Food Manufacturing

(NAICS 311)

SIGNIFICANT POINTS

- This industry has one of the highest incidences of injury and illness among all industries; animal slaughtering plants have the highest incidence among all food manufacturing industries.
- Production workers account for 53 percent of all jobs.
- Most production jobs require little formal education or training; many can be learned in a few days.
- Automation and increasing productivity will limit employment growth, but unlike many other industries, food manufacturing is not highly sensitive to economic conditions.

Nature of the Industry

Workers in the food manufacturing industry link farmers and other agricultural producers with consumers. They do this by processing raw fruits, vegetables, grains, meats, and dairy products into finished goods ready for the grocer or wholesaler to sell to households, restaurants, or institutional food services.

Food manufacturing workers perform tasks as varied as the many foods we eat. For example, they slaughter, dress, and cut meat or poultry; process milk, cheese, and other dairy products; can and preserve fruits, vegetables, and frozen specialties; manufacture flour, cereal, pet foods, and other grain mill products; make bread, cookies, cakes, and other bakery products; manufacture sugar and candy and other confectionery products; process shortening, margarine, and other fats and oils; and prepare packaged seafood, coffee, potato and corn chips, and peanut butter. Although this list is long, it is not exhaustive: Food manufacturing workers also play a part in delivering numerous other food products to our tables.

Quality control and quality assurance are vital to this industry. The U.S. Department of Agriculture (USDA) oversees all aspects of food manufacturing. In addition, other food safety programs have been adopted recently as issues of chemical contamination and the growing number of new food-borne pathogens remain a public health concern. For example, by applying science-based controls from raw materials to finished products, a program called Hazard Analysis and Critical Control Point (HACCP) focuses on identifying hazards and preventing them from contaminating food.

Thirty-four percent of all food manufacturing workers are employed in plants that slaughter and process animals, and another 19 percent work in establishments that make bakery goods (table 1). Seafood product preparation and packaging, the smallest sector of the food manufacturing industry, accounts for only 3 percent of all jobs.

Table 1. Distribution of wage and salary employment in food manufacturing by industry segment, 2004
(Employment in thousands)

Industry segment	2004 Employment	2004-14 Percent Change
Total employment	1497.5	3.81
Animal slaughtering and processing	505.3	12.82
Bakeries and tortilla manufacturing	287.8	3.79
Fruit and vegetable preserving and specialty food manufacturing	181.7	-1.49
Other food manufacturing	154.1	6.42
Dairy product manufacturing	132.0	-10.61
Sugar and confectionery product manufacturing	83.7	-4.42
Grain and oilseed milling	60.6	-6.60
Animal food manufacturing	50.7	-4.93
Seafood product preparation and packaging	41.6	-3.85

Working Conditions

Many production jobs in food manufacturing involve repetitive, physically demanding work. Food manufacturing workers are highly susceptible to repetitive-strain injuries to their hands, wrists, and elbows. This type of injury is especially common in meat-processing and poultry-processing plants. Production workers often stand for long periods and may be required to lift heavy objects or use cutting, slicing, grinding, and other dangerous tools and machines. To deal with difficult working conditions, ergonomic programs have been introduced to cut down on work-related accidents and injuries.

In 2003, there were 8.6 cases of work-related injury or illness per 100 full-time food manufacturing workers, much higher than the rate of 5.0 cases for the private sector as a whole. Injury rates vary significantly among specific food manufacturing industries, ranging from a low of 1.8 per 100 workers in retail bakeries to 12.9 per 100 in animal slaughtering plants, the highest rate in food manufacturing.

In an effort to reduce occupational hazards, many plants have redesigned equipment, increased the use of job rotation, allowed longer or more frequent breaks, and developed training programs in safe work practices. Furthermore, meat and poultry plants must comply with a wide array of Occupational Safety and Health Administration (OSHA) regulations ensuring a safer work environment. Although injury rates remain high, training and other changes have reduced those rates. Some workers wear protective hats, gloves, aprons, and shoes. In many industries, uniforms and protective clothing are changed daily for reasons of sanitation.

