and drugs increased 6.6 percent (table 2). Of the 5.7-percent increase for all personal food expenditures in 1994, there was a 7.4-percent growth in away-from-home food expenses compared with only a 4.7-percent increase in expenditures for food at home.

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In 1994, only 11.4 percent of disposable personal income of households was spent on food—6.8 percent went to food at home and 4.5 percent to food away from home. That compares with 12.4 percent of disposable personal income going to food in 1984. About 25 percent of disposable personal income in 1994 was spent on housing (including supplies, fuel, and furniture), 16 percent on medical care and drugs, 11 percent on transportation (including cars and gasoline), and only 4 percent was allocated to savings.

Once adjusted for inflation and population growth, total food spending per person fell 0.9 percent in 1994 (fig. 1). But the trend toward eating out more continues, with a 3.2-percent increase partially offsetting a 4.3-percent decrease in food at home to soften the decline in per capita real food spending.

Spending on Food Prepared Outside the Home Considerably Higher

One of the ways by which people economized during the 1990-91 recession was cutting down on eating out or going to less expensive places. The share of total food dollars spent away from home declined from 1988 to 1991, reflecting the economic slowdown and the subsequent recession. By 1994, however, spending for food away from home increased more than for food at home and the share reached new highs, 47.0 percent of food dollars and 36.7 percent of food quantities, continuing the spending recovery begun in 1992.

Vigorous competition among fast-food chains drove down prices in 1990 and 1991, and, as a result, fast-food sales declined from 34.0 percent of dollar sales of food away from home in 1989 to 33.6 percent in

Updated Data Available Soon

The first estimates for 1995 food expenditures will be available from USDA's Economic Research Service through the AutoFAX system in May 1996. These estimates will also include 1993 and 1994 revisions.

To receive by AutoFAX, dial by telephone connected to a FAX machine (202) 219-1107, respond to the voice prompts, and order document # 11530 (lists all the available data tables, which can then be requested).

When responding to the voice prompts, please note: when asked for a yes or no response, press 1 for yes and 2 for no; you may interrupt the main menu choices to order the document by pressing 4—the system will then prompt you for the document number.

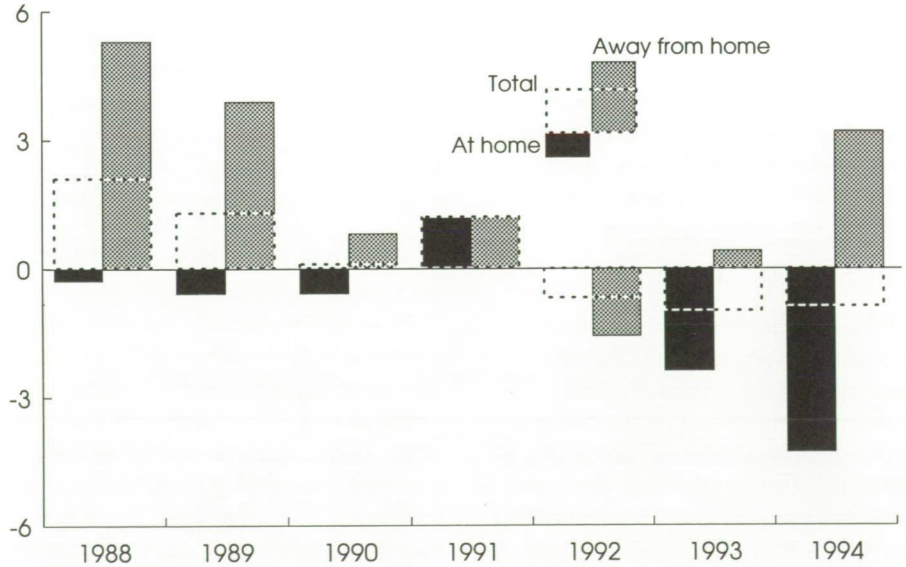
Table 1
Food Spending Rose 5.3 Percent in 1994

Expenditures	1992	1993	1994	Change, 1993-94
	———Billion dollars———			Percent
Total food and beverages[1]	674.1	696.9	732.4	5.1
Total food (excluding alcohol)	592.5	614.6	646.9	5.3
At-home food	323.2	328.8	343.7	4.6
Sales	316.0	321.6	336.5	4.6
Home production and donation	7.2	7.2	7.2	0.0
Away-from-home meals	269.3	285.9	303.2	6.1
Sales	239.0	254.1	270.0	6.3
Supplied and donated[2]	30.4	31.8	33.2	4.4
Alcoholic beverages	81.6	82.3	85.5	3.9
Packaged	46.5	46.3	47.6	2.8
Drinks	35.0	36.1	37.9	5.0

Notes: Data may not total due to rounding. [1]These expenditures include all food and alcoholic beverages, regardless of who paid for them. [2]Includes Government subsidies for school-lunch programs.

Figure 1
Higher Spending on Food Away From Home Softened the Decline in Per Capita Real Food Spending[1]

Food spending, percent change from previous year



Note: [1]Food expenditures at 1988 prices.

1991. However, the share started upward in 1992 and rebounded to 35.5 percent in 1994, as people continued to eat out more, but kept a wary eye on prices.

Restaurants did not lower prices as much as fast-food places did during the recession. Their share of sales of food away from home fell from 38.7 percent in 1991 to 37.6 percent in 1992 and 1993, and 37.5 percent in 1994. The trend seems to be reversing, as preliminary 1995 data indicate that full-service restaurant sales increased 8.5 percent from January through August, exceeding the 4-percent increase for fast-food sales.

Away-from-home purchases rose faster than at-home purchases in 1994, reflecting higher prices of away-from-home meals and snacks due to the added costs of preparing, cooking, and serving. In addition, more meals were eaten out in 1994. Restaurant and other foodservice prices do not change in conjunction with those in grocery stores. Adjusting for these different price levels, the quantity of food eaten away from home rose from 33.8 percent of total food in 1991 to 36.7 percent in 1994.

Higher Incomes, Less Time Drive Demand

More two-income households and higher employment levels have increased household incomes and reduced the amount of time available to prepare food at home. According to the U.S. Retail Trade Census data, sales from restaurants, fast-food places, cafeterias, and other eating places increased 32.3 percent from 1987 to 1992 (the most recent census year), while the number of these eating establishments increased only 14 percent. Monthly U.S. retail trade data for the first half of 1995 indicate that sales from eating places have increased more than 9 percent over the first half of 1994.

Table 2
Rise in Personal Food Expenditures Slightly Lower Than Disposable Personal Income[1]

Component	1992	1993	1994	Change, 1993-94
	——————Billion dollars——————			Percent
Disposable personal income	4,505.8	4,688.7	4,959.6	5.8
Total personal consumption expenditures	4,136.9	4,378.2	4,628.5	5.7
Food	514.0	534.2	564.8	5.7
At home	318.3	324.0	339.1	4.7
Away from home	195.7	210.2	225.7	7.4
Alcoholic beverages	69.2	69.4	71.9	3.6
At home	46.5	46.3	47.6	2.8
Away from home	22.7	23.1	24.3	5.2
Nonfood	3,553.7	3,774.6	3,991.8	5.8
Housing, household operation, supplies, fuel, furniture	1,124.1	1,189.5	1,253.2	5.4
Transportation, cars, gasoline	466.3	504.2	538.0	6.7
Medical care, drugs	694.6	749.5	799.1	6.6
Clothing, shoes, toiletries, personal care, jewelry	311.6	323.3	338.6	4.7
Recreation, tobacco, toys, sporting goods, pet food	264.2	275.8	289.3	4.9
Personal business	354.0	373.3	390.5	4.6
Other	96.0	166.4	180.0	8.2
Savings	242.9	192.6	203.1	5.5

Notes: Data may not add due to rounding. Food expenditures in this table are only those paid for by consumers with cash or food stamps. [1]As of July 26, 1995. Sources: Food and alcoholic beverage data are from USDA's Economic Research Service. All other data are from the Bureau of Economic Analysis, U.S. Department of Commerce.

Eating establishments have emphasized the convenience they provide—especially delivery, drive-thru, and takeout—in order to capture an increasing share of food expenditures. In 1992, the last census year, restaurant takeout and delivery food sales were 10.2 percent of total restaurant sales, while fast-food takeout and delivery sales were an unprecedented 50.5 percent of total fast-food sales.

Takeout sales have become an important growth area for some fast-food restaurants that originally emphasized dine-in eating. For example, in 1994, Pizza Hut delivery sales (which started only about 10 years ago) accounted for almost half of its pizza sales, carryout accounted for 26 percent, and dine-in only 27 percent. Most Kentucky Fried Chicken meals are also consumed away from the restaurant, with dine-in accounting for only 13 percent of total sales. Taco Bell's 1994 sales were about evenly split between dine-in and drive-thru/takeout.

Heavy Competition Among Retailers

Where consumers buy their groceries has changed dramatically over the last decade and a half. Supermarkets' share peaked in the mid-1980's at almost 65 percent of the sales of food at home, dropping to 61 percent in 1994. The remaining purchases of food for use at home occurred in other smaller grocery stores, specialty foodstores, and a wide variety of other outlets.

More competitors strongly emphasizing low prices have come on the scene in recent years. The new competitors—notably warehouse clubs, mass merchandisers, and deep-discount drugstores—increased their combined retail sales of food to consumers from 1.7 percent in 1982 to 4.5 percent in 1992 and 5.6 percent in 1994.

Warehouse clubs (formerly called wholesale clubs) are hybrids of membership wholesale outlets and retail stores. They carry a wide assortment of general merchandise, groceries in large packs, and perishables (such as meat and some produce). More than 40 percent of their food sales go to operators of small restaurants, institutions, and noncommercial groups (such as churches and clubs). The remaining

60 percent are sales to consumers. Their share of retail food sales to consumers for at-home use increased from almost nothing in 1982 to 1.4 percent in 1994.

Growth of warehouse clubs seems to be slowing as they approach market saturation in many areas. K-Mart, one of the major warehouse club operators, sold its Pace clubs to Wal-Mart, which renamed them Sam's clubs. Price Club and Costco, the other major operators, merged in 1993, as the club boom tapered off. Wal-Mart is turning the emphasis of its Sam's clubs back to supplying small restaurants, lunchrooms, and institutions.

Some mass merchandisers, also called discount department stores, have included an entire supermarket in their stores since the early 1960's, when a number of supermarket chains built their own discount department stores. Many such chains left the discount business in the 1970's as the field became crowded. To serve their consumers more effectively, Wal-Mart and K-Mart (the leading mass merchandisers) have recently opened very large supercenters that include a large supermarket section. Mass merchandisers' share of at-home food sales to consumers rose from 1.1 percent in 1982 to 2.5 percent in 1992 and 3.1 percent in 1994.

The most recent entrant has been deep-discount drugstores, which sell dry groceries (no perishables) at discount prices. The share of food-at-home sales to consumers accounted for by deep-discount drugstores increased from nothing in 1982 to 0.6 percent in 1994.

These newcomers in the marketplace are putting competitive pressure on operators of all kinds of supermarkets. Many supermarkets are fighting back by featuring bulk sales and large club packs at competitive prices. ■

Americans Spending a Smaller Share of Income on Food

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The percentage of income that Americans spend on food continues to drop. In 1992, Americans spent just 11.7 percent of their income on food, down from 14.2 percent in 1980. The decline mainly reflects incomes rising faster than food prices. Between 1980 and 1992, overall food prices rose 59 percent. During that time, per person income rose 94 percent (from $6,916 to $13,398).

The dollar amount of food spending nonetheless continues to rise, but at the same rate (59 percent) as food prices. (Therefore, the numbers indicate that Americans bought about the same amount of food in 1992 as in 1980.) Between 1980 and 1992, annual spending for retail food (food consumed at home) rose 55 percent (from $667 per person to $1,031) and nearly 69 percent (from $318 per person to $536) for foodservice (food away from home) (table 1). Likewise, prices for food away from home rose more than for food at home, 69 percent compared with 55 percent.

However, these national averages mask some underlying differences that occur among households of different types and sizes. For example, rural Americans spent about the same as their urban counterparts on food at home but somewhat less on food away from home.

These findings are gleaned from a continuing survey of households conducted by the Bureau of Labor Statistics. The detailed statistics presented in this article are based on the urban portion of this sample, a group which has been surveyed continuously since the survey was initiated in 1980 and which represents about 87 percent of the noninstitutionalized population. (The rural population was not sampled during some of the early years of the survey.)

Larger Households Spend Less Per Person

The most important determinant of household food spending is the number of household members. Larger households tend to spend more in total dollars but less per person (table 2). In 1992, one-person households spent more than twice as much per person on food ($2,146 per person) than did households composed of six or more people ($878). Larger households tend to spend less per person because they purchase more economical packages, have younger children who tend to eat less, and spend more on groceries than on food away from home. One-person households spent a much larger share of their food budget on food consumed away from home: 42 percent compared with 20 percent for larger households.

Household size also affects the mix of food spending. For example, larger households tend to be more frugal and spend a larger share of their at-home food dollar on basic ingredients and lower cost items, such as cereal products, fluid milk, and ground beef, and a smaller share on bakery products and fresh and frozen seafood. The larger households also tend to have more young children and teenagers, which also affects the mix of foods and helps to explain why larger households spend a much smaller share on fruits and vegetables and adult beverages (such as coffee).

Composition of households is another important factor. Married couples without children spent about the same amount per person as did one-person households. Single mothers with children spent about half as much per person as one-person households. Married couples with children spent more per person as their children got older, but their expenditures still tended to be lower than those for married couples without children.

Wealthier Households Spend More

Food spending increases with household income for both food at home and food away from home, as

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wealthier households buy higher quality food items and more convenience foods. In 1992, households in the poorest 20 percent of the Nation's income distribution (household income averaging $6,669) spent $1,249 per person on food, compared with $1,997 for the wealthiest 20 percent (household income averaging $77,311).

As expected, wealthier households tended to spend more money and a larger share of their food budget on food away from home. The poorest group spent 24 percent of their food budget on food away from home, while the wealthiest group spent 40 percent. Spending on food away from home showed little change for all income groups between 1988 and 1992, increasing only 12 percent for the highest income group, 5 percent for the lowest income group, and declining slightly (2 percent) for the middle group.

Spending on food at home rose about 30 percent in all income groups between 1988 and 1992. However, each group allocated its money differently (fig. 1). Households with the highest incomes increased their spending on fish and seafood by about 47 percent in 1988-92, while these purchases by the lowest income group increased only 13 percent, widening the already marked gap in spending for this food group. In 1992, the highest income group bought $48 worth of fish and seafood per person, while the lowest income group spent $26 per person.

Fruit and vegetable expenditures increased between 21 and 28 percent for all income groups between 1988 and 1992. Those with the highest incomes increased their spending on fresh vegetables by twice as much as did the lowest income group, up 34 percent to $64 per person in 1992 for the highest income group, versus a 17-percent increase for the lowest income group to $50 per person. Conversely, the lowest income group increased its spending on processed vegetables by 43 percent, compared with a 38-percent increase by the highest income group.

The lowest income group increased its spending on sugar and sweets at a faster rate between 1988 and 1992 than did the highest income group (45 percent versus 31

Table 1
Households Spending a Smaller Share of Income on Food

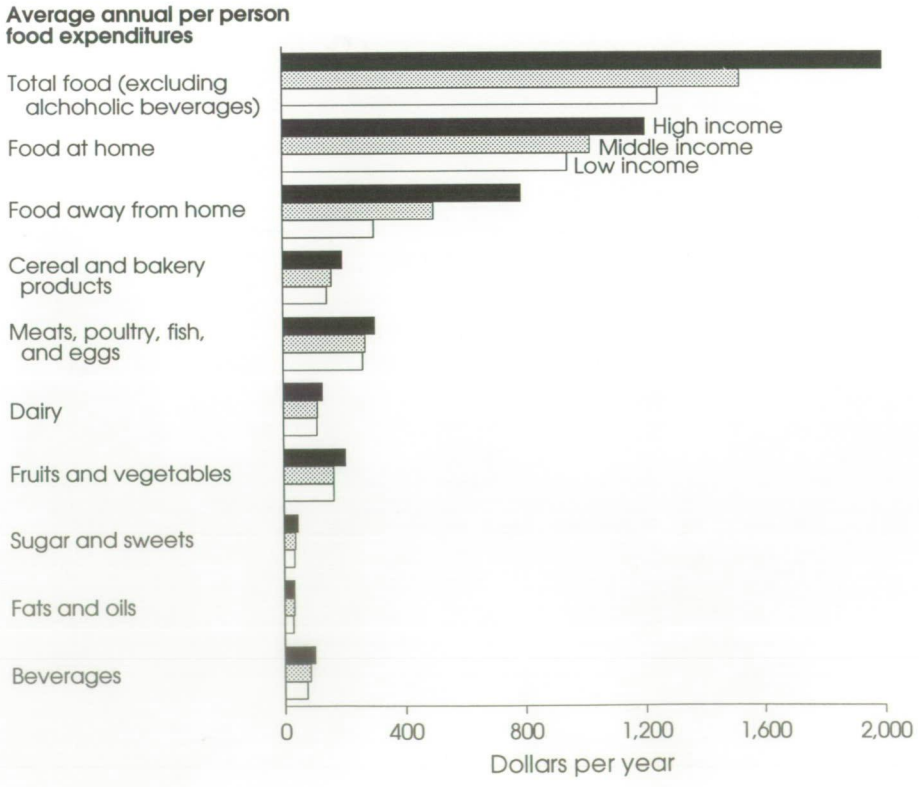
Household characteristic	Unit	1980	1984	1988	1992
Annual income before taxes	*Dollars*	17,843	23,547	28,929	33,764
Portion of income spent on food	*Percent*	14	13	12	12
Members per household	*Number*	2.6	2.6	2.6	2.5
Food spending per person:	*Dollars*	985	1,173	1,335	1,567
Food at home	"	667	755	824	1,031
Cereal and bakery products	"	84	102	121	163
Meats, poultry, fish, and eggs	"	231	228	217	274
Meats	"	168	155	147	182
Beef	"	90	79	72	84
Pork	"	48	45	42	60
Other meats	"	31	31	33	37
Poultry	"	30	33	34	50
Fish and seafood	"	20	27	26	31
Eggs	"	13	14	11	11
Dairy	"	84	94	103	115
Fruits and vegetables	"	101	125	147	172
Fresh fruits	"	30	37	47	51
Fresh vegetables	"	29	37	44	52
Processed fruits	"	23	28	34	40
Processed vegetables	"	19	22	22	29
Sugar and sweets	"	25	29	30	40
Fats and oils	"	22	25	24	32
Beverages	"	61	69	77	84
Miscellaneous foods	"	58	85	104	152
Food away from home	"	318	418	511	536

Note: Data may not add due to rounding.