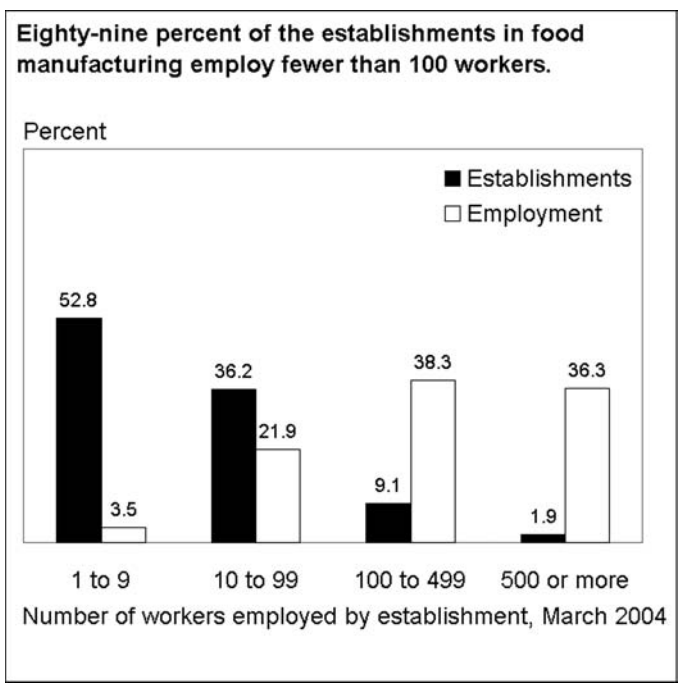
Because of the considerable mechanization in the industry, most food manufacturing plants are noisy, with limited opportunities for interaction among workers. In some highly automated

plants, "hands-on" manual work has been replaced by computers and factory automation, resulting in less waste and higher productivity. While much of the basic production—such as trimming, chopping, and sorting—will remain labor intensive for many years to come, automation is increasingly being applied to various functions, including inventory management, product movement, and quality control issues such as packing and inspection.

Working conditions also depend on the type of food being processed. For example, some bakery employees work at night or on weekends and spend much of their shifts near ovens that can be uncomfortably hot. In contrast, workers in dairies and meat-processing plants typically work daylight hours and may experience cold and damp conditions. Some plants, such as those producing processed fruits and vegetables, operate on a seasonal basis, so workers are not guaranteed steady, year-round employment and occasionally travel from region to region seeking work. These plants are increasingly rare, however, as the industry continues to diversify and manufacturing plants produce alternative foods during otherwise inactive periods.

Employment

In 2004, the food manufacturing industry provided 1.5 million jobs. Almost all employees were wage and salary workers, but a few food manufacturing workers were self-employed and unpaid family workers. In 2004, about 29,000 establishments manufactured food, with 89 percent employing fewer than 100 workers (chart 1). Nevertheless, establishments employing 500 or more workers accounted for 36 percent of all jobs.



The employment distribution in this industry varies widely. Animal slaughtering and processing employs the largest proportion of workers. Economic changes in livestock farming and slaughtering plants have changed the industry. Increasingly, fewer, but larger, farms are producing the vast majority of livestock in the United States. Similarly, there are now fewer, but much larger, meat-processing plants, owned by fewer companies—a development that has tended to concentrated employment in a few locations.

Food manufacturing workers are found in all States, although some sectors of the industry are concentrated in certain parts of the country. For example, in 2004, California, Illinois, Iowa, Pennsylvania, and Texas employed 24 percent of all workers in animal slaughtering and processing. That same year, Wisconsin employed 33 percent of all cheese manufacturing workers, and California accounted for 20 percent of fruit and vegetable preserving and specialty food manufacturing workers.

Occupations in the Industry

The food manufacturing industry employs many different types of workers. More than half are production workers, including skilled precision workers and less skilled machine operators and laborers (table 2). Production jobs require manual dexterity, good hand-eye coordination, and, in some sectors of the industry, strength.

Red-meat production is the most labor-intensive food-processing operation. Animals are not uniform in size, and *slaughterers and meatpackers* must slaughter, skin, eviscerate, and cut each carcass into large pieces. They usually do this work by hand, using large, suspended power saws. They also clean and salt hides and make sausage. *Meat, poultry, and fish cutters and trimmers* use handtools to break down the large primary cuts into smaller sizes for shipment to wholesalers and retailers. These workers use knives and other handtools to eviscerate, split, and bone chickens and turkeys.

Bakers mix and bake ingredients according to recipes to produce breads, cakes, pastries, and other goods. Bakers produce goods in large quantities, using mixing machines, ovens, and other equipment.

Many food manufacturing workers use their hands or small handtools to do their jobs. *Cannery workers* perform a variety of routine tasks—such as sorting, grading, washing, trimming, peeling, or slicing—in the canning, freezing, or packing of food products. *Hand food decorators* apply artistic touches to prepared foods. *Candy molders and marzipan shapers* form sweets into fancy shapes by hand.

With increasing levels of automation in the food manufacturing industry, a growing number of workers are operating machines. For example, *food batchmakers* operate equipment that mixes, blends, or cooks ingredients used in manufacturing various foods, such as cheese, candy, honey, and tomato sauce. *Dairy processing equipment operators* process milk, cream, cheese, and other dairy products. *Cutting and slicing machine operators* slice bacon, bread, cheese, and other foods. *Mixing and blending machine operators* produce dough batter, fruit juices, or spices. *Crushing and grinding machine operators* turn raw grains into cereals, flour, and other milled-grain products, and they produce oils from nuts or seeds. *Extruding and forming machine operators* produce molded food and candy, and *casing finishers and stuffers* make sausage links and similar products. *Bottle packers and bottle fillers* operate machines that fill bottles and jars with preserves, pickles, and other foodstuffs.

Food cooking machine operators and tenders steam, deep-fry, boil, or pressure-cook meats, grains, sugar, cheese, or vegetables. *Food and tobacco roasting, baking, and drying ma-*

chine operators and tenders operate equipment that roasts grains, nuts, or coffee beans and tend ovens, kilns, dryers, and other equipment that removes moisture from macaroni, coffee beans, cocoa, and grain. *Baking equipment operators* tend ovens that bake bread, pastries, and other products. Some foods—ice cream, frozen specialties, and meat, for example—are placed in freezers or refrigerators by *cooling* and *freezing equipment operators*. Other workers tend machines and equipment that clean and wash food or food-processing equipment. Some machine operators also clean and maintain machines and perform duties such as checking the weight of foods.

Many other workers are needed to keep food manufacturing plants and equipment in good working order. *Industrial machinery mechanics* repair and maintain production machines and equipment. *Maintenance repairers* perform routine maintenance on machinery, such as changing and lubricating parts. Specialized mechanics include *heating, air-conditioning, and refrigeration mechanics*, *farm equipment mechanics*, and *diesel engine specialists*.

Still other workers directly oversee the quality of the work and of final products. *Supervisors* direct the activities of production workers. *Graders and sorters* of agricultural products, *production inspectors,* and *quality control technicians* evaluate foodstuffs before, during, or after processing.

Food may spoil if not packaged properly or delivered promptly, so packaging and transportation employees play a vital role in the industry. Among these are *freight, stock, and material movers*, who manually move materials; *hand packers and packagers*, who pack bottles and other items as they come off the production line; and *machine feeders and offbearers*, who feed materials into machines and remove goods from the end of the production line. *Industrial truck and tractor operators* drive gasoline or electric-powered vehicles equipped with forklifts, elevated platforms, or trailer hitches to move goods around a storage facility. *Truckdrivers* transport and deliver livestock, materials, or merchandise and may load and unload trucks. *Driver/sales workers* drive company vehicles over established routes to deliver and sell goods, such as bakery items, beverages, and vending-machine products.

The food manufacturing industry also employs a variety of managerial and professional workers. Managers include *top executives*, who make policy decisions; *industrial production managers*, who organize, direct, and control the operation of the manufacturing plant; and *advertising, marketing, promotions, public relations, and sales managers*, who direct advertising, sales promotion, and community relations programs.

Engineers, scientists, and technicians are becoming increasingly important as the food manufacturing industry implements new automation and food safety processes. These workers include *industrial engineers,* who plan equipment layout and workflow in manufacturing plants, emphasizing efficiency and safety. Also, *mechanical engineers* plan, design, and oversee the installation of tools, equipment, and machines. *Chemists* perform tests to develop new products and maintain the quality of existing products. *Computer programmers and systems analysts* develop computer systems and programs to support management and scientific research. *Food scientists and technologists* work in research laboratories or on production lines to develop new products, test current ones, and control food quality, including minimizing food-borne pathogens.

Finally, many sales workers, including sales *representatives, wholesale and manufacturing*, are needed to sell the manufactured goods to wholesale and retail establishments. *Bookkeeping, accounting, and auditing clerks and procurement clerks* keep track of the food products going into and out of the plant. *Janitors and cleaners* keep buildings clean and orderly.