Table 2
Larger Households, Those Headed by Single Mothers, and Black Households Spent the Least per Person on Food

Demographic category	1980	1984	1988	1992
		Dollars per person		
All urban households	985	1,173	1,335	1,567
Household size				
One member	1,268	1,579	1,910	2,146
Two members	1,195	1,375	1,643	1,964
Three members	952	1,206	1,325	1,579
Four members	891	1,073	1,168	1,382
Five members	828	944	1,000	1,134
Six or more members	726	801	823	878
Single female parents with children	647	831	918	1,091
Income quintiles				
Lowest	857	861	1,014	1,249
Middle	943	1,171	1,310	1,524
Highest	1,171	1,536	1,638	1,997
Race				
White	1,031	1,235	1,406	1,633
Black	691	771	930	1,150
Other	919	1,111	1,150	1,527

Figure 1
Food Spending Increases With Household Income



Note: 1992 data.

percent), but the total spending level for this group remained substantially below that of the highest income group in 1992 ($46 per person versus $35).

Spending Disparities Among Races

Blacks and whites both spend an average of 12 percent of their income on food. However, blacks tend to spend less per person on food, due partly to their lower average incomes and larger household sizes.

Average annual food spending in white households was $1,633 per person in 1992, about 30 percent higher than the $1,150 spent by black households. Food spending for other races (such as Asians, Native Americans, and Pacific Islanders) was below that of whites but above that of blacks. Other races spent about $1,527 per person on food in 1992, about 10 percent of their income.

Average household income was highest for other races ($46,504) and lowest for blacks ($25,461). Although other races had larger households (3.0 members on average, compared with 2.7 for blacks and 2.5 for whites), they tended to have more earners per household (1.6 earners) than did whites (1.4 earners) or blacks (1.3 earners).

Food spending by blacks increased at a faster rate (24 percent, compared with 6 percent for whites) between 1988 and 1992, helping to close the gap in spending levels (fig. 2). Spending on pork and poultry items increased by more than 44 percent for both racial groups. In contrast, expenditures for beef increased 17 percent by whites and 21 percent by blacks. Spending on fruits and vegetables increased by about the same percentage for both groups, but blacks focused their increased purchases on fresh fruits and processed vegetables, whereas whites tended to buy more processed fruits and fresh vegetables.

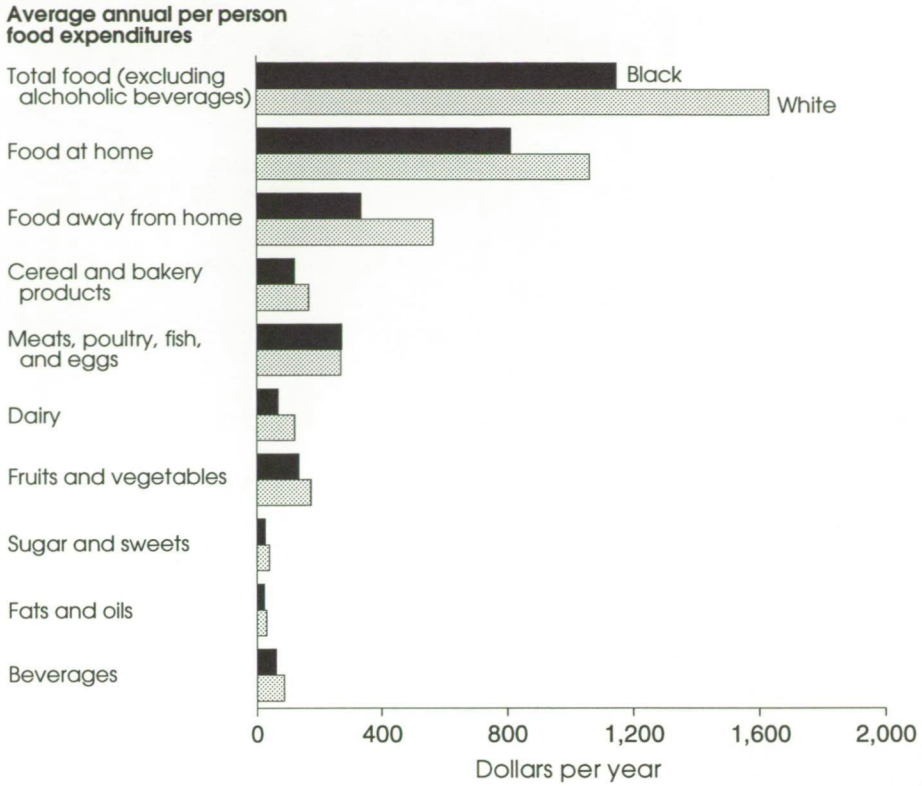
Urbanites Spend More

Geographic location of households was also a factor in food spending. Food spending varied with geographic location of residence and with city size. Households in urban areas tended to spend more on food than did those in rural areas, likely due to their higher incomes and more convenient access to food away from home which is more costly than food prepared at home.

In 1992, urban households spent an average of $1,567 per person per year on food—$1,031 on food at home and $536 on food away from home. Rural households spent an annual average of only $1,453 per person for food, of which $1,036 was for food at home and $428 was for food away from home. Rural households spent a smaller share of their food budget on food away from home than did urban households, 29 percent compared with 34 percent.

Since 1988, rural consumers increased their food spending at a slightly faster pace than did urban consumers for both at home and away from home. Spending for food away from home rose about three times as much for rural consumers than urban consumers between 1988 and 1992 (16 percent versus 5 percent), but the rate was substantially less than that for food at home (up 25 percent for urban consumers and 27 percent for rural consumers).

Figure 2
Black Households Spend Less per Person on Food Than White Households



Note: 1992 data.

Of all the food items, spending on poultry increased the most, up about 59 percent for rural consumers and 47 percent for urban consumers. However, the higher expenditures by rural consumers did not catch up to the level that urban consumers spent on poultry in 1992 ($43 per person versus $50).

Spending for fruits and vegetables tended to increase at about the same rate for urban and rural consumers, about 16 percent each. However, rural consumers tended to increase their spending on processed products, while urban consumers spent their money on fresh products. ■

Food Marketing Costs Increased in 1994

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The 1994 economy yielded the largest aggregate employment growth of the last decade. Higher wages and salaries produced the strongest growth in per capita personal income since 1988—up 2.5 percent in real dollars (adjusted for inflation)—which spurred higher consumer expenditures for food.

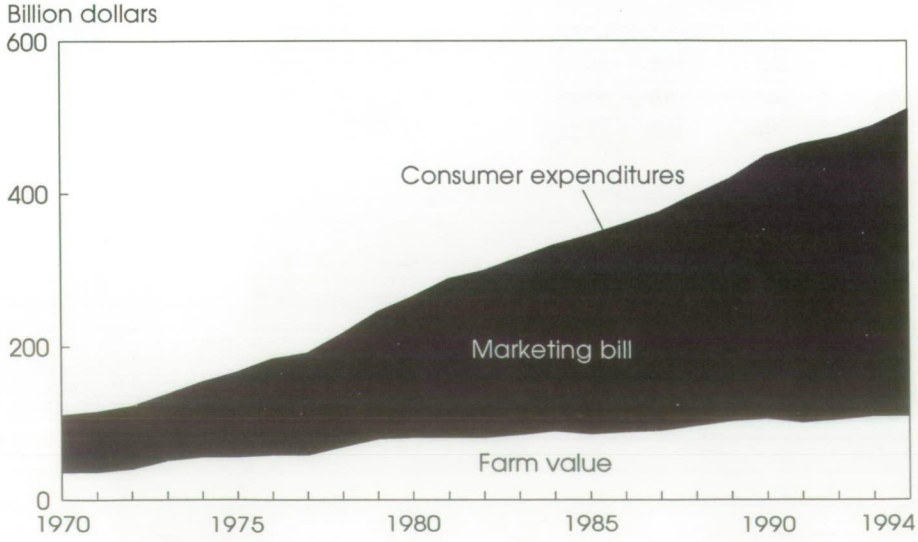
Sales of food purchased in grocery stores rose 0.4 percent in real dollars in 1994—a small increase, but a reversal of the 0.2-percent drop the previous year. Personal income growth was more strongly manifested at eating places, where real spending grew 5.2 percent. The growth in food spending translated into higher demand for the marketing and processing services that are required to bring food from the farmer to the consumer.

Nearly four-fifths of the $510.6 billion U.S. consumers spent for farm foods (excludes seafood and imports) in 1994 went to pay for marketing costs. The remaining 21 percent represented the farmers' share of food expenditures. Nominal consumer expenditures for farm foods have risen 54 percent since 1984. The marketing bill rose 66 percent over the past decade, while the farm value increased only 22 percent (fig. 1).

Food marketing costs are measured by the marketing bill, which represents the difference between the farm value of food produced on U.S. farms and the final cost to consumers at grocery stores and eating places. Such costs include labor, packaging, transportation, and energy, as well as other marketing services, such as advertising and promotion.

The cost of providing marketing services beyond the farm gate increased moderately in 1994, and continues to be the most persistent source of rising food expenditures. The marketing bill for domestic farm foods rose 5.6 percent in 1994 to $401 billion. Higher labor costs accounted for most of the rise. Costs of other inputs, such as energy and transportation, rose modestly, while packaging and profits posted strong increases. The 1994 rise in the marketing bill was larger than both the 2.8-percent increase in 1993 and the 5.2-percent average annual gain of the last 10 years.

Figure 1
Over Three-Quarters of 1994 Food Expenditures Went To Pay Marketing Costs



Note: Data are for foods of U.S. farm origin purchased by or for consumers for consumption both at home and away from home.

The author is an agricultural economist with the Food and Consumer Economics Division, Economic Research Service, USDA.

Higher Labor Costs Fueled the Marketing Bill's Rise

Labor overshadows all other cost components of the marketing bill. Rising labor costs are responsible for half the increase in the marketing bill during the last 10 years, and are the primary factor underlying the 1994 increase.

Direct labor costs came to about $188.9 billion in 1994, or 37 percent of food expenditures (fig. 2). Direct labor costs include wages and salaries; employee benefits, such as health insurance; estimated earnings of proprietors and family workers; and tips. These costs do not include labor accounted for by other cost components, such as for-hire transportation of food or labor employed in the manufacturing and distribution of packaging supplies.

With higher wages and benefits, labor costs in the food industry rose about 6.1 percent in 1994, a higher gain than 1993's 5.7-percent rise. Hourly earnings increased 2.1 percent in food manufacturing, compared with a 2.6-percent hike in 1993. Average hourly earnings of foodstore workers rose 1.8 percent, a smaller increase than 1993's 2.9-percent rise. These smaller increases reflect wage-restraining provisions negotiated in labor contracts. On the other hand, wages for workers in eating and drinking places rose 2.2 percent, double the gain in 1993. Higher wages for foodservice workers reflect increased demand for labor in restaurants, which needed to pay higher salaries in order to attract and retain workers.

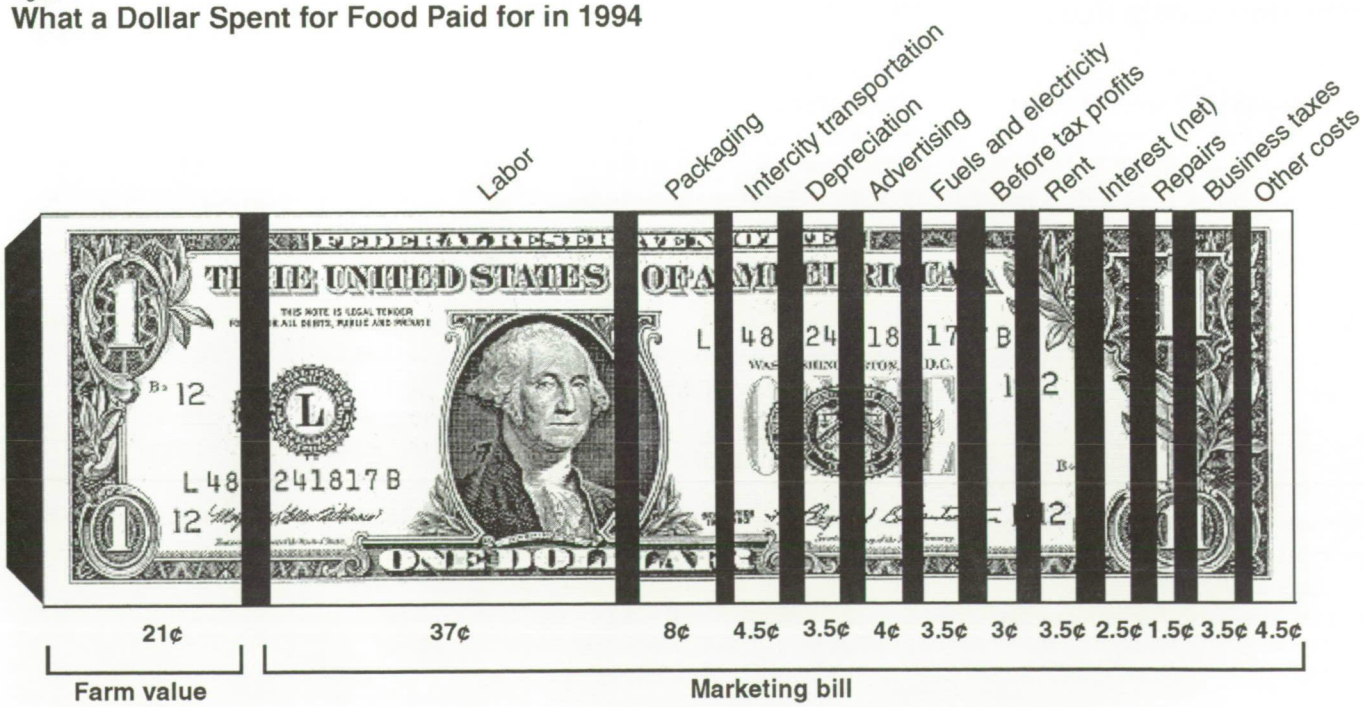
In 1994, food industry employment increased 2.3 percent to 12.8 million people, a slightly smaller gain than in 1993. About 25 percent worked for foodstores, 13 percent for food manufacturing firms, and 7 percent for food wholesalers. More than half, 7.1 million people, were employed by eating places.

Employment in eating and drinking places shot up 3.6 percent in 1994, the largest employment increase in the food industry. In fact, this sector experienced the second-largest rise in employment of any U.S. industry in 1994, behind only employment agencies and other hiring services. The labor-intensive nature of foodservice has meant strong employment growth in order to meet the demand for convenience food and restaurant meals.

By contrast, food retailing employment rose about 1.1 percent in 1994, reflecting relatively flat retail sales and managerial efforts to restrain cost increases. Food manufacturing employment fell 0.5 percent, as higher labor productivity and increased use of technology alleviated the need for additional hirings.

The cost of benefits increased 7.0 percent, because of higher pensions and escalating health-insurance premiums due to rising medical costs. However, the 5.2-percent increase in the Consumer Price Index for medical services in 1994 was smaller than both the 6.5-percent increase

Figure 2
What a Dollar Spent for Food Paid for in 1994



Notes: Includes food eaten at home and away from home. Other costs include insurance, accounting and professional services, promotion, bad debts, and many miscellaneous items.

Table 1
Labor Makes Up the Largest Share of Food Marketing Costs

Component	1980	1985	1990	1993	1994
	Billion dollars				
Labor[1]	81.5	115.6	154.0	178.0	188.7
Packaging materials	21.0	26.9	36.5	39.4	42.1
Rail and truck transportation[2]	13.0	16.5	19.8	21.2	21.8
Fuels and electricity	9.0	13.1	15.2	17.2	17.9
Pretax corporate profits	9.9	10.4	13.2	14.2	16.0
Advertising	7.3	12.5	17.1	18.3	18.9
Depreciation	7.8	15.4	16.3	16.8	17.4
Net interest	3.4	6.1	13.5	13.1	13.5
Net rent	6.8	9.3	13.9	17.0	17.8
Repairs	3.6	4.8	6.2	6.8	7.1
Business taxes	8.3	11.7	15.7	17.6	18.3
Other costs	11.1	16.7	22.2	20.0	21.5
Total marketing bill	182.7	259.0	343.6	379.6	401.0

Notes: [1]Includes employees' wages, salaries, and health and welfare benefits. [2]Excludes local hauling charges.

recorded in 1993 and the 7.2-percent average annual increase over the last 10 years.

Packaging Costs Rose Sharply

Packaging is the second-largest component of the marketing bill, accounting for 8 percent of food expenditures in 1994. Costs of these materials rose about 6.9 percent in 1994—a faster pace than the marketing bill—mainly due to higher prices of raw materials and greater demand for most packaging inputs.