Table 2. Employment of wage and salary workers in food manufacturing by occupation, 2004 and projected change, 2004-14
(Employment in thousands)

Occupation	Employment, 2004 Number	Employment, 2004 Percent	Percent change, 2004-14
All occupations	1,498	100.0	3.8
Management, business, and financial occupations	66	4.4	6.3
Top executives	18	1.2	4.8
Marketing and sales managers	5	0.3	6.4
Industrial production managers	10	0.7	5.7
Purchasing agents and buyers, farm products	1	0.1	5.7
Professional and related occupations	25	1.6	9.2
Computer specialists	5	0.3	13.4
Agricultural engineers	1	0.0	3.5
Food scientists and technologists	4	0.2	7.9
Agricultural and food science technicians	4	0.3	3.7
Service occupations	61	4.1	6.3
Cooks and food preparation workers	11	0.7	6.9
Food and beverage serving workers	17	1.1	5.9
Building cleaning workers	25	1.6	7.9
Sales and related occupations	57	3.8	2.1
Retail sales workers	29	2.0	0.0
Sales representatives, wholesale and maufacturing	20	1.3	5.2
Office and administrative support occupations	105	7.0	-6.6
Financial clerks	21	1.4	-5.2
Information and record clerks	15	1.0	-5.0
Shipping, receiving, and traffic clerks	19	1.3	-4.1
Secretaries and administrative assistants	9	0.6	-4.1
Office clerks, general	12	0.8	-5.5
Farming, fishing, and forestry occupations	19	1.3	11.6
Installation, maintenance, and repair occupations	86	5.8	6.2
Industrial machinery installation, repair, and maintenance workers	71	4.7	6.3
Production occupations	789	52.7	5.2
First-line supervisors/managers of production and operating workers	50	3.4	7.1
Bakers	48	3.2	6.8
Butchers and other meat, poultry, and fish processing workers	249	16.6	13.9
Miscellaneous food processing workers	105	7.0	2.9
Packaging and filling machine operators and tenders	107	7.1	-10.2
Miscellaneous production workers	107	7.2	3.6
Transportation and material moving occupations	284	19.0	1.2
Motor vehicle operators	56	3.7	4.5
Industrial truck and tractor operators	40	2.7	0.4
Laborers and material movers, hand	168	11.2	0.2

Note: May not add to totals due to omission of occupations with small employment

Training and Advancement

Most production jobs in food manufacturing require little formal education or training. Graduation from high school is preferred, but not always required. In general, inexperienced workers start as helpers to experienced workers and learn skills on the job. Many of these entry-level jobs can be learned in a few days. Typical jobs include operating a bread-slicing machine, washing fruits and vegetables before processing begins, hauling carcasses, and packing bottles as they come off the production line. Even though it may not take long to learn to operate a piece of equipment, employees may need several years of experience to enable them to keep the equipment running smoothly, efficiently, and safely.

Some food manufacturing workers need specialized training and education. Inspectors and quality control workers, for example, are trained in food safety and usually need a certificate to be employed in a food manufacturing plant. Often, USDA-appointed plant inspectors possess a bachelor's degree in agricultural or food science. Formal educational requirements for managers in food manufacturing plants range from 2-year degrees to master's degrees. Those who hold research positions, such as food scientists, usually need a master's or doctoral degree.

In addition to participating in specialized training, a growing number of workers receive broader training to perform a number of jobs. The need for flexibility in more automated workplaces has meant that many food manufacturing workers are learning new tasks and being trained to work effectively in teams. Some specialized training is provided for bakers and some other positions.

Advancement may come in the form of higher earnings or more responsibility. Helpers usually progress to jobs as machine operators, but the speed of this progression can vary considerably. Some workers who perform exceptionally well on the production line, or those with special training and experience, may advance to supervisory positions. Plant size and the existence of formal promotion tracks may influence advancement opportunities.

Requirements for other jobs are similar to requirements for the same types of jobs in other industries. Employers usually hire high school graduates for secretarial and other clerical work. Graduates of 2-year associate degree or other postsecondary programs often are sought for science technician and related positions. College graduates or highly experienced workers are preferred for middle-management or professional jobs in personnel, accounting, marketing, or sales.

Outlook

Overall wage and salary employment in food manufacturing is expected to increase by 4 percent over the 2004-14 period, compared with 14 percent employment growth projected for the entire economy. Despite the rising demand for manufactured food products by a growing population, automation and increasing productivity are limiting employment growth. Nevertheless, numerous job openings will arise in many segments of food manufacturing, as experienced workers transfer to other industries or retire or leave the labor force for other reasons.

Job growth will vary by occupation but will be concentrated among food manufacturing workers—the largest group of workers in the industry. Because many of the cutting, chopping, and eviscerating tasks performed by these workers have proven difficult to automate, employment among handworkers will rise along with the growing demand for food products, especially beef. Handworking occupations include slaughterers and meat packers and meat, poultry, and fish cutters and trimmers, whose employment will rise as the consumption of meat, poultry, and fish climbs and more processing takes place at the manufacturing level. Other production workers also will benefit from the shift in food processing from retail establishments to manufacturing plants.

Although automation has had little effect on most handworkers, it is having a broader impact on numerous other occupations in the industry. Fierce competition has led food manufacturing plants to invest in technologically advanced machinery to be more productive. The new machines have been applied to tasks as varied as packaging, inspection, and inventory control. As a result, employment will not increase as rapidly among some machine operators, such as packaging machine operators, as for industrial machinery mechanics who repair and maintain the new machinery. Computers also are being widely implemented throughout the industry, reducing employment growth of some mid-level managers and resulting in decreased employment for administrative support workers, but increasing the demand for workers with excellent technical skills. Taken as a whole, automation will continue to have a significant impact on workers in the industry as competition becomes even more intense in coming years.

Food manufacturing firms will be able to use this new automation to better meet the changing demands of a growing and increasingly diverse population. As convenience becomes more important, consumers increasingly demand highly processed foods such as pre-marinated pork loins, peeled and cut carrots, microwaveable soups, or "ready-to-heat" dinners. Such a shift in consumption will contribute to the demand for food manufacturing workers and will lead to the development of thousands of new processed foods. Domestic producers also will attempt to market these goods abroad as the volume of international trade continues to grow. The increasing size and diversity of the American population has driven demand for a greater variety of foods, including more ethnic foods. The combination of expanding export markets and shifting and increasing domestic consumption will help employment among food manufacturing workers to rise over the next decade and will lead to significant changes throughout the food manufacturing industry.

Unlike many other industries, food manufacturing is not highly sensitive to economic conditions. Even during periods of recession, the demand for food is likely to remain relatively stable.

Earnings

Table 3 shows that production workers in food manufacturing averaged $12.98 an hour, compared with $15.67 per hour for all workers in private industry in May 2004. Weekly earnings among food manufacturing workers were lower than average, $510 compared with $529 for all workers in private industry in May 2004. Food manufacturing workers averaged about 39.3 hours a week, compared with only 33.7 for all workers in the private sector. Weekly earnings ranged from $408 in seafood product preparation and packaging plants to $832 in grain and oilseed milling plants. Hours worked play a large part in determining earnings. For example, grain-milling and oilseed-milling workers, who averaged 41.4 hours a week, had higher hourly and weekly earn-

ings than did workers in bakeries and tortilla manufacturing companies, who averaged 37.3 hours a week. Earnings in selected occupations in food manufacturing appear in table 4.

In 2004, 18 percent of workers in the food manufacturing industry belonged to a union or were covered by a union contract, compared with 14 percent of all workers in the private sector. Prominent unions in the industry include the United Food and Commercial Workers; the International Brotherhood of Teamsters; and the Bakery, Confectionery, Tobacco Workers and Grain Millers International Union.

Sources of Additional Information

For information on job opportunities in food manufacturing, contact individual manufacturers, locals of the unions listed in the section on earnings, and State employment service offices.

Detailed information on many occupations in food manufacturing, including the following, appears in the 2006-07 *Occupational Outlook Handbook*.

- Food processing occupations
- Industrial production managers
- Industrial machinery mechanics and maintenance workers
- Inspectors, testers, sorters, samplers, and weighers
- Material moving occupations
- Truck drivers and driver/sales workers

Table 3. Average earnings of production or nonsupervisory workers in food manufacturing by industry segment, 2004

Industry segment	Weekly	Hourly
Total, private industry	$529	$15.67
Food manufacturing	510	12.98
Grain and oilseed milling	832	19.27
Beverages	735	18.70
Dairy products	680	16.60
Sugar and confectionery products	580	15.34
Fruit and vegetable preserving and specialty	512	12.86
Other food products	494	12.90
Bakeries and tortilla manufacturing	472	12.64
Animal slaughtering and processing	458	11.53
Seafood product preparation and packaging	408	10.69

Table 4. Median hourly earnings of the largest occupations in food manufacturing, May 2004

Occupation	Food manufacturing	All industries
First-line supervisors/managers of production and operating workers	$19.71	$21.51
Maintenance and repair workers, general	16.25	14.77
Packaging and filling machine operators and tenders	11.41	10.67
Food batchmakers	11.01	10.62
Bakers	10.62	10.26
Laborers and freight, stock, and material movers, hand	10.23	9.67
Helpers—production workers	10.10	9.70
Slaughterers and meat packers	10.04	10.03
Packers and packagers, hand	9.20	8.25
Meat, poultry, and fish cutters and trimmers	8.96	9.09