Prices of most major packaging materials rose sharply. For example, prices of paperboard shipping boxes and other paper products increased 4.7 percent in 1994 after declining 0.6 percent in 1993, and prices of paper bags and sacks rose 2.5 percent after dropping 0.1 percent the previous year. These increases reflected a stronger demand for paperboard materials used to package consumer nondurables—demand strong enough to deplete inventory levels for several types of paperboard supplies to near-record lows. The higher prices for paper products bolstered the price of the competing plastic packaging, even though the cost of oil used to produce plastic dropped in 1994. The price of plastic rose 1.3 percent after declining for 3 of the last 4 years. Prices for glass containers rose 1.3 percent, while metal can prices for processed fruits and vegetables fell 3.5 percent.

Transportation and Energy Costs Up Slightly

Intercity rail and truck transportation for food amounted to $21.8 billion in 1994, or about 4.5 percent of food expenditures. The transportation cost index, representing railroad freight rates, advanced 0.9 percent in 1994, slightly more than the gain recorded in 1993. Most foods shipped by railroad are canned and bottled products.

Trucking rates, as measured by the Bureau of Labor Statistics, grew 2.2 percent due to higher operating costs and the stronger economy. For example, operating costs of trucks hauling produce were 0.6 percent higher in 1994, with fuel and labor accounting for 44 percent of the total. Trucking wages rose 1.7 percent, half of the increase in 1993, while fuel costs slipped 2 percent. Other trucking expenses—depreciation and maintenance, overhead, licenses, and insurance—rose an average of 0.6 percent, compared with a 3.6-percent increase in 1993. These trucking expenses were restrained by small increases in overhead expenses and largely unchanged maintenance costs.

The 1994 energy bill for food marketing increased 4.1 percent to about $17.9 billion, a slower pace than the increase in the marketing bill. Energy costs again comprised about 3.5 percent of retail food expenditures in 1994. The energy bill includes only the costs of electricity, natural gas, and other fuels used in food processing, wholesaling, retailing, and foodservice establishments. (Transportation fuel costs are excluded here, but are included in transportation costs.)

Slightly lower electricity prices—the main energy source in the food industry—and slightly higher natural gas prices restrained the overall increase in energy costs. Electricity makes up 55 percent of the energy costs incurred in food manufacturing, with natural gas accounting for the remaining 45 percent. Electricity accounts for 85 percent of energy used by public eating places and nearly all of the energy used in foodstores.

Profits Rose Sharply in 1994

U.S. corporations earned approximately $16 billion in pre-Federal-income-tax profits from manufacturing and marketing food, a 12.7-percent jump from 1993. In 1994, about 3 cents of every food dollar went to pretax corporate profits.

Food retailers' profits were 67 percent higher in 1994 than in 1993, as profits rebounded from 1993's unusually low levels. Profits were reduced in 1993 as the result of a first-quarter write-off against income of post-retirement benefits, which lowered reported profits for the entire year.

The stronger economy, technological improvements, and increased sales of store labels and prepared foods (deli items, salad bars) also stimulated higher 1994 retail profits. Retailers continued to make greater use of technology—particularly checkout scanning, satellite communications, and more sophisticated merchandising and labor scheduling systems—to increase efficiency and control labor costs, their largest operating expense. Retailers also continued to cut costs by making extensive use of part-time employees, which likely held down the rise in hourly earnings in food retailing.

Food manufacturers have also been able to hold down costs with gains in labor productivity. Profits rose for many food manufacturing companies in 1994. However, manufacturers' profits continue to be tempered by increased consumer purchases of less costly store-label foods, which cut into sales and profits of manufacturers' brand-name foods. Moreover, an extensive restructuring by a major food processor resulted in a major net income loss, which produced a 0.7-percent decline in aggregate 1994 food manufacturing industry profits.

Food wholesaling profits also declined, slipping 8 percent from 1993. This drop reflected decreased sales by wholesalers to their biggest clients, independent grocery stores. Independent grocery stores have been losing sales to supercenters that offer both food and an extensive line of other retail merchandise.

Restaurant chains' profits rose 7 percent in 1994, reflecting stronger sales growth. Foodservice continues to capture an expanding share of total food expenditures. However, the demand for convenience is also being seen at grocery stores, where prepared foods are accounting for higher percentages of supermarket sales. The distinction between the retail (at-home) and foodservice (away-from-home) markets has become increasingly blurred as these two segments compete for the consumer's food dollar. ■

Food Marketing Sales, Mergers, and New Product Introductions Rose in 1994

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Sales in the U.S. food marketing system reached $825 billion in 1994, up 4.6 percent from 1993 sales. Retail foodstores rang up $336 billion, accounting for 41 percent of food marketing sales, and foodservice sold $303 billion, accounting for another 37 percent of sales (fig. 1). A decade earlier, eating places accounted for 42 percent of the food dollar, compared with 47 percent in 1994. The gap between at-home and away-from-home eating continues to close as restaurants, fast-food places, and other eating places take up more of consumers' total food dollars.

The alcoholic beverage market, accounting for about 11 percent of sales in the food marketing system, continues to reflect lower consumption. The Nation's liquor stores, eating and drinking places, and food retailers sold $86 billion worth of wine, beer, and distilled spirits in 1994 versus $83 billion in 1993, while total sales of food and alcoholic beverages rose to $725 billion in 1994 from $690 billion in 1993 and $443 billion in 1984.

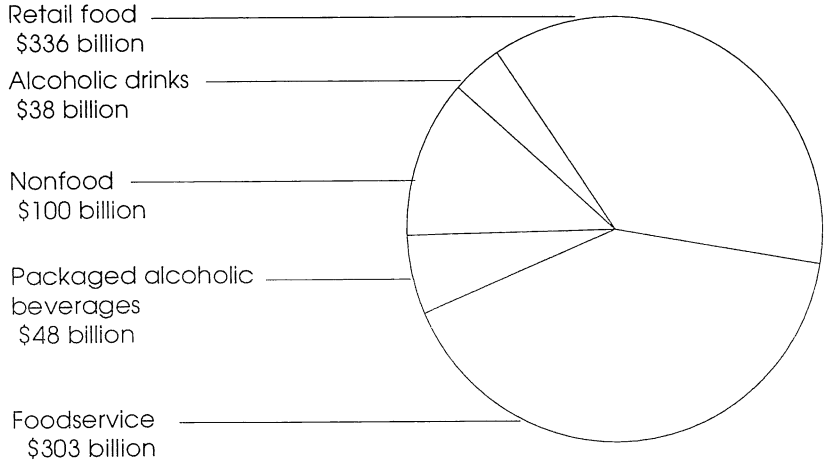
Nonfood retail sales amounted to an estimated $100 billion in 1994. Nonfood grocery items include tobacco, health and beauty aids, detergents, paper products, gasoline sold at convenience stores, and other nonfood grocery items sold through retail outlets (nonfood items sold in vending machines and nonfood catering supplies are grouped into the foodservice category).

Record Number of Food Product Introductions

The food system has always been the forerunner in new product introductions, a form of nonprice competition which differentiates products in consumers' eyes. Over 20,000 new grocery products—including new sizes, packaging, flavors, and brands—were placed on U.S. grocery shelves in 1994, more than a 14-percent increase from 1993 (table 1). In 1994, new products accounted for 8 percent of the 240,000 scanned grocery products available in different supermarkets across the United States. In 1988, about 10,600 grocery products were introduced, accounting for 5 percent of the total scanned products stocked.

Of the 20,076 grocery products introduced in 1994, 15,006 were new foods. Five product categories accounted for nearly 60 percent of these new foods. About 3,271 new condiments constituted over a fifth of the new food products introduced

Figure 1
Sales in the Food Marketing Sector Rose to $825 Billion in 1994

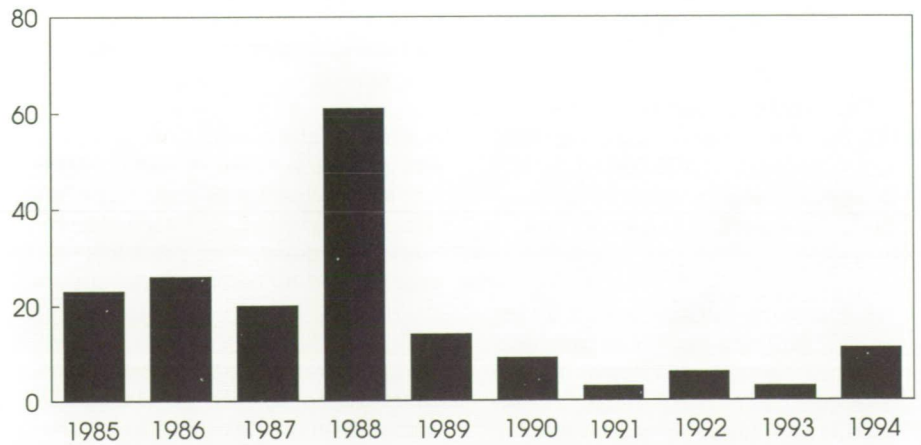


The author is an agricultural economist with the Food and Consumer Economics Division, Economic Research Service, USDA.

Table 1
Condiments Topped the List of Food Product Introductions

Category	1985	1990	1993	1994
		Number		
Foods	5,617	10,301	12,897	15,006
Baby food	14	31	7	45
Bakery foods	553	1,239	1,420	1,636
Baking ingredients	142	307	383	544
Beverages	625	1,143	1,845	2,250
Breakfast cereals	56	123	99	110
Condiments	904	1,486	3,148	3,271
Candy, gum, and snacks	1,146	2,028	2,042	2,461
Dairy	671	1,327	1,099	1,323
Desserts	62	49	158	215
Entrees	409	753	631	694
Fruit and vegetables	195	325	407	487
Pet food	103	130	276	161
Processed meat	383	663	454	565
Side dishes	187	538	680	980
Soups	167	159	248	264
Nonfood items	1,713	2,943	4,674	5,070
Health and beauty aids	1,446	2,379	3,864	4,368
Household supplies	184	317	467	426
Paper products	42	174	145	183
Tobacco products	27	31	38	38
Pet products	14	42	160	55
Total	7,330	13,244	17,571	20,076

Figure 2
The Value of Food Marketing Mergers and Leveraged Buyouts Rose to $11 Billion in 1994



Note: Data are for mergers and leveraged buyouts costing more than $100 million.

in 1994. Other new foods finding their way to grocery shelves in 1994 include nearly 2,500 candies, gums, and snacks; 2,250 beverages; over 1,600 bakery products; and nearly 1,300 dairy items—mostly cheese and ice cream. New products geared to children continued to increase, and new products with health claims rebounded after falling in 1993.

Value of Mergers and Acquisitions Rose

In 1994, there were 432 mergers and acquisitions in the U.S. food marketing system, down just 1 from 1993 and down 152 from the record 584 mergers and acquisitions in 1986. Over half (232) of these mergers took place in food processing (78 occurred in foodservice, 60 in retailing, and 62 in wholesaling). An increase in the number of mergers in food retailing, wholesaling, and foodservice since 1993 offset a decline in food processing.

The value of these transactions, however, rose from $3 billion in 1993 to $11.5 billion in 1994, the highest level since 1989 (fig. 2). Food processing ranked seventh out of the roughly 70 manufacturing industries in the value of mergers. Leveraged buyout activity was minimal in 1994. Food wholesalers ranked second among all wholesalers in the number of mergers, while food retailers ranked fourth among all retail mergers. ■

Fewer But Larger Supermarkets

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Supermarket sales totaled an estimated $289 billion in 1994, accounting for just over three-quarters of the sales of all grocery stores combined. With individual store sales of at least $3.4 million in 1994, these large grocery stores offer all major food departments. The remaining 23 percent of grocery store sales went through convenience stores, superettes, and smaller grocery stores—delicatessens, health-food stores, so-called mom and pop stores, and bodegas.

The number of supermarkets in this country declined from 26,815 stores in 1980 to 24,548 in 1993. Yet their floor space has grown to accommodate an increasing array of products and services. Since 1980, supermarkets' average selling area rose from 23,000 to 35,000 square feet. And, the variety of unique brands, package sizes, and flavors carried has expanded from an estimated 14,000 items in 1980 to 25,000 items in 1993.

Supermarkets are classified according to one of several formats—or combinations of products and services (see box). The conventional-format store dominated in 1980, representing 73 percent of supermarkets and 80 percent of total supermarket sales (table 1). But, the growth of new formats eroded the market share of conventional stores, which accounted for only 28 percent of supermarkets and 50 percent of sales by 1993.

Since 1980, retailers have introduced new supermarket formats as a way of tailoring their product and service offerings to appeal to an identified consumer segment. Warehouse and superwarehouse stores, no-frills outlets that appeal to price-conscious consumers willing to forgo some services and product

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Supermarket Formats Vary

Supermarkets are foodstores that sell a variety of food products (including fresh meat, produce, packaged and canned foods, frozen foods, and other processed foods) and nonfood products (such as household cleaning supplies, paper products, and personal-care products). These primarily self-service operations have at least $3.4 million in annual sales (1994 dollars).

Supermarkets are classified into several formats according to the variety of products and services they offer.

- **Conventional-format store**—a full-line supermarket, ranging in size from 10,000 to 25,000 sq. ft. of floor space and carrying at least 9,000 different food and nonfood items.

- **Superstore**—distinguished by its greater size and variety of products (over 14,000 different items) than conventional supermarkets. These tend to include food specialty and service departments, and a larger inventory of nonfood products, including general merchandise, such as clothing and automotive supplies.

- **Warehouse store**—a supermarket with limited product variety and fewer services, incorporating case-lot stocking and shelving practices.

- **Superwarehouse store**—larger than a warehouse store, offering expanded product variety, and often having full-service meat, delicatessen, or fresh seafood departments.

- **Combination food and drugstore**—a supermarket containing a pharmacy, a nonprescription drug department, and a greater variety of personal-care products than that carried by conventional supermarkets.

- **Hypermarket**—the largest supermarket format, with general merchandise accounting for up to 40 percent of sales.

Table 1
Conventional Supermarkets Facing Competition

Supermarket formats	Share of sales		Share of store numbers	
	1980	1993	1980	1993
	Percent			
Conventional	80	50	73	28
Superstore	12	26	18	36
Warehouse	6	13	4	11
Combination food and drug store	2	9	4	16
Superwarehouse	NA	2	1	5
Hypermarket	NA	1	NA	3

Note: NA = Not available.

variety in exchange for generally lower prices, increased from 1,677 stores in 1980 to 3,630 in 1993. Their share of supermarket sales grew from 6 percent to 15 percent over 1980-93. Superstores provide "one-stop shopping" convenience with an extended assortment of food and nonfood items, including a greater assortment of general merchandise products. Superstores' share of supermarket sales more than doubled since 1980, reaching 26 percent in 1993.

Consumers' Choices Show Up in Sales Figures

Coffee and tea, rice and dried vegetable products, and pasta were the three leading categories of sales growth in supermarkets in 1994 (table 2). Their sales far exceeded the 3.1-percent growth in overall supermarket sales between 1993 and 1994. Leading decliners were tobacco products (-10.7 percent), nuts and dried fruits (-3.2 percent), and household supplies, such as cleansers, laundry detergents, and furniture polishes (-2.2 percent).

Year-to-year changes in supermarket sales categories are the effect of both price and quantity changes, and reflect the choices made by consumers throughout the year. For example, rapidly rising prices were behind the 16.2-percent rise in supermarket sales of coffee. With prices pretty much constant for household supplies, their declining sales reflect fewer quantities sold in supermarkets.

Average annual sales changes over the past 5 years reveal some changing tastes and preferences of consumers. Sales of deli items (such as prepared dishes) and instore bakery products grew 6.3 percent and 6.5 percent per year, respectively, between 1989 and 1994, as supermarkets responded to consumers' desires for more convenient products. Produce department sales rose an average of 4.3 percent a year, as retailers increased their offerings of convenient products, such as packaged salads and trimmed and cut items. Sauces and dressings, including salsas and salad dressings, increased an average of 5.1 percent a year in 1989-94.

The growth of grocery product sales by nonfoodstore retailers, such as mass merchandisers, discount drugstores, and warehouse clubstores, also plays a role in declining supermarket sales growth. The inroads by nonfoodstore retailers has had the greatest impact on canned and packaged food and nonfood products. For example, increasing sales by nontraditional competitors, such as tobacco shops, account for the declining supermarket sales of tobacco products.

Foreign Investors Increase Their Presence Here

Food retailing sales by U.S. affiliates of foreign firms reached $48.2 billion in 1992, an increase of 2.3 percent over 1991, according to the most recent figures. Affiliates were responsible for 12.8 percent of total U.S. grocery store sales in 1992. U.S. affiliates are those companies having at least 10 percent of voting stock or equivalent equity owned by a foreign investor.

The 5 largest U.S. affiliates of foreign food retailers were among the top 30 food retailers nationwide, generating sales of $39.5 billion in 1994. Albertson's, headquartered in Boise, ID, was the largest U.S. affiliate and the fourth largest food retailer in the United States, with sales of $11.9 billion in 1994 (table 3). U.S. affiliates have grown by building new stores and by acquiring other food retailers. Both Albertson's and Food Lion have relied almost exclusively on internal growth strategies, while Ahold, USA, and The Atlantic and Pacific Tea Company (A&P) have grown through acquisition strategies.

U.S. food retailing is attractive to foreign investors for a variety of reasons. The U.S. market is much larger than many foreign markets, with favorable overall growth prospects. The United States has a highly de-

Table 2
Convenience Products Generate High Growth in Supermarket Sales

Category	Supermarket sales 1994[1] Volume	Share of store sales	Change, 1993-94	Average annual percent change, 1989-94
	Million dollars	*Percent*		
Grocery foods	**$90,271.36**	**30.01**	**4.4**	**3.14**
Baby foods	2,731.36	.91	5.7	8.21
Baking needs	5,439.74	1.81	2.5	1.65
Beer & wine	7,109.06	2.36	5.3	4.31
Breakfast foods	10,151.74	3.37	4.9	5.05
Candy & gum	3,284.56	1.09	4.0	3.28
Canned fish	1,710.26	.57	5.9	-2.33
Canned fruits	1,243.99	.41	-2.4	-.67
Canned vegetables	3,003.18	1.00	2.3	-.33
Coffee & tea	4,923.97	1.64	16.2	1.13
Cookies & crackers	6,306.49	2.10	2.6	2.56
Desserts & toppings	772.71	.26	1.9	1.74
Juice (grocery)	3,993.85	1.33	4.2	4.89
Nuts & dried fruits	1,552.54	.52	-3.2	-.03
Pasta	2,399.28	.80	7.4	3.94
Pickles & olives	1,234.45	.41	3.0	1.42
Prepared foods	2,261.96	.75	4.0	3.08
Rice & dried vegetables	1,422.95	.47	7.7	3.54
Sauces & dressings	6,328.00	2.10	4.9	5.07
Snacks	6,203.03	2.06	4.3	3.60
Soft drinks & mixes	12,120.03	4.03	3.2	3.22
Soups	2,858.29	.95	5.0	5.26
Spices & extracts	1,245.49	.41	3.3	2.48
Spreads & syrups	1,974.46	.66	-.3	-.54
Perishables	**148,963.89**	**49.50**	**3.0**	**3.44**
Bakery foods, packaged	8,868.01	2.95	3.0	3.62
Dairy products	24,791.43	8.24	3.5	2.69
Deli	9,373.70	3.11	4.5	6.33
Florals	557.50	.19	2.5	2.79
Frozen foods	16,342.03	5.43	4.8	2.22
Ice cream	4,630.92	1.54	4.0	3.24
Instore bakery	5,558.80	1.85	6.9	6.49
Meat & seafood	48,620.70	16.15	1.7	2.90
Produce	30,220.80	10.04	2.6	4.31
Nonfood groceries	**30,382.61**	**10.09**	**-3.0**	**-1.15**
Household supplies	8,409.63	2.79	-2.2	-.58
Paper, plastic, films, & oil	9,519.83	3.16	1.3	-.56
Pet foods	5,140.06	1.71	-.1	-.49
Tobacco products	7,313.09	2.43	-10.7	-2.92
General merchandise	**11,991.34**	**3.98**	**2.8**	**2.48**
Health & beauty care	**12,413.50**	**4.12**	**3.2**	**3.15**
Pharmacy	**4,812.48**	**1.60**	**NA**	**NA**
Video rental	**1,358.03**	**.44**	**7.1**	**NA**
Unclassified	**806.76**	**.26**	**NA**	**NA**
Total supermarket	**301,000.00**	**100.00**	**3.1**	**3.16**

Notes: NA = Not available. [1]Supermarkets with annual sales of $2 million or more. Source: *Progressive Grocer*, July 1995.

Table 3
The Leading U.S. Food Retailing Affiliates

U.S. affiliate	Foreign investor	U.S. food retailing— 1994 sales	Rank
		Billion dollars	*Rank*
Albertson's	Theo Albrecht (Germany)	11.9	4
Atlantic and Pacific Tea Company	Tengelmann, AG (Germany)	10.3	7
Food Lion	Delhaize, Le Lion (Belgium)	7.9	8
Ahold, USA	Ahold (The Netherlands)	7.4	9
Shaw's Supermarkets	Sainsbury PLC (U.K.)	2.0	29

veloped food-distribution infrastructure, imposes fewer restrictions on overseas investors and, and has less stringent regulations related to the building of new stores and support facilities than do many other countries. The United States also offers a stable political and business environment with lower investment risk.

However, the competitive environment of U.S. food retailing may not be fully appreciated by overseas investors, as evidenced by the failure of many foreign-owned hypermarket stores that opened during the 1980's. Hypermarkets are a relatively new supermarket format here, based on popular stores in Europe. These very large stores often exceed 100,000 square feet of floor space. They offer a wide variety of both food and nonfood and general merchandise products.

Foreign hypermarket retailers, including Carrefour and Leedmark, apparently did not generate sustainable sales volume in their U.S. affiliate stores. In Europe, hypermarkets compete with very small, specialized food retailers which have relatively high per-unit operating costs compared with U.S. supermarkets. For this reason, hypermarket costs and operating margins were likely higher than those of their U.S. supermarket competitors. Also, the sheer size of hypermarkets may have been daunting to U.S. consumers. Without strong marketing and merchandising strategies, this very large and different format failed to create a strong consumer image. ■

Sales of Food Away From Home Expanding

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The foodservice market continues to grow—from $151 billion in sales in 1984 to $273 billion in 1994 (excluding sales tax and tips). Over the decade, such sales of food away from home increased an average of 5.6 percent annually, or about 2.5 percent per year when adjusted for inflation. That compares with a 0.4-percent inflation-adjusted annual rise in retail food sales (food at home).

Growth in the foodservice market is not unexpected, given that today's time-pressured consumers do not always have the time to plan, shop, cook, eat, and clean up a meal prepared at home. Convenient, value-priced foodservice has become a popular alternative. Higher disposable income due to two-earner families, more women in the workplace, and less leisure time are all reasons for increased sales of food away from home, particularly fast food.

Commercial establishments constitute the largest sector of the foodservice market, accounting for 78 percent of industry sales in 1994 (table 1). These establishments prepare, serve, and sell meals and snacks for profit to the general public. The commercial foodservice sec-

Table 1
Rapid Growth in Foodservice Sales in the Last Decade[1]

Industry segment	1984	1994	Change over decade
	Million dollars		*Percent*
Commercial foodservice	110,951	212,596	92
Separate eating places	93,581	181,014	93
Fast-food outlets	42,805	93,686	119
Restaurants and lunchrooms	46,934	81,598	74
Cafeterias	3,102	4,114	33
Caterers	740	1,616	18
Other commercial:			
Lodging places	7,762	12,528	61
Retail hosts	5,123	9,861	92
Recreation and entertainment	3,288	7,364	124
Separate drinking places	1,197	1,829	52
Noncommercial foodservice	40,384	60,102	49
Education	13,887	19,558	41
Elementary and secondary	8,615	9,848	14
Colleges and universities	5,272	9,710	84
Military services	1,753	986	-44
Troop feeding	1,152	722	-37
Clubs and exchanges	601	264	-56
Plants and office buildings	3,472	6,233	80
Hospitals	3,780	3,698	-2
Extended care facilities	5,926	7,838	32
Vending	4,930	6,227	26
Transportation	2,500	5,816	133
Associations	1,342	2,101	56
Correctional facilities	1,590	3,128	97
Child daycare facilities	706	1,572	123
Elderly feeding programs	105	177	69
Other	393	2,768[2]	NA
Total foodservice	151,335	272,698	80

Notes: NA = Not applicable. [1]Excludes sales taxes and tips. [2]Includes more categories in 1994 than 1984. Source: USDA, Economic Research Service, *Food Marketing Review,* selected issues.

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Table 2
Top 10 Restaurant Chains in the United States Are Tops Overseas, Too

Restaurant chains	Domestic		International	
	Sales	Units	Sales	Units
	Billion dollars	*Number*	*Billion dollars*	*Number*
McDonald's	14.2	9,283	9.4	4,710
Burger King	5.5	5,996	1.2	1,125
Pizza Hut	4.8	8,138	1.6	2,295
Hardee's/Roy Rogers	4.0	3,997	.1	63
Taco Bell	3.7	4,809	.1	112
Wendy's Old Fashioned Hamburgers	3.6	3,791	.3	377
KFC	3.4	5,038	3.7	3,995
Dairy Queen	2.3	4,860	.3	611
Domino's Pizza	2.2	4,750	.3	550
Little Caesars	2.2	4,687	.1	145

Note: 1993 data. Source: *Restaurant Business,* selected issues.

tor includes separate eating places—full-service restaurants and lunchrooms, fast-food/quick-service outlets, cafeterias, and caterers—and foodservice operations located in other facilities, such as lodging places, recreation and entertainment facilities, retail hosts (like department stores and limited-price variety stores), and separate drinking places.

About 22 percent of foodservice sales in 1994 came from noncommercial operators. These foodservice operations prepare and serve meals and snacks as an adjunct, supportive service in institutional and educational settings, such as schools, nursing homes, child daycare centers, and patient feeding in hospitals.

Fast Food the Largest Segment

Fast food accounts for the largest, and fastest rising, share of sales in the foodservice industry. Sales in 1994 reached $93.7 billion—outdistancing the $81.6 billion of receipts earned by full-service restaurants and lunchrooms. However, that has not always been the case. Up until 1987, restaurants and lunchrooms retained the largest share of sales (fig. 1). Fast-food outlets more than doubled their sales over 1984-94 and captured an increasing share of separate eating-place sales—from 46 percent in 1984 to 52 percent in 1994 (table 1).

McDonald's is by far the leading foodservice chain, with $23.6 billion in 1993 sales from 9,283 domestic units and 4,710 outside the United States (table 2). Burger King, a subsidiary of Grand Metropolitan, PLC, is the second-largest chain in terms of sales ($6.7 billion), but ranks third in the number of outlets worldwide (7,121). PepsiCo's Pizza Hut is the largest pizza chain in the industry, with 10,433 outlets and $6.4 billion in sales.

These top three fast-food chains continue to expand their presence overseas. McDonald's recently opened in Hungary, Trinidad, and Bulgaria; Burger King in Israel; and Pizza Hut in China, Italy, and India.

Many fast-food chains are also establishing themselves in nontraditional sites, such as mobile kiosk operations, push carts, sports centers, and educational institutions. One force driving this expansion strategy is the concept of taking the food to the consumer.

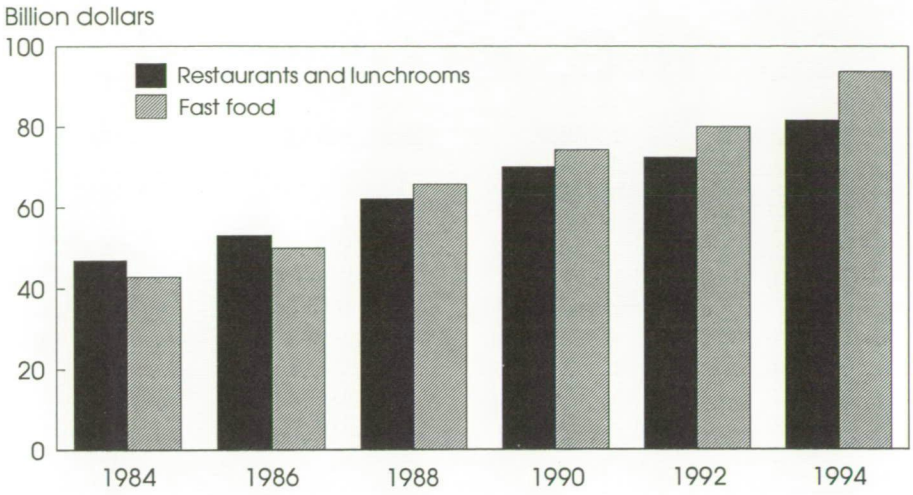
Two other segments in commercial foodservice about doubled their sales from 1984 to 1994—recreation and entertainment facilities and retail hosts. Increased food sales by gasoline stations, convenience stores, and miscellaneous retail stores contributed to the growth in retail hosts.

Noncommercial Segment Also Expands

Noncommercial foodservice sales grew 50 percent from $40 billion in 1984 to $60 billion in 1994.

Sales nearly doubled for college and university foodservice operations between 1984 and 1994 due to

Figure 1
Fast-Food Sales Outpacing Restaurant and Lunchrooms Annual Sales



Source: USDA, Economic Research Service, *Food Marketing Review*, various issues.

an increase in school enrollments. Vending sales rose as machines were placed in more (and new) locations. Transportation foodservice sales more than doubled, along with increased air, rail, and ship traffic. Sales increased in plants and offices by 80 percent and in elderly feeding programs by 69 percent.

However, sales declined in some noncommercial operations. Military foodservice sales dropped by 44 percent between 1984 and 1994 as the number of troops decreased. Sales fell 2 percent in hospitals during the same period. ■

Annual Review of Domestic Food-Assistance Programs

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Overall expenditures for domestic food-assistance programs grew 4.8 percent in fiscal 1994 to approximately $37 billion (table 1).

With emphasis on outreach to all eligible individuals, outlays for the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) had the greatest percentage increase (12 percent), followed by child-nutrition programs (primarily the school lunch, up 5 percent, and breakfast programs, up 11 percent). Food Stamp Program outlays increased by 4 percent in fiscal 1994, but participation and program costs declined in the first 6 months of calendar year 1995. The value of food donation programs continued to decline—as it has in recent years. Purchases of commodities through price-support programs have fallen in recent years, making less available for donation to domestic food-assistance programs.

Budget considerations loom large in the future of USDA's domestic food-assistance programs. Legislation currently being considered in Congress would make major changes in the Food Stamp and child-nutrition programs. (For more details about these proposals and their economic impacts, see "New Directions for National Food-Assistance Efforts" in the January-April 1995 issue of *FoodReview*.)

In the future, USDA will continue its effort to improve the nutritional balance of meals served in schools by promoting more fruit and vegetable servings; fewer sweets; and less fat, cholesterol, and sodium. USDA is providing technical assistance to help schools prepare meals which conform to the *Dietary Guidelines for Americans*.

The following is a summary of the various programs—how they work and whom they served in fiscal 1994.

WIC

Established in 1972, The Special Supplemental Food Program for Women, Infants, and Children (WIC) works to improve the nutrition and health of low-income pregnant, breastfeeding, and non-breastfeeding postpartum women, along with infants and children up to age 5, who are determined by health or medical professionals to be at nutritional risk.

Participants are given vouchers which are to be exchanged for monthly allotments of foods that are rich in the nutrients typically lacking from diets of low-income children and mothers, such as infant formula, eggs, fruits, juice, milk, cheese, and cereal. Participants are also offered nutrition education and provided information on the community health and medical services available to them.

Expenditures on the WIC program grew slightly more than 12 percent in fiscal 1994—largely due to a 9.4-percent increase in recipients. An average of 6.5 million people participated in the program each month—approximately three-quarters of whom were infants and children. Average monthly benefits were $29.91 per participant in fiscal 1994, usually in the form of vouchers for specific foods but sometimes as actual foodstuffs. In fiscal 1993, an average of 5.9 million people participated each month, a 9.5-percent increase over the previous year. Average monthly benefits in 1993 equaled $29.77 per participant.

Child-Nutrition Programs

Linked with local and State governments, USDA operates five programs to provide meals and snacks to preschool and school-age children: National School Lunch, School Breakfast, Special Milk, Child and Adult Care Food Program, and Summer Food Service Programs. In fiscal 1994, Federal expenditures for these programs totaled approximately $7.7 billion. In comparison, $7.2 billion was spent in fiscal 1993.

Through USDA's food programs in fiscal 1994, an average of over 30 million meals are served each school

For questions about food-assistance participation and expenditures, contact Victor Oliveira at (202) 219-1271.

day to children enrolled in public and private schools, and another 2.1 million meals are served daily to children in the Child and Adult Care Food Program.

The National School Lunch Program serves the largest number of children, with 25.3 million participating on a typical school day in fiscal 1994. That is a 1.7-percent gain over fiscal 1993. The average daily number of free and reduced-price meals also increased in fiscal 1994, up 3.5 percent and 3.9 percent, respectively, over fiscal 1993. The level of participation in the free and reduced-price lunches—which are subsidized at higher levels and available only to economically eligible students—is closely related to the well-being of the general economy; the pool of students eligible for free or reduced-price meals enlarges during economic downturns and decreases during upturns.

The fiscal 1994 School Breakfast Program participation rate of 5.8 million students per school day was an 8.9-percent increase over fiscal 1993. Outlays increased from $868 million in fiscal 1993 to $959 million in fiscal 1994.

The Child and Adult Care Food Program provides cash and commodities for food service to children in nonresidential child daycare centers, children in family daycare homes, and chronically impaired adults and persons over age 60 who are enrolled in adult daycare centers. Average daily attendance during the 4 months for which attendance is collected rose from 2.0 million people in fiscal 1993 to 2.2 million in fiscal 1994.

The school food programs make up over three-quarters of Child-Nutrition Program expenditures (tables 1 and 2).

Between 1984 and 1994, outlays for the School Breakfast Program increased at an annual rate of 9.6 percent. In fiscal 1994, outlays for the School Breakfast Program increased by approximately 11 percent, compared with a 5-percent increase in the School Lunch Program (table 2). Efforts to expand the School Breakfast Program have been directed at encouraging schools that participate in the School Lunch Program to also participate in the School Breakfast Program. In fiscal 1994, for example, the School Breakfast Program was offered in 63 percent of public and private schools participating in the School Lunch Program, compared with 57 percent in fiscal 1993 and 52 percent in fiscal 1992.

Commodities donated by USDA continued to play a diminished role in the overall funding of the school food programs. Due to the reduction of Government stocks of surplus commodities, expenditures for food donations have fallen off since the mid-1980's.

In fiscal 1994, commodity donations (including milk provided through the Special Milk Program) accounted for less than 10 percent of total expenditures for school food programs. The Special Milk Program (with outlays of $17.8 million in fiscal 1994) offers milk to children whose schools do not participate in any other Federal meal program.

Table 1
Expenditures for USDA's Food-Assistance Programs Rose 4.8 Percent in Fiscal 1994

Fiscal year	Food stamps[1]	Food donations[2]	Child nutrition[3]	WIC	Total cost[4]
			Million dollars		
1984	12,407.5	1,489.8	4,265.9	1,388.1	19,634.2
1985	12,531.9	1,439.2	4,391.0	1,489.3	19,935.9
1986	12,462.1	1,380.9	4,625.5	1,582.9	20,129.9
1987	12,461.4	1,313.1	4,883.3	1,679.6	20,421.6
1988	13,199.7	1,074.3	5,047.0	1,797.5	21,204.4
1989	13,844.3	723.5	5,060.5	1,910.7	21,787.4
1990	16,431.5	720.8	5,475.8	2,122.5	24,875.8
1991	19,736.5	691.3	6,098.1	2,301.1	28,696.4
1992	23,468.2	702.9	6,712.1	2,596.8	33,355.8
1993	24,695.5	688.6	7,162.6	2,818.5	35,505.0
1994	25,572.9	659.9	7,603.7	3,164.7	37,132.1

Notes: [1]Includes benefits, State administrative expenses, and other program costs for the Food Stamp Program and Nutrition Assistance to Puerto Rico and the Northern Marianas. [2]Includes all costs of the following programs: Food Distribution to Indian Reservations, Nutrition Program for the Elderly, Commodity Supplemental Food, Charitable Institutions, Emergency Food Assistance, and Commodities for Soup Kitchens. Excludes commodities for child nutrition programs. [3]Includes School Programs, Child Care Food Program, Summer Food Service Program, Child Nutrition State administrative expenses, Nutrition Education and Training Program, Nutrition Studies, and Food Service Equipment Assistance Program. [4]Includes program administration funds.

Food Stamps

Under the Food Stamp Program, low-income households receive either coupons or Electronic Benefit Transfer (EBT) cards to purchase food. The program operates in all 50 States, the District of Columbia, Guam, and the U.S. Virgin Islands. Puerto Rico was a participant until 1982, when it established a separate Nutrition Assistance Program. To be eligible for food stamps, applicants must meet income guidelines, asset limitations, and certain work requirements. Monthly benefits are based on income and household size. Each year, the dollar amounts are adjusted in order to reflect changes in the cost of the Thrifty Food Plan, which is the most economical of four food plans calculated by USDA.

The Food Stamp Program is USDA's largest food-assistance program. In fiscal 1994, an average of 27.5 million people received an average of $69 worth of benefits each month for a total of $22.8 billion. Benefits represent approximately 93

Table 2
Expenditures for School Food Programs Rose 5.2 Percent in Fiscal 1994

Fiscal year	School lunch[1]	School breakfast[1]	Special milk	Commodities	Total
			Million dollars		
1984	2,507.7	364.0	16.0	827.4	3,715.1
1985	2,578.4	379.3	15.8	801.3	3,774.8
1986	2,714.5	406.3	15.5	821.9	3,958.8
1987	2,797.1	446.8	15.5	888.2	4,147.6
1988	2,916.4	482.1	18.7	813.7	4,230.9
1989	3,005.7	513.2	18.5	764.2	4,301.6
1990	3,213.9	596.2	19.2	619.7	4,449.0
1991	3,524.7	685.0	19.8	699.2	4,928.7
1992	3,856.4	786.7	19.5	707.3	5,369.9
1993	4,080.0	868.3	18.7	663.0	5,630.0
1994	4,290.7	959.0	17.8	656.5	5,924.0

Note: [1]Reflects cash payments.

Table 3
Average Monthly Participation in the Food Stamp Program Fell in Fiscal 1995, the First Time Since 1988[1]

Fiscal year	Average monthly— Participation	Benefits	Total annual costs	Benefits' share of costs
	Millions	*Dollars*	*Million dollars*	*Percent*
1984	20.9	42.7	11,579	92.4
1985	19.9	45.0	11,703	91.8
1986	19.4	45.5	11,638	91.1
1987	19.1	45.8	11,604	90.5
1988	18.6	49.8	12,317	90.5
1989	18.8	51.9	12,932	90.5
1990	20.1	58.9	15,491	91.6
1991	22.6	63.8	18,769	92.4
1992	25.4	68.6	22,462	93.1
1993	27.0	68.0	23,653	93.0
1994	27.5	69.0	24,491	92.9
1995	27.3	71.5	25,159	92.3

Notes: [1]Excludes Puerto Rico and the Northern Marianas Islands. 1984-93 numbers are from *Annual Historical Review: Fiscal Year 1993.* 1994 numbers are from July Key data, 1995 numbers are from the President's budget.

percent of expenditures on the program, a level that has remained nearly constant during the 1990's.

Expenditures and participation in fiscal 1994 increased—but at lower rates than during the recession of 1990-91. Almost 23 million people participated each month in fiscal 1991, compared with 20 million in fiscal 1990 and under 19 million in fiscal 1989. In fiscal 1994, Food Stamp Program expenditures increased 3.4 percent (table 3).

Food stamp benefits are pegged to changes in the Consumer Price Index for food at home. In fiscal 1995, food stamp recipients are estimated to have received $71.50 on average per person per month, up from $69 in fiscal 1994.

Average monthly participation in the Food Stamp Program rose 1.8 percent in fiscal 1994 (table 3) to a record 27.5 people. The highest single-month enrollment during fiscal 1994 was 27.96 million. For the first 6 months of fiscal 1995, monthly participation fell from its 1994 record. An average of 27 million people participated each month, the same rate recorded during fiscal 1993. However, the total cost of the program continues to increase because of higher per person benefits. ■

ERS Estimates U.S. Foodborne Disease Costs

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Microbial pathogens in food cause between 6.5 million and 33 million cases of human illness and up to 9,000 deaths each year in the United States. Over 40 different foodborne pathogens are believed to cause human illness. The annual cost of human illness caused by seven foodborne pathogens for which we have estimates ranges between $5.6 billion and $9.4 billion. Meat and poultry are the primary sources.

Microorganisms are commonly found in soil, water, plants, and animals. Most do not cause human illness. In fact, we rely on some microorganisms in the making of bread, alcohol, cheese, vitamins, and antibiotics.

Some, however, do cause human illness. Pathogens—microorganisms that cause disease—include viruses, bacteria, parasites, and fungi. The bacterium *Staphylococcus aureus* lives harmlessly on human skin and in the nasal cavities of less than half the people in the United States, but in food it can produce toxins that cause human illness. Another bacterium *Escherichia coli* O157:H7 usually lives harmlessly in the intestinal tracts of some cattle, but in people it can cause serious illness, including bloody diarrhea and kidney failure, as well as premature death. People can acquire the bacteria by eating mishandled or insufficiently cooked meat from infected animals. Half of all foodborne illnesses have no identified cause. Yet of those foodborne illnesses that are confirmed and reported to the Centers for Disease Control and Prevention (CDC), over 90 percent are attributed to bacteria.

Increasing Government scrutiny over food safety is improving efforts to restrict microbial pathogens in the food supply—as well as to improve data on the numbers of cases and costs associated with these pathogens. This article is the first in a new Economic Research Service series that will track the estimated costs and incidence of seven foodborne diseases over time (see box on key foodborne pathogens). These diseases were chosen for this series because they are commonly found in meat and poultry.

Public-health officials can compare the cost-of-illness (COI) estimates to identify the most expensive foodborne pathogens and illnesses. COI estimates can also be compared with the costs of pathogen-control programs to determine what level and direction of intervention may be needed.

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Foods Contain Pathogens

Foods are the major source for some pathogens, such as *Listeria monocytogenes, E. coli* O157:H7, *Salmonella,* and *Campylobacter jejuni* (table 1). People also can be exposed to pathogens through inhalation, by drinking contaminated water, and by contact with infected pets, farm animals, and people.

Foods most likely to carry pathogens are high-protein, nonacid foods, such as meat, poultry, seafood, dairy products, and eggs (see box on sources of pathogens). Farm livestock and poultry infected with microbial pathogens may expose other animals in a herd or flock by excreting pathogens, pathogen cysts, or larvae.

However, for most pathogens commonly found on meat and poultry flesh, contamination does not usually occur until slaughter. Slaughtering, defeathering, chilling, and processing stages all provide opportunities for contamination. Accidental puncturing of the intestinal tract during slaughter can lead to widespread contamination of a packing line. Proper sanitation on the farm, in fishing vessels, and in processing plants can reduce the pathogen level on food that goes to retail. Animal products, such as milk and eggs, also require proper handling.

Consumers can reduce their risks from foodborne illness by: cooking foods thoroughly; practicing sanitary kitchen techniques, such as washing utensils and cutting boards that came in contact with raw meat; immediately refrigerating and properly packaging leftover foods; and not consuming unpasteurized milk, and raw or rare meat, poultry, eggs, or seafood. However, consumers cannot protect themselves from all microbial hazards. Some pathogens are not easily killed by cooking or by refrigeration. For instance, if meat and poultry are contaminated with *Staphylococcus aureus* and are held at unsafe temperatures, *S. aureus* can produce heat-stable toxins that are able to withstand temperatures as high as 250°F. *Listeria* can survive and multiply during refrigeration.

Severity of Foodborne Illness Varies

Microbial pathogens in food can cause infections when the pathogens are eaten and are then established in the body, usually multiplying inside human intestinal tracts, and irritating the lining of the intestines. Two pathogens that cause infections are *Listeria* and *Campylobacter*. Sometimes these pathogens invade other

Seven Key Foodborne Pathogens Causing Human Illnesses in the United States

•Symptoms from *Campylobacter jejuni* infections range from a mild illness with diarrhea lasting a day, to severe abdominal pain, severe diarrhea (sometimes bloody), sometimes accompanied by fever, occasionally lasting for several weeks. The incubation period for most cases is 2-5 days and the illness usually lasts from 2 to 10 days, depending on its severity. Although the illness is generally regarded as a relatively mild disease, death can occur in some cases, especially for the very young, very old, or immunocompromised.

•Illness from *Clostridium perfringens* intoxications typically occurs 6 to 24 hours after ingestion of food bearing large counts of this bacteria. The illness in humans is frequently a mild gastrointestinal distress, lasting only around a day. Deaths are uncommon.

•*Escherichia coli* O157:H7 disease is usually a mild gastrointestinal illness that occurs 3 to 5 days after eating contaminated food. However, *E. coli* O157:H7 disease can result in illness requiring hospitalization: hemorrhagic colitis and hemolytic uremic syndrome (HUS). Hemorrhagic colitis is distinguished by the sudden onset of severe abdominal cramps, little or no fever, and diarrhea that may become grossly bloody. Although less than 5 percent of *E. coli* O157:H7 disease cases develop HUS, it is a severe, life-threatening illness. HUS is a disease characterized by red blood cell destruction, kidney failure, and neurological complications, such as seizures and strokes. Most of these HUS cases are children under 5 years old, although the feeble elderly may also be at risk.

•Illness caused by the bacterium *Listeria monocytogenes* may be either mild or severe. Milder cases are characterized by a sudden onset of fever, severe headache, vomiting, and other influenza-type symptoms. Severe cases can result in chronic illness and death. Listeriosis may appear mild in healthy adults and more severe in fetuses, the elderly, and the immunocompromised. Outbreak data show that the incubation period ranges from 3 to 70 days.

•Illness from the bacterium *Salmonella* usually appears 6 to 74 hours after eating contaminated food and lasts for a day or two. Common symptoms are nausea, diarrhea, stomach pain, and sometimes vomiting. In rare cases *Salmonella*, like many other bacterial and parasitic infections, can cause chronic disease syndromes such as arthritis and meningitis. Although the illness is generally regarded as a relatively mild disease, death can occur in some cases—especially for the very young, very old, or immunocompromised.

• *Staphylococcus aureus* intoxications occur usually within 1 to 6 hours following consumption of the toxins produced by the bacteria. In fact, onset of symptoms may occur within 30 minutes of consumption. Illness caused by *S. aureus* enterotoxin is characterized by severe nausea, vomiting, cramps, and diarrhea. Although the illness generally does not last longer than 1 or 2 days, the severity of the illness may indicate the need for hospitalization and possibly for surgical exploration.

•*Toxoplasma gondii* is a parasite that can cause acute or chronic human illness when people eat undercooked pork, mutton, and some other meats. The acute illness has mild flu-like symptoms. People can also be exposed to *T. gondii* through contact with cats or cat excrement. Most people infected with the parasite do not have any symptoms, and some people are at higher risk of getting sick from this parasite. Women infected with *T. gondii* during pregnancy may transmit the infection to their fetus, possibly leading to stillbirths or babies born with birth defects ranging from hearing or visual impairments to mental retardation. People with suppressed immune systems, such as AIDS and cancer patients, are also at higher risk than others from this parasite. One outbreak associated with undercooked meat indicates that the incubation period ranges from 10 to 23 days.

tissues, causing additional infections.

Other microbial pathogens when eaten in food may produce harmful or deadly toxins while growing in the human intestinal tract. These toxic byproducts—not the pathogens themselves—cause human illness. Two pathogens that cause this kind of foodborne illness are *Clostridium perfringens* and *E. coli* O157:H7.

Human illness from microbial pathogens can also occur when someone consumes food tainted with either toxins released during the growth stages of specific bacteria (such as *Staphylococcus aureus*) or mycotoxins produced by molds. Illnesses from these sources tend to occur quickly after consumption, because they do not involve any establishment or growth stage in the human body.

Four main categories of factors increase the risk and severity of a foodborne illness:

- **Microbial factors**, such as the type, strain, and quantity of pathogens or toxins ingested;
- **Host factors,** such as an individual's age, stress level, and strength of immune system;
- **Diet-related factors,** such as nutritional deficiencies; and
- **Other factors,** such as the geographical distribution of pathogens in soil and water.

Researchers are gaining greater knowledge of how these factors place people at greater risk for some pathogens. For example, high levels of iron in a person's blood can increase the risk of illness from ingesting *Vibrio vulnificus*, a deadly seafood pathogen. Some pathogens require ingestion of only very small amounts of a pathogen, or its cysts or larvae, to result in infectious illness. Ingestion of only one cyst, for example, can result in toxoplasmosis.

Most cases of foodborne illness are classified as "acute." These are usually self-limiting and of short duration, although they can range from mild to severe. Gastrointestinal problems and vomiting are common acute symptoms of many foodborne illnesses. Deaths from acute foodborne illnesses are uncommon and more typically occur in the very young, elderly, or patients with compromised immune systems (such as those suffering from AIDS and cancer). However, the U.S. Food and Drug Administration (FDA) estimates that 2 to 3 percent of all acute cases develop secondary long-term illnesses, called "chronic sequelae," such as arthritis.

Chronic sequelae of foodborne illness can occur in any part of the body and subsequently affect the joints, nervous system, kidneys, or heart. These chronic illnesses may afflict the patients for the remainder of their lives or result in premature death. For example, *Campylobacter* infections are estimated to be responsible for 20 to 40 percent of Guillain-Barré syndrome cases (a major cause of paralysis unrelated to

Table 1
Not All Illnesses and Deaths From These Pathogens Are From Food Sources

Pathogen	Estimated total cases	Estimated total deaths	Percent foodborne
	———-Number———		Percent
Selected bacteria:	12,221,795-15,431,860	8,865-12,960	N/A
Campylobacter jejuni or *coli*	2,500,000	200-730	55-70
Clostridium perfringens	10,000	100	100
Escherichia coli O157:H7	10,000-20,000	200-500	80
Listeria monocytogenes	1,795-1,860	445-510	85-95
Salmonella (non-typhoid)	800,000-4,000,000	800-4,000	87-96
Staphylococcus aureus	8,900,000	7,120	17
Parasite:			
Toxoplasma gondii	4,111	82	50
Total	12,225,906-15,435,971	8,947-13,042	N/A

Note: N/A = Not applicable.

Animal Products Are Major Sources of Illness-Causing Pathogens[1]

Pathogen	Food sources
Campylobacter jejuni or *coli*	Major: poultry Minor: milk, mushrooms, clams, hamburger, water, cheese, pork, shellfish, eggs, cake icing
Clostridium perfringens	Major: meat, meat stews, meat pies, and beef, turkey and chicken gravies Minor: beans, seafood
Escherichia coli 0157:H7	Major: beef--particularly ground beef Minor: poultry, cross-contamination has implicated apple cider, raw milk, vegetables, cantaloupe, hot dogs, mayonnaise, salad bar items
Listeria monocytogenes	Major: soft cheese, pâté, ground meat Minor: poultry, dairy products, hot dogs, potato salad, chicken, seafood, vegetables
Salmonella (non-typhoid)	Major: poultry, meat, eggs, milk, and their products Minor: vegetables, fruits, chocolate, peanuts, shellfish
Staphylococcus aureus[2]	Major: meat (especially sliced meat) poultry, fish, canned mushrooms Minor: dairy products, prepared salad dressing, ham, salami, bakery items, custards, cheese
Toxoplasma gondii	Major: pork, mutton Minor: lamb, insufficiently cooked hamburger, raw goat milk

Notes: [1]All the above are bacteria, except for *Toxoplasma gondii* which is a parasite. [2]Most human illness from this pathogen is caused by handling and contaminating food in manufacturing/processing facilities. Source: Adapted from CAST 1994, Benenson 1990, and Bean and others, 1990.

trauma) in the United States. About 5 percent of *E. coli* O157:H7 disease patients develop hemolytic uremic syndrome, which usually involves red blood cell destruction, kidney failure, and neurological complications, such as seizures and strokes.

National surveillance systems and laboratory-based reporting discover only a small percentage of foodborne disease cases. Surveillance systems rely on voluntary reporting by State Health Departments and primarily cover outbreaks. Lab-based systems only cover a handful of pathogens. Even if the disease is required to be reported to CDC, many foodborne illness cases never get associated with a particular pathogen, let alone with a particular food source. People who experience only mild foodborne illness usually do not seek medical treatment.

Only acute cases of some foodborne diseases are routinely documented. Reported cases are sometimes extrapolated to produce national "best estimates" of incidence and deaths. We compare CDC's estimates when possible with data from the medical literature and databases maintained by the National Center for Health Statistics.

Cost-of-Illness Estimates Understate True Social Costs

The costs of seven foodborne illnesses from all food sources range between $5.6 billion and $9.4 billion each year (table 2). For most of the illnesses, we used ranges to reflect uncertainty in the estimates of annual number of cases and/or deaths.

Estimated costs of foodborne illnesses vary because the incidence and severity of the illness are both factors. Salmonellosis and toxoplasmosis cases are the two most costly of the seven foodborne illnesses—largely because of the high number of annual *Salmonella* cases and because of the severity of chronic illness caused by *Toxoplasma gondii.*

Salmonella is a major cause of foodborne illness in most developed countries—including the United States and Canada. In the United States alone, estimated salmonellosis infections numbered as high as 3.8 million cases in 1993, and were responsible for an estimated $0.6 bil-

Table 2
Toxoplasma gondii and _Salmonella_ Ranked as the Most Costly Foodborne Pathogens in 1993

Pathogen	Estimated cases	Estimated foodborne— Deaths	Costs
	———————Number———————		Billion dollars
Selected bacteria:	3,603,526 - 7,130,767	2,654-6,546	2.9-6.7
Campylobacter jejuni or *coli*	1,375,000 - 1,750,000	110-511	0.6-1.0
Clostridium perfringens	10,000	100	0.1
Escherichia coli O157:H7	8,000 - 16,000	160-400	0.2-0.6
Listeria monocytogenes	1,526-1,767	378-485	0.2-0.3
Salmonella	696,000 - 3,840,000	696-3,840	0.6-3.5
Staphylococcus aureus	1,513,000	1,210	1.2
Parasite:			
Toxoplasma gondii	2,056	41	2.7
Total	3,605,582 - 7,132,823	2,695-6,587	5.6-9.4

lion to $3.5 billion in medical costs and lost productivity.

Although *Toxoplasma gondii* causes far fewer incidents of foodborne illness than do the other six pathogens (table 2), the estimated total annual costs are relatively high because of its disease severity. The estimated $2.7 billion annual cost of toxoplasmosis reflects three types of costs: productivity losses because of death or impairment, medical costs incurred from birth through adulthood, and residential care or special education required because of physical or mental disabilities caused by the disease.

COI estimates are calculated from the number of acute and chronic foodborne illness cases and deaths caused by each pathogen each year, the corresponding medical costs, costs of lost productivity, and other illness-specific costs, such as special education and residential care costs.

For each severity group, medical costs are estimated for physician and hospital services, supplies, medications, and special procedures unique to treating the particular foodborne illnesses. Such costs reflect the number of days/treatments of a medical service, the average cost per service/treatment, and the number of patients receiving such service/treatment.

Most people with foodborne illnesses only miss a day or two of work. However, some patients die or contract such physical complications that they never return to work, regain only a portion of their pre-illness productivity, or switch to less demanding and lower paying jobs. Lost productivity due to a foodborne illness is the present value (in today's dollars) of the lifetime stream of income the person would have earned if she or he had not had the foodborne illness. The total cost of lost productivity is the sum for all individuals affected, including the patients and their parents or paid caretakers in the case of ill children.

The COI method of computing the costs of foodborne illnesses underestimates costs to society, because the data cannot account for some costs that are difficult to measure (such as pain and suffering). Future analysis will explore methods to make more comprehensive estimates.

Our estimates of the annual costs to society of foodborne illness would increase considerably if:

- All foodborne pathogens were included in the analysis,
- All chronic illnesses that are triggered by foodborne disease were considered, and
- Less conservative estimates were used to value premature death.

Estimates Might Be Larger in the Next Decade

The number of cases of people affected by foodborne illness each year might increase with improved statistical reporting and estimation procedures. The proportion of the population that is highly susceptible to microbial foodborne illness is growing, largely due to the aging of the U.S. population and to the spread of chronic diseases (such as AIDS) that suppress the immune system. The pressure will be on reg-

ulators, processors, marketers, and consumers to become more vigilant in preventing and controlling foodborne illness.

New pathogen tests and improved epidemiological methods will allow us to recognize more human illnesses that have foodborne sources. Future advances in science can be expected to lead to the discovery of new links between microbial pathogens and chronic human illnesses. For example, *E. coli* O157:H7 was newly identified in 1985 as a foodborne pathogen causing chronic kidney failure in children.

Continuing technological and informational advances in the food marketing system (such as in refrigerating, pasteurizing, and labeling) have led to improved control techniques. For example, CDC researchers estimate that listeriosis cases have fallen by 44 percent in the last decade due to educational, industry, and regulatory efforts to reduce *Listeria* contamination of foods and subsequent illnesses.

Just as researchers find new control and treatment techniques, pathogens mutate. The short lifespan of the pathogens encourages improved virulence through quick adaptation to changes in their environment. Under favorable conditions, some bacteria replicate every 15-30 minutes. Researchers are concerned about a new strain of *E. coli* O157:H7 associated with a recent outbreak from dry salami. This strain appears to be more acid-tolerant, can survive at higher temperatures, and may more easily survive storage and cooking than some other *E. coli* strains—potentially resulting in more human illnesses.

The recent trend toward increased consumption of convenience foods and meals and snacks outside the home can pose greater food-safety risks, especially for the immunocompromised. For example, microwave heating of foods can be uneven—potentially creating an atmosphere for some parasites and bacteria to survive. Eating away from home (at places such as restaurants, fast-food outlets, nursing homes, and schools) means that consumers have less control over how their food is stored, handled, and cooked.

Public-health officials recognize these food-safety problems all along the food chain and are taking action. FDA continues to update the Model Food Code to help ensure safer food in restaurants, institutions, and supermarkets. USDA regulations now require labels describing safe-handling practices on all packages of raw meat and poultry sold at retail. Three States—Florida, California, and Louisiana—require restaurants serving raw shellfish to display warnings to customers about potential risks of consuming raw shellfish.

FDA, CDC, and USDA's Food Safety and Inspection Service (FSIS) are collaborating on a 6-month pilot project to improve estimates of which pathogens are responsible for diarrheal disease and to identify risk factors that increase or decrease the chances of becoming ill. Better information can be used to improve the design of control programs. *Salmonella* and *E. coli* 0157:H7 will be targeted first, followed by additional pathogens as the study gets underway.

In early 1995, FSIS published a proposal on the Hazard Analysis Critical Control Point (HACCP) approach to improving inspection practices for meat and poultry. HACCP is a science-based strategy to identify critical points in the manufacturing process that require special attention for pathogen control. FDA has promulgated a similar HACCP plan for seafood.

Successful implementation of HACCP by FSIS, as well as improved consumer awareness of food-safety risks, would be important components to reducing the number of foodborne illness cases from eating meat and poultry since the slaughter/processing facility and the home are two key control points.

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U.S. Trade Surplus in Processed Foods Expected To Continue

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The United States is among the world leaders in both exports and imports of processed foods and beverages. U.S. processed food firms buy and sell in a near trillion-dollar worldwide market for all goods. The appeal of U.S. brand names, influence of U.S. multinational firms abroad, and leading role played by the United States in global commerce suggest a major role for the United States in processed food trade for years to come.

In 1994, the United States exported $25.8 billion worth of processed foods. Five industries have accounted for half of these exports in recent years. Most produce minimally processed products, such as fresh and frozen meats, frozen fish, soybean oil, and canned fruits and vegetables. The dominance of these industries reflects U.S. efficiency in field crops and meat and poultry production.

The fastest growing processed food and beverage exports over the past few years have been in industries with relatively low trade volumes. Many of these exports are highly processed, brand-name products, such as frozen bakery products, chewing gum, and soft drinks. Their growth reflects rising incomes, changing demographics, and the westernization of eating habits in many developing countries. These factors have led to increases in demand for U.S. foods and beverages.

"Processed" Foods Cover a Wide Territory

This article covers exports and imports listed in the Standard Industrial Classification code 20 (known as SIC-20)—processed foods, beverages, and related products. SIC-20 is comprised of 48 food processing industries. Products from SIC-20 industries are often referred to as "value-added"—meaning that some combination of labor, technology, and materials has been applied to raw commodity inputs, such as wheat and yeast, in order to transform them into products like breads or pastries. The processing may be minor, as in the case of canned fruits and vegetables, or may be quite extensive, as in the conversion of cocoa, sugar, milk, and nuts into candy bars.

Some processed foods are sold at a number of value-added levels. For example, beef sold "on hoof" is listed as a raw commodity and

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Processed Food Trade Concordance

The U.S. export and import statistics in this article are based on data collected by the U.S. Customs Service using the international Harmonized System (HS). The HS trade data include over 2,000 processed foods and beverages traded between the United States and more than 200 countries. The United States adopted the HS in 1989, so 1990 is the first full year of comparable data.

Researchers with USDA's Economic Research Service (ERS) have paired the 48 domestic food processing industries composing SIC-20 with their corresponding codes in the international HS. The Standard Industrial Classification System (SIC) is a Federal classification system that assigns U.S. establishments or plants to groups based on their principal activity. The result is a self-contained reference for use in statistical and analytical work where exports and imports of individual products and industries must be jointly evaluated.

More details on these data sets and the pairing process can be found in *Processed Food Trade Concordance* (AH-707), by Walter B. Epps and J. Michael Harris, USDA, ERS, March 1995. Call toll-free 1-800-999-6779 for price and ordering information.

would not be included in SIC-20. However, as beef moves through various distribution channels toward the consumer, it becomes a processed product—whether it is sold as carcass beef, as boxed beef, or as a shrink-wrapped steak in the grocer's display case. Many processed foods are brand-name products from well-known companies (such as Pillsbury or Hersheys). However, a number of processed food products reflect very little product differentiation between various suppliers (such as milk, soybean oil, or animal feed).

Trade Surpluses Began in 1991

With exports exceeding imports for the first time, the U.S. processed food industry turned a corner in 1991, posting a net trade surplus of $156 million (table 1). Previously, trade deficits in processed foods and beverages were standard, on the order of $5 billion per year in the mid-1980's. Then, U.S. exports of processed foods more than doubled between 1985 and 1992, reducing those deficits during the late 1980's and finally reversing them in the early 1990's. Imports also grew, but at a slower pace, increasing only 37 percent during this same time period.

Eleven food processing industries generated $1 billion trade surpluses over the 5-year period of 1990-94 (table 2). (We report 5-year combined totals to more accurately reflect the rankings of U.S. food processing industries and trading partners for the entire 1990-94 period.) Four of these 11 industries were grain mill processors (wet corn milling, rice milling, prepared animal feeds, and flour and grain mill products), 2 were meat processors (meatpacking and poultry processing), and 2 were fats and oils manufacturers (soybean oil mills and animal and marine fats). Together, these eight industries reflect the strength of U.S. competitiveness in field crops and meat and poultry production. The two industries most responsible for the surplus in food products trade were soybean oil mills and meatpacking, with $8.1 billion and $7.9 billion trade surpluses, respectively, during 1990-94. Wet corn milling and poultry processing also averaged over $1 billion per year in trade surpluses during that period.

Five industries averaged over $1 billion per year in export sales between 1990 and 1994: meatpacking (including hides and skins), prepared and frozen fish (hereafter designated as "frozen fish"), soybean oil mills, wet corn milling, and poultry processing. Together, they accounted for half of total U.S. processed food exports during 1990-94. Meatpacking alone, at $22.4 billion in export sales, accounted for 20 percent (table 3). Sixteen industries were responsible for over 80 percent of U.S. processed food exports.

Of the 11 food processing industries with billion-dollar trade surpluses during 1990-94, only 7 were also top-10 exporters. That is, three industries (frozen fish, canned fruits and vegetables, and the miscellaneous category) were among the largest export industries, but also were large importers relative to their export activity. In fact, the frozen fish industry was the largest contributor to the deficit in processed food trade despite being the second-largest export industry.

Five U.S. food processing industries averaged over $1 billion per year in imports during 1990-94: frozen fish; meatpacking; canned fruits and vegetables; distilled and blended spirits; and wines, brandy, and brandy spirits. Together, these constituted 54 percent of total U.S. processed food imports during 1990-94, with frozen fish alone accounting for 22 percent of the U.S. total. The top 12 industries accounted for over 80 percent of all U.S. processed food imports.

Smaller Industries Posted Higher Growth Rates

Among the 10 leading export industries, the largest export increases in the last few years were in poultry

Table 1
Surplus in U.S. Processed Food Trade Every Year Since 1991

U.S. processed food trade	1990	1991	1992	1993	1994	5-year total, 1990-94
			Million dollars			
Exports	18,706	20,223	22,839	23,387	25,828	110,983
Imports	20,129	20,067	21,215	21,126	23,263	105,800
Trade balance	-1,422	156	1,623	2,261	2,565	5,183

processing, with a 75-percent increase in 1993/94 (combined years) over 1991/92, and the miscellaneous category with an 83-percent increase. "Miscellaneous" industries include prepared foods and miscellaneous food specialties not elsewhere classified, and such diverse products as leavening compounds, peanut butter, tea, spices, vinegar, and cider.

Table 2
Eleven Industries Generated Billion-Dollar Surpluses in U.S. Processed Food Trade

Industry	5-year total, 1990-94
	Million dollars
Soybean oil	8,100
Meatpacking	7,880
Wet corn milling	5,423
Poultry processing	5,233
Rice milling	3,379
Animal/marine fats and oils	2,653
Flavoring extracts and syrups	2,565
Prepared animal feed	2,085
Salted/roasted nuts and seeds	2,044
Dried fruits and vegetables	1,625
Flour and grain mill products	1,448

Table 3
Leading U.S. Food Export and Import Industries by Trade Value

Industry	5-year total, 1990-94	Share of SIC-20 shipments	Cumulative share of SIC-20 shipments
	Million dollars		*Percent*
U.S. exports:			
Meatpacking	22,396	20.2	20.2
Prepared and frozen fish	12,945	11.7	31.9
Soybean oil	8,272	7.5	39.3
Wet corn milling	6,557	5.9	45.2
Poultry processing	5,379	4.8	50.1
Salted/roasted nuts and seeds	4,000	3.6	53.7
Canned fruits and vegetables	3,965	3.6	57.2
Rice milling	3,877	3.5	60.7
Other food preparations	3,659	3.3	64.0
Animal/marine fats and oils	3,182	2.9	66.9
U.S. imports:			
Prepared and frozen fish	23,778	22.5	22.5
Meatpacking	14,516	13.7	36.2
Canned fruits and vegetables	6,606	6.2	42.5
Distilled and blended spirits	6,334	6.0	48.5
Wines, brandy, brandy spirits	5,989	5.7	54.1
Processed fishery products	4,913	4.6	58.8
Malt beverages	4,693	4.4	63.2
Vegetable oil	4,198	4.0	67.2
Cane sugar	3,711	3.5	70.7
Other food preparations	3,545	3.4	74.0

The largest growth, however, in both imports and exports of U.S. processed foods over the past few years came from industries with relatively low trade volumes. Six low-volume industries more than doubled their import levels between 1990/91 and 1993/94: ice cream and frozen desserts, frozen bakery products (except bread), blended and prepared flours, flour and grain mill products, animal and marine fats, and cottonseed oil. The largest of these six—animal and marine fats—ranked only 27th in the volume of U.S. imports among all 48 SIC-20 industries, with a combined total of $529 million worth of imports during the 5-year period 1990-94.

Export volumes for seven industries more than doubled between 1990/91 and 1993/94: frozen bakery products, potato chips and snacks, chewing gum, frozen specialties, blended and prepared flours, soft drinks and carbonated water, and ice cream and frozen desserts (table 4). Again, the fastest growth occurred among the industries with smaller export volumes. The largest of these seven—soft drinks and carbonated water—ranked only 24th in total export volume during 1990-94, with just under $1 billion in total export sales.

Varied Destination and Source Countries

The United States exports processed foods and beverages to nearly every country in the world. Relatively few countries, however, constitute the bulk of the business. During 1990-94, the United States exported a total of $111 billion in processed foods to 227 countries, including the 15 nations of the former Soviet Union.

Four countries imported an average of over $1 billion worth of U.S. processed food products per year

during 1990-94: Japan, Canada, Mexico, and South Korea. These buyers accounted for 55 percent of total U.S. exports of processed foods and beverages during this period (table 5). Japan imported $29.6 billion worth of processed food from the United States during 1990-94 and accounted for 27 percent of U.S. processed food exports. Nearly two-thirds of Japan's 1990-94 total imports of U.S. processed foods were from two industries—$10.2 billion worth of meatpacking and $9.1 billion worth of frozen fish. Japan also imported large amounts of U.S. frozen fruits and vegetables, prepared feeds, and poultry.

Canada was the second-largest destination for U.S. exports, spending $16.7 billion for processed food imports from the United States during 1990-94. Meatpacking, frozen fish, canned fruits and vegetables, and the miscellaneous category were the leading U.S. export industries for Canadian markets. Each of these industries generated over $1 billion worth of U.S. exports to Canada during 1990-94. However, these four industries constituted only 35 percent of total U.S. processed food exports to Canada. The remainder was a large and diverse mix of products, with an additional 31 industries shipping at least $100 million in processed food exports to Canada during 1990-94.

Ten countries accounted for more than 70 percent of total U.S. processed food exports (table 5). Three of these importers were newly industrialized countries in East Asia: South Korea, Taiwan, and Hong Kong.

U.S. imports of processed foods are more widely sourced. The top 10 suppliers accounted for only 58 percent of total U.S. imports of processed foods (table 5). These suppliers included three developing countries: Thailand, Mexico, and Brazil. Five countries averaged more than $1 billion per year in processed food exports to the United States during 1990-94: Canada, Thailand, Mexico, Australia, and France.

Although by far the leading exporter of processed foods to the United States, Canada commanded only a 19-percent share of the market during 1990-94. The dominant U.S. imports from Canada were from the same two industries that led U.S. exports to Canada: meatpacking and frozen fish. These two industries accounted for 44 percent

Table 4
Foreign Sales More Than Doubled in the Past Few Years for the Fastest Growing U.S. Processed Food Exports

Industry	Combined calendar years 1990/91	1993/94
	Million dollars	
Frozen bakery products	32	92
Potato chips and snacks	154	427
Chewing gum	46	122
Frozen specialties	42	111
Blended and prepared flours	99	215
Soft drinks and carbonated water	240	518
Ice cream and frozen desserts	80	164

Table 5
Japan and Canada Are the Largest Markets for U.S. Processed Food Exports

Country	5-year total, 1990-94	Share of SIC-20 shipments	Cumulative share of SIC-20 shipments
	Million dollars		*Percent*
U.S. exports:			
Japan	29,584	26.7	26.7
Canada	16,693	15.0	41.7
Mexico	9,011	8.1	49.8
South Korea	6,013	5.4	55.2
The Netherlands	3,915	3.5	58.8
United Kingdom	3,006	2.7	61.5
Germany	2,593	2.3	63.8
Taiwan	2,492	2.2	66.1
Hong Kong	2,461	2.2	68.3
France	2,145	1.9	70.2
U.S. imports:			
Canada	19,626	18.6	18.6
Thailand	6,515	6.2	24.7
Mexico	5,507	5.2	29.9
Australia	5,309	5.0	34.9
France	5,040	4.8	39.7
Brazil	4,318	4.1	43.8
New Zealand	4,131	3.9	47.7
Italy	4,123	3.9	51.6
United Kingdom	3,413	3.2	54.8
The Netherlands	3,081	2.9	57.7

of U.S. processed food imports from Canada. For example, in 1994 the United States imported $377 million worth of beef from Canada (primarily to serve west coast markets) while at the same time exporting $365 million worth of beef to Canada (primarily to serve the eastern half of Canada).

Thailand, the second-largest import source for U.S. processed foods, attained only a 6-percent share of the U.S. import market. Prepared and frozen fish and canned and cured fish made up 70 percent of U.S. processed food imports from Thailand. Over half of U.S. imports of Mexican processed food products consisted of frozen fish, frozen fruits and vegetables, and malt beverages. Meat products accounted for 74 percent of U.S. imports of processed food from Australia, while wine, brandy, and brandy spirits accounted for 65 percent of U.S. processed food imports from France.

Developing Countries, Growing Markets

Six countries, among them four East Asian nations, were responsible for 70 percent of the increase in U.S. processed food exports between 1990 and 1994. All four of these Asian countries are growing markets, as are many of their "smaller" neighbors (such as Thailand and Singapore). A large portion of increased U.S. exports to Canada and Mexico can be attributed to recent reductions in trade barriers between the United States and these two countries.

A number of the East Asian countries have major import barriers in place for certain products, which, if removed, could substantially increase U.S. exports there. For example, U.S. beef exports to South Korea are restricted because of import quotas and high tariffs.

Many of the fastest growing destinations for U.S. processed food exports are small, developing countries. U.S. export data for these countries may include some U.S. food aid in addition to commercial sales. However, food aid accounts for less than 2 percent of processed food exports. Among those nations importing at least $1 million worth of U.S. processed foods in 1990/91, 12 more than doubled their purchases by 1993/94. Countries with the largest percentage increases were: China, Hungary, Argentina, the Sudan, Poland, Tunisia, Colombia, Guyana, Paraguay, Kuwait, Yemen, and Costa Rica. China's imports of U.S. processed foods swelled 473 percent, from $63.3 million in 1990/91 to $362.7 million in 1993/94.

Outlook for U.S. Processed Food Exports

The recent trends in U.S. trade in processed foods will likely continue into the near future. The processed food trade surplus that originated in 1991 has continued to grow every year. Exports have exhibited strong growth in the past decade, particularly in a number of food processing industries with historically smaller export levels. Import growth has been at a much slower rate.

Although the industrialized countries of Western Europe have long served as major sources and destinations for U.S. processed foods and beverages, trade between the United States and Western Europe has not grown much in recent years. Thus, the share of U.S. exports going to Western Europe is expected to slowly decline.

Trade in value-added products is generally more sensitive to changes in income levels, changes in demographics, and westernization of diets in importing countries than is trade in raw commodities. As incomes have increased in developing countries, these countries (particularly the newly industrialized countries of East Asia) have become the fastest growing destinations for U.S. processed food exports. Income growth is crucial in order to increase U.S. processed food exports to the more highly populated, lower income countries like China, Vietnam, Indonesia, and India.

Since the signing of major trade agreements, U.S. exports of processed food and beverages to Mexico and Canada have increased. These trends will likely continue, even though 1995 exports to Mexico are down temporarily due to the devaluation of the peso. Further negotiations on trade agreements with other Western Hemisphere countries—notably Chile, Costa Rica, Brazil, Argentina, Uruguay, and Paraguay—could increase U.S. exports to Latin America.

U.S. companies are investing in continued future growth of U.S. processed food and beverage sales. Many U.S. firms are directly investing in overseas processed food plants. However, such investment has not diminished their export levels. Leading U.S. multinational food processors are clearly expanding U.S. exports, even as they increase their investments in foreign food processing facilities. A sample of leading U.S. food processors shows that sales from their foreign plants rose 56 percent between 1988 and 1993, while exports from their U.S. plants grew even faster—143 percent. ■

World Food Consumption Up, But Not Everywhere

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Rapid income growth, especially in China and other Asian nations, boosted world average caloric intake to record levels in many regions during 1990-92, mainly from increased consumption of cereals, meat, and vegetable oils. Average daily food use, measured as the calories available for human consumption (see box for more details), climbed to nearly 2,700 calories worldwide in the early 1990's, rising from just under 2,400 calories two decades ago.

Growth was particularly strong in the developing countries of Asia, led by a 33-percent increase since 1970-72 in caloric intake in China and 13-percent growth in Hong Kong, Malaysia, the Republic of Korea, and Thailand (see box for regional descriptions). In Latin America, a large increase in food availability in the 1970's had slowed by the 1980's, and caloric intake held steady at about the world average. Consumers in the European Union, Canada, the United States, and most other industrialized nations continued to struggle with the health consequences of excess food consumption. An average of 3,500 calories per day was available for consumption to people in these areas, higher than the U.S. recommended 1,300 to 3,000 calories for consumers over 2 years of age.

Many, however, did not share in the growing food abundance enjoyed in parts of Asia and the industrialized world—particularly those in the least developed countries. For many people in the poorest countries, undernutrition caused by inadequate energy and/or nutrient intake continues to be a major force behind increased rates of infection

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The Food Balance Sheet Data

Food consumption trends for 1970-92 are based on the United Nations Food and Agriculture Organization (FAO) Agrostat database, which includes annual food production, trade, and consumption estimates for most countries and world regions. Per capita food consumption is estimated at the national level using a type of food balance sheet, because the costs associated with individual or household-level food intake surveys are prohibitive for many countries.

Food balance sheets provide information about a country's average per capita daily food supply, based on commodity flows from production to end uses. The total supply of each commodity equals domestic production plus imports and drawdowns from existing stocks. The food balance sheet is not a measure of actual food consumption, because it does not account for losses due to food preparation or waste (from households or institutions). Consumption is estimated from the amount left over after subtracting other uses from available supplies, such as exports, seed use, livestock feed, food and nonfood manufacturing, farm waste, and marketing waste due to transport and retail losses. Per capita food consumption is then estimated by dividing the total food supply by the resident population of a given country. Estimates are also made for per capita intake of total energy and the individual nutrients of fat and protein.

Food balance sheets are most useful as a tool for measuring long-term trends in national food availability and food composition, and for comparing food use to nutritional requirements. They are also useful for determining the extent to which countries rely on food imports to meet their nutritional needs. However, the national averages presented in the food balance sheet may mask important deviations from trends in energy and nutrient intake among individuals, households, and population groups within a particular country.

Table 1
Developing Countries' Diets Becoming More Varied, with More Calories From Meat, Dairy Products, and Vegetable Oils

Region	Total foods	Cereals	Starchy roots and pulses	Fruits and vege-tables	Sugar and sweet-eners	Meat and poultry	Milk and other dairy	Fish and seafood	Vege-table oils	Animal fats[1]
	Average calories per person	*Percent of total calories*								
World:										
1970-72	2,384	50.7	10.5	4.3	8.7	6.1	4.2	.8	5.7	2.8
1980-82	2,540	51.8	8.4	4.3	8.6	6.4	4.1	.8	7.0	2.5
1990-92	2,683	51.7	7.3	4.4	8.4	7.0	4.0	.9	.1	2.1
Industrialized countries:										
1970-72	3,139	27.1	5.1	5.3	14.0	12.5	8.6	1.6	9.5	6.4
1980-82	3,221	26.3	4.3	5.2	13.1	13.2	8.7	1.6	10.7	6.1
1990-92	3,404	26.0	4.3	5.6	13.1	13.3	8.5	1.8	12.3	5.1
United States and Canada:										
1970-72	3,222	18.7	3.9	4.9	18.1	16.4	10.6	.7	10.5	6.4
1980-82	3,326	19.6	3.6	5.4	16.6	15.6	10.1	.7	12.0	6.2
1990-92	3,642	22.1	3.7	5.9	16.6	14.5	9.9	.9	12.8	5.1
European Union:										
1970-72	3,234	26.1	6.3	5.7	11.6	12.4	8.5	1.1	10.2	7.6
1980-82	3,344	24.6	5.4	5.5	11.1	8.9	1.0	10.9	7.5	7.5
1990-92	3,493	23.3	5.1	6.1	10.8	14.8	8.8	1.2	13.4	6.3
Eastern Europe:										
1970-72	3,343	41.1	7.2	3.7	10.5	8.5	8.1	.6	5.1	.3
1980-82	3,431	37.2	6.0	4.2	10.8	10.6	7.9	.6	6.3	.5
1990-92	3,285	36.6	5.5	4.0	10.8	11.3	8.2	.6	7.1	.4
Developing countries:										
1970-72	2,147	60.7	12.7	3.9	6.4	3.4	2.2	.6	4.2	1.0
1980-82	2,352	60.7	9.8	4.0	7.0	4.0	2.4	.6	5.7	1.1
1990-92	2,520	59.3	8.1	4.0	7.0	5.1	2.6	.7	7.0	1.1
Africa developing:										
1970-72	2,159	47.6	21.3	5.9	4.7	2.7	2.4	.6	7.0	.9
1980-82	2,257	48.3	18.3	5.7	6.0	2.8	2.8	.7	.4	1.0
1990-92	2,256	48.7	19.5	5.6	5.6	2.7	2.5	.6	.5	0.8
North Africa:										
1970-72	2,312	60.8	3.3	5.2	8.9	2.3	2.9	.3	9.6	1.6
1980-82	2,854	58.1	3.7	4.9	10.4	2.3	3.2	.4	10.9	1.8
1990-92	3,124	57.8	4.2	5.2	9.9	2.5	3.1	.4	11.0	1.5
Asia developing:										
1970-72	2,094	66.7	11.2	3.1	5.2	2.8	1.7	.6	3.3	.9
1980-82	2,315	66.9	8.4	3.4	5.5	3.5	1.8	.6	4.8	1.0
1990-92	2,542	64.7	6.1	3.6	5.9	5.0	2.2	.7	6.1	1.0
Latin America developing:										
1970-72	2,503	39.0	12.5	6.2	15.7	7.5	5.2	.5	6.1	2.2
1980-82	2,730	38.2	9.5	5.4	16.7	8.1	5.5	.5	.9	2.1
1990-92	2,737	38.3	8.0	5.2	16.2	8.1	5.4	.5	11.0	2.0
Least developed:										
1970-72	2,020	60.5	15.9	4.2	4.2	2.6	2.3	.7	4.0	.6
1980-82	2,046	60.7	16.2	4.2	3.6	2.5	2.6	.6	4.7	.6
1990-92	2,043	62.2	15.3	4.0	3.4	2.3	2.3	.6	5.3	.5

Notes: [1]Includes butter, lard, fish oils, and edible tallow. Source: Selected commodities from FAO Agrostat database.

Table 2
Cereals Remain a Staple Food in the Developing World

Region	Cereals	Starchy roots and pulses	Fruits and vegetables	Sugar and sweeteners	Meat and poultry	Milk and other dairy	Fish and seafood	Vegetable oils	Animal fats[1]
	Pounds per capita							Grams per capita	
World:									
1970-72	328.0	180.7	237.9	46.6	56.5	143.7	22.9	15.3	7.3
1980-82	356.4	157.4	259.3	49.4	62.2	152.3	23.8	20.0	7.2
1990-92	375.2	141.7	281.2	51.6	69.1	154.6	28.3	24.7	6.4
Industrialized countries:									
1970-72	247.9	162.3	412.6	99.2	162.0	412.0	55.8	33.5	22.3
1980-82	247.4	145.9	430.3	96.3	177.6	446.7	55.5	39.1	22.0
1990-92	258.2	149.1	492.1	102.9	191.1	469.4	66.9	47.2	19.0
United States and Canada:									
1970-72	182.0	137.3	420.4	129.3	238.0	516.2	33.0	38.1	23.0
1980-82	196.6	128.5	469.7	126.0	236.5	515.5	36.3	45.2	23.2
1990-92	243.6	141.4	571.8	142.1	253.2	565.0	49.4	52.5	20.7
European Union:									
1970-72	254.6	212.8	434.5	85.2	152.7	430.6	48.4	37.2	27.5
1980-82	249.3	190.6	446.3	83.8	180.4	500.1	45.3	41.3	28.0
1990-92	242.4	187.9	523.6	85.2	192.4	522.9	54.0	52.8	24.3
Eastern Europe:									
1970-72	420.9	262.9	312.5	80.1	126.1	410.1	18.4	19.5	30.7
1980-82	392.1	219.8	367.9	83.8	161.3	430.7	18.4	24.4	32.4
1990-92	352.0	199.5	342.2	80.1	164.5	394.3	18.0	26.3	30.6
Developing countries:									
1970-72	346.7	183.0	187.7	31.3	25.3	61.7	14.0	10.1	2.5
1980-82	381.2	158.4	215.6	37.3	32.1	74.4	16.3	15.3	2.9
1990-92	399.8	138.7	236.3	40.3	41.7	83.9	20.5	20.0	3.1
Africa developing:									
1970-72	275.0	335.0	217.8	23.5	25.9	61.0	15.1	17.0	2.1
1980-82	291.3	304.2	222.6	30.9	28.0	74.1	18.4	21.4	2.5
1990-92	293.5	328.8	219.4	28.7	27.0	68.6	15.7	21.6	2.1
North Africa:									
1970-72	408.4	39.8	260.0	46.8	24.7	91.0	7.4	25.0	4.7
1980-82	478.0	60.6	322.3	67.2	31.1	125.8	12.7	35.1	6.3
1990-92	518.6	79.3	391.4	70.5	37.9	138.0	15.2	38.8	6.0
Asia developing:									
1970-72	371.3	152.5	167.4	24.7	18.3	44.1	13.6	7.9	2.0
1980-82	412.3	129.7	203.0	29.0	24.7	54.0	15.4	12.4	2.4
1990-92	438.6	99.1	231.0	33.9	37.3	68.9	21.8	17.6	2.9
Latin America developing:									
1970-72	262.6	208.0	287.5	88.9	73.9	187.5	15.4	17.3	6.0
1980-82	284.2	166.2	287.4	102.9	87.3	215.8	19.5	27.6	6.4
1990-92	286.6	139.7	289.7	100.2	91.3	208.0	18.7	34.2	6.2
Least developed:									
1970-72	318.2	219.6	142.3	19.0	21.2	49.5	16.8	9.1	1.5
1980-82	322.2	229.0	138.7	16.4	20.9	56.6	13.8	11.0	1.5
1990-92	329.1	221.3	131.5	15.6	19.7	51.0	14.9	12.1	1.2

Notes: [1]Includes butter, lard, fish oils, and edible tallow. Source: Selected commodities from FAO Agrostat database.

and infant mortality, reduced productivity, and shortened lifespans. The United Nations Food and Agriculture Organization (FAO) estimates that 350 million to 500 million people in the least developed countries in 1992, over two-thirds of their population, consumed too little food to meet their energy needs. Between 1970-72 and 1990-92, food consumption in the least developed countries remained stagnant at about 2,000 calories per day. Low incomes (averaging less than $400 per capita per year), rising food prices due to changing agricultural policies, and poor access to productive resources with which to grow food are the most frequent causes of undernutrition in the poorest countries.

Worldwide, Rising Incomes Lead to New Food Choices

Despite continued undernutrition in most of the least developed countries, total food consumption increased and the type of foods consumed changed considerably in other developing countries—particularly in China—due to their rising incomes, increased urbanization, and growing dependence on food imports. Diets in developing countries typically have been heavily based on carbohydrates, with 60 percent or more of calories obtained from "starchy staples," such as cassava, sweet potatoes, corn, barley, and sorghum. As incomes rise above subsistence levels, diets tend to diversify into more expensive and higher protein grains, such as wheat and rice. Additional income growth expands dietary variety, including consumption of higher value foods, such as fruits, vegetables, animal products, and processed foods—among them fats and oils, baked goods, beverages, and confectionery products.

Cereals Remain a Dietary Staple

Cereals continue to be an inexpensive source of calories and nutrients, with consumption in most developing countries remaining at a fairly steady 60 percent of calories during the past two decades. This is about twice the share common in most industrialized countries. In the wealthiest nations, high incomes support the consumption of relatively more expensive sources of calories, including meats, dairy products, and fresh fruits and vegetables.

Despite the continued prominence of cereals, important shifts have occurred in other components of the diet. While starchy roots remain an important source of calories in many of the least developed countries, including Sub-Saharan Africa, they accounted for only 5 percent of total energy in developing countries as a

World Economic Regions

Countries of the world are grouped according to economic regions defined by the United Nations Food and Agriculture Organization.

Developed Countries

Industrialized countries—United States, Canada, Japan, the European Union-12 (Belgium-Luxembourg, Denmark, France, Germany, Greece, Ireland, Italy, The Netherlands, Portugal, Spain, and United Kingdom), Australia, Austria, Finland, Vatican City, Iceland, Israel, Liechtenstein, Malta, Monaco, New Zealand, Norway, South Africa, Sweden, and Switzerland.

Eastern Europe—Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Czech Republic, Hungary, Macedonia, Poland, Romania, Serbia, Slovakia, Slovenia.

Developing Countries

Africa—North Africa (Algeria, Egypt, Libya, Morocco, and Tunisia) and Sub-Saharan Africa, excluding South Africa.

Asia—Near East, including Iran, Iraq, Saudi Arabia, and Turkey; South Asia, including India; other Asia, including China, Hong Kong, Korean Republic, Malaysia, Singapore, the Philippines, Thailand, and Vietnam.

Latin America—The Caribbean, including Cuba; Central America, plus Mexico; and South America, including Brazil.

Oceania—Central and South Pacific islands of Oceania, including Papua New Guinea and New Caledonia. Excludes Australia and New Zealand.

Least Developed Countries
(these are the lowest-income developing countries)

Africa—Benin, Botswana, Burkina Faso, Burundi, Cape Verde, Central African Republic, Chad, Comoros, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, The Gambia, Guinea, Guinea-Bissau, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Rwanda, Sierra Leone, Somalia, the Sudan, Sao Tome Principe, Tanzania, Togo, Uganda, Yemen, Zaire, and Zambia.

Asia—Afghanistan, Bangladesh, Bhutan, Cambodia, Laos, Maldives, Myanmar, and Nepal.

Latin America—Haiti.

Oceania—Central and South Pacific islands of Kiribati, Samoa, Solomon Islands, Tuvalu, and Vanuatu.

whole during 1990-92. Their share in the diet declined in most world regions. Significant declines also occurred in the consumption of vegetable-based protein foods, including dry beans, peas, and lentils.

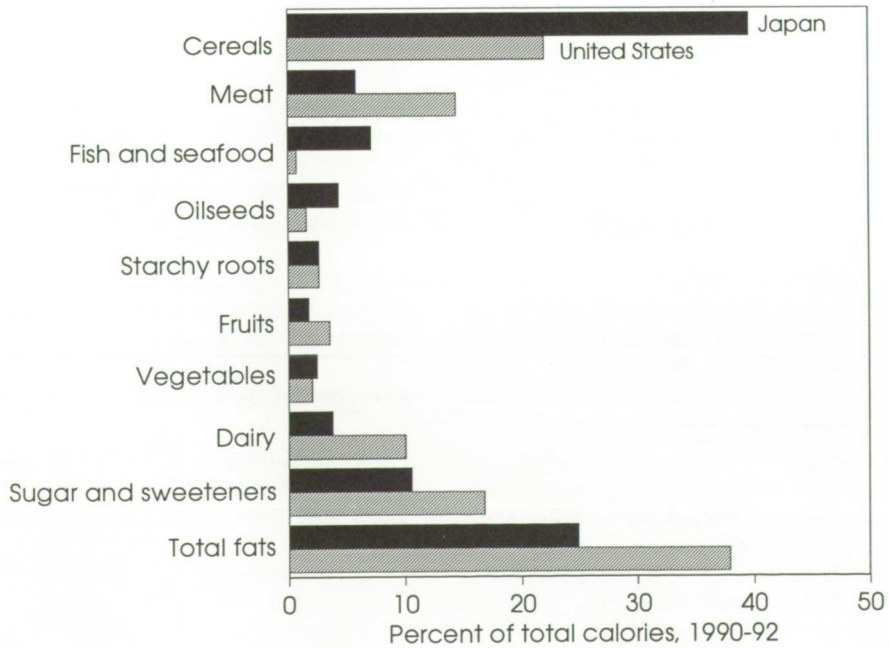
Changing Role for Animal Products

Starchy roots and vegetable-based protein alternatives to meat (such as pulses) are increasingly being replaced with fats—primarily in the form of vegetable oils used in food processing and home cooking— and with more expensive and relatively high-fat animal products, including meats, eggs, and dairy foods. Between 1970 and 1992, consumption of animal products, primarily meat, grew 65 percent in developing countries to 10 percent of total calories. Growth was strongest in the developing countries of Asia where consumption doubled since 1970. Consumption of animal products held steady at about 17 percent of total calories in Latin America, where meat is an important part of the diet in countries with large livestock sectors, such as Brazil and Argentina.

Health concerns related to excess consumption of total fats, saturated fat, and cholesterol caused a small reduction in animal products' share of the diet in industrialized countries to 31 percent of total calories, due primarily to a decline in the use of eggs and animal fats. Use of meat and dairy products continued to rise, however, accounting for over 20 percent of total energy intake in 1990-92.

Among industrialized countries, the exception to this trend was Japan, where a near doubling of meat intake and a 20-percent increase in the use of eggs increased animal products' share of total energy intake from 16 to 21 percent of total calories between 1970 and 1992. In Japan, fish, seafood, and oilseed products (derived primarily from soybeans) accounted for nearly 40 percent of total protein intake during 1990-92, compared with about 11 percent in other industrialized countries that obtain most of their protein from meats and dairy products.

Figure 1
U.S. Diets Differ Considerably From Those in Japan



Wide Gap Still Exists Among Countries

In most countries, meats continue to act as a complement to grain and vegetable-based dishes rather than as the main component of the meal. Even in China, where meat consumption has more than doubled since 1970 to 62 pounds per capita, intake is below 3 ounces per person per day, compared with more than 8 ounces in industrialized countries. Meat remains an inaccessible food for a significant portion of the world's population. In 1990-92, people in the least developed countries consumed less than 20 pounds of meat per capita annually, compared with 253 pounds in the United States and Canada.

Low per capita incomes, poorly developed livestock sectors, lack of foreign exchange with which to import feed grains, and the high cost of meat relative to other foods limit meat consumption in many developing countries. Even in developing countries with well-established poultry industries, such as Turkey, the average consumer price for fresh broiler meat was about $1.40 per pound in 1992, compared with a government-subsidized price of 5 cents per pound for wheat macaroni, a staple food. Annual per capita income in Turkey was just under $2,000 in 1992. In comparison, fresh whole broilers and macaroni in the United States sold for about the same price per pound in 1992—between 87 and 86 cents each—according to the U.S. Bureau of Labor Statistics. The $23,400 average per capita income in the United States (more than 10 times the average income in Turkey) made both products accessible to most American consumers.

A gap between developing and developed countries also exists in the consumption of fresh and processed fruits and vegetables. Although per capita fruit and vegetable consumption more than dou-

bled in China and other developing Asian countries during the past two decades, declining use in Sub-Saharan Africa and Latin America kept fruit and vegetable intake at a constant 4 percent of total calories across all developing countries. With annual per capita use of 236 pounds in 1990-92, consumption was less than half that of industrialized countries where fruits and vegetables account for about 6 percent of total caloric intake. For many low-income countries, particularly in the least developed regions of Africa and Asia which have limited land and water resources for growing input-intensive fruits and vegetables, these foods are a relatively expensive source of calories. In order to supplement domestic production, a developing country would have had to pay more than $550 on average to import a metric ton of oranges from the United States and nearly $800 for the same quantity of fresh tomatoes, according to FAO data for 1993. By contrast, a metric ton of a cereal staple such as wheat, rice, or corn would have cost about $125.

Fat Intake on the Rise

Strong growth in the consumption of vegetable oils across all regions offset a decline in the use of animal fats in the industrialized countries, raising total fat consumption to 67 grams per person per day. During 1990-92, fats accounted for about 18 percent of total calories in developing countries, 36 percent in all industrialized countries, and nearly 40 percent in the European Union.

In China and other developing Asian nations, fat consumption grew by nearly two-thirds to about 48 grams daily—17 percent of total calories. Fat intake totaled 14 percent of total calories in the least developed countries. However, fats accounted for a slightly higher share of calories in Africa, due to more frequent use of meats and vegetable oils in the higher income countries of North Africa. Federal nutrition guidelines in the United States recommend that most adults limit fat intake to no more than 30 percent of total calories for good health.

Figure 2
Developing Countries Eating a More Varied Diet Than Two Decades Ago

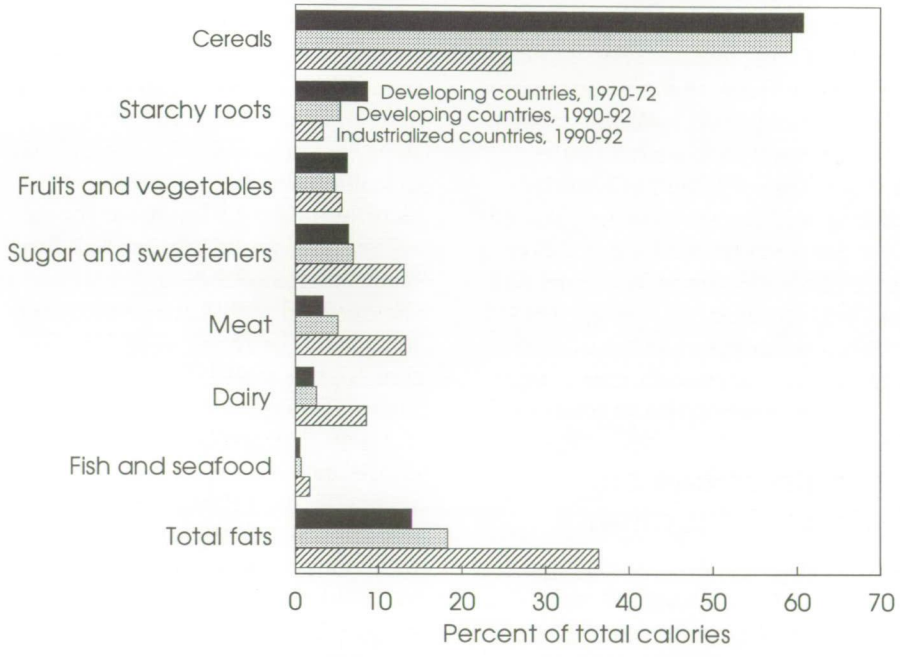
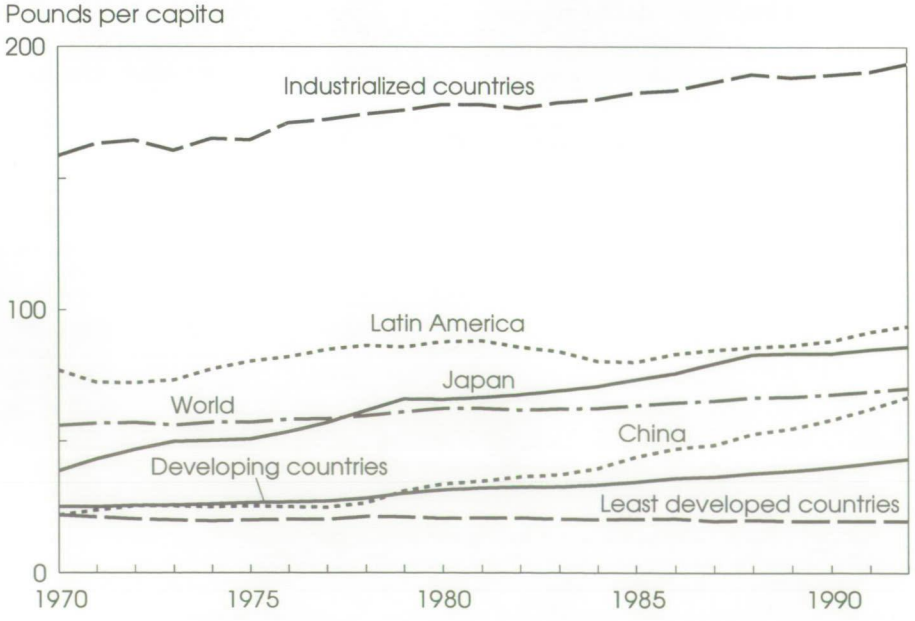


Figure 3
Meat Consumption on the Rise—in Areas That Can Afford it



Source: FAO Agrostat Database.

A growing food processing sector helped make vegetable oils the fastest growing food in the developing countries of Asia and Latin America, with use more than doubling in both regions between 1970 and 1992. Vegetable oils now account for nearly 40 percent of total fat intake in developing countries, compared with about 34 percent in industrialized regions where animal products are still the primary source of fat. Among developed countries, use of animal fats, such as butter and lard, was highest in Eastern Europe and lowest in Japan. Eastern Europeans consumed a daily average of about 8 teaspoons of animal fats per person daily during 1990-92, while consumption in Japan averaged about 1 teaspoon, mirroring that of developing Asian countries.

Expanded Role for Nutrition Education

While income growth has reduced hunger and improved nutrition among many populations in developing countries, higher incomes do not always result in improved nutritional status. In industrialized nations, overnutrition, caused by eating too many calories particularly from fat and saturated fats, is associated with a high prevalence of obesity and chronic diseases, such as coronary heart disease, hypertension, adult-onset diabetes, and some forms of cancer. As incomes rise and diets in low-income countries move closer to those in industrialized nations, the incidence of diet-related diseases is likely to rise.

Obesity, for example, is becoming a major health concern in parts of the developing world—especially among higher income, urbanized consumers in low-income countries across Asia, Africa, and Latin America. Educational programs that discourage overconsumption of calories, fats, and low-fiber foods will be important in improving the health status of these populations as the demand for Western-style diets increases. For many people in the developing world, however, undernutrition and the many infectious diseases that can be precipitated by inadequate energy and nutrient consumption, will continue to be a major public-health problem for the foreseeable future. ■

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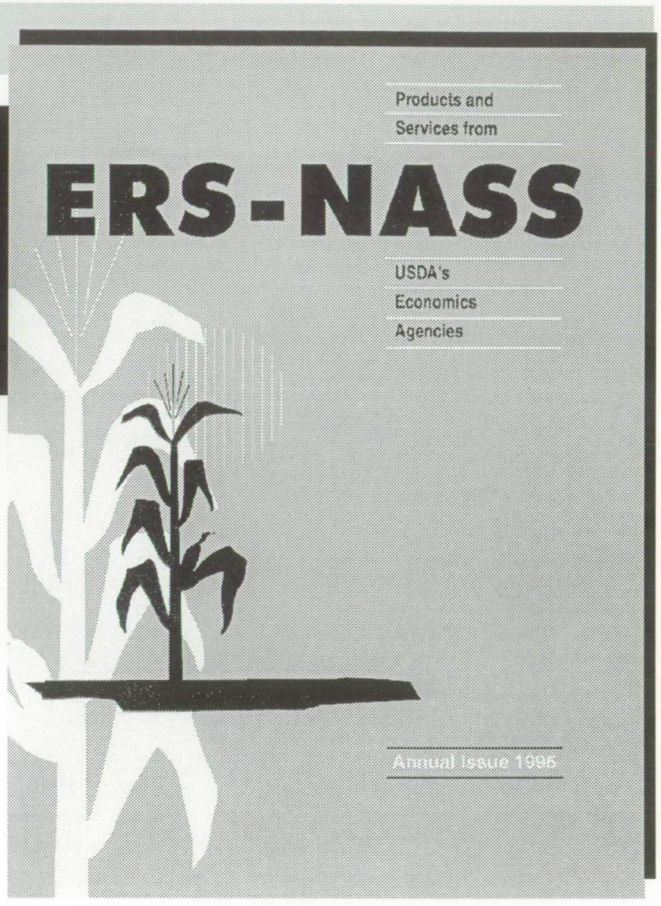

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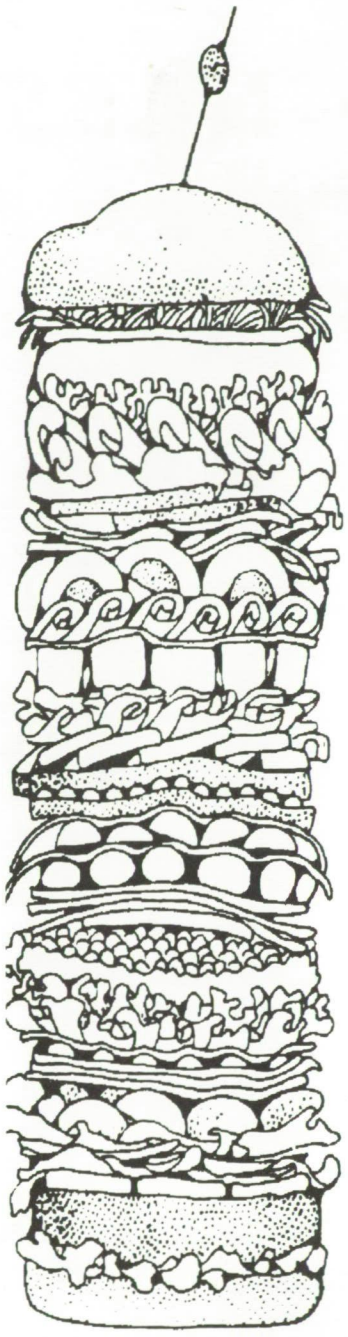

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