

## Agriculture in Developed Regions

### Learning Outcome 10.3.6

Describe how mixed crop and livestock farming works.

Commercial agriculture in developed countries can be divided into six main types: mixed crop and livestock farming, dairy farming, commercial gardening and fruit farming, grain farming, Mediterranean agriculture, and livestock ranching. Each type is predominant in distinctive regions within developed countries, depending largely on climate. Commercial agriculture is also becoming increasingly important in many developing countries.

In commercial farming, farmers grow crops and raise animals primarily for sale off the farm rather than for their own consumption. Agricultural products are not sold directly to consumers but to food-processing companies. Large processors, such as General Mills and Kraft, typically sign contracts with commercial farmers to buy their grain, chickens, cattle, and other output. Farmers may have contracts to sell sugar beets to sugar refineries, potatoes to distilleries, and oranges to manufacturers of concentrated juices.

Commercial farming is closely tied to other businesses. The system of commercial farming found in developed countries has been called **agribusiness** because the family farm is not an isolated activity but is integrated into a large food-production industry. Commercial farmers make heavy use of modern communications and information technology to stay in touch and keep track of prices, yields, and expenditures.

Although farmers account for less than 2 percent of the U.S. labor force, around 20 percent of U.S. laborers work in food production and services related to agribusiness—food processing, packaging, storing, distributing, and retailing. Agribusiness encompasses such diverse enterprises as tractor manufacturing, fertilizer production, and seed distribution. Although most farms are owned by individual families, many other aspects of agribusiness are controlled by large corporations.

### MIXED CROP AND LIVESTOCK FARMING

Mixed crop and livestock farming is the most common form of commercial agriculture in the United States west of the Appalachians and east of 98° west longitude and in much of Europe from France to Russia (refer to Figure 10-18).

**INTEGRATION OF CROPS AND LIVESTOCK.** The most distinctive characteristic of mixed crop and livestock farming is the integration of crops and livestock (Figure 10-35). Most of the crops are fed to animals rather than consumed directly by humans. In turn, the livestock



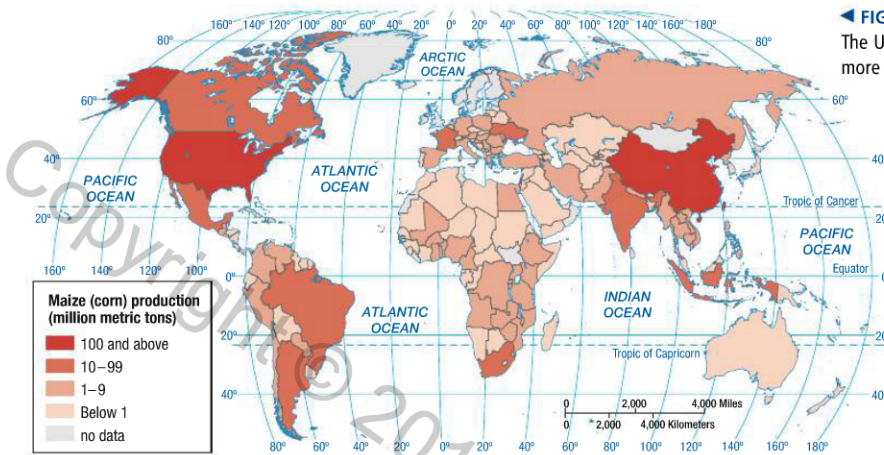
▲ FIGURE 10-34 MIXED CROP AND LIVESTOCK Harvesting corn in Iowa.

supply manure to improve soil fertility to grow more crops. A typical mixed crop and livestock farm devotes nearly all land area to growing crops but derives more than three-fourths of its income from the sale of animal products, such as beef, milk, and eggs. In the United States pigs are often bred directly on the farms, whereas cattle may be brought in to be fattened on corn.

Mixing crops and livestock permits farmers to distribute the workload more evenly through the year. Fields require less attention in the winter than in the spring, when crops are planted, and in the fall, when they are harvested. Meanwhile, livestock require year-long attention. A mix of crops and livestock also reduces seasonal variations in income; most income from crops comes during the harvest season, but livestock products can be sold throughout the year.

In the United States, corn (maize) is the crop most frequently planted in the mixed crop and livestock region because it generates higher yields per area than do other crops (Figure 10-35). Some of the corn is consumed by people as oil, margarine, and other food products, but most is fed to pigs and cattle. The most important mixed crop and livestock farming region in the United States—extending from Ohio to the Dakotas, with its center in Iowa—is frequently called the Corn Belt because around half of the cropland is planted in corn. Soybeans have become the second-most-important crop in the U.S. mixed commercial farming region. Like corn, soybeans are mostly used to make animal feed. Tofu (made from soybean milk) is a major food source, especially for people in China and Japan. Soybean oil is widely used in U.S. foods, as a hidden ingredient.

**CROP ROTATION.** Mixed crop and livestock farming typically involves crop rotation. The farm is divided into a number of fields, and each field is planted on a planned cycle, often of several years. The crop planted changes from one year to the next, typically going through a cycle of two or more crops, and perhaps a year of fallow before the cycle is repeated. Crop rotation helps maintain the fertility of a field because various crops deplete the soil of



**FIGURE 10-35 MAIZE (CORN) PRODUCTION**  
The United States produces nearly 40 percent and China more than 20 percent of the world total.

certain nutrients but restore others. Crop rotation contrasts with shifting cultivation, in which nutrients depleted from a field are restored only by leaving the field fallow (uncropped) for many years. With shifting cultivation, in any given year, crops cannot be planted in most of an area's fields, so overall production is much lower than in mixed commercial farming.

A two-field crop-rotation system was developed in Northern Europe as early as the fifth century. A cereal grain, such as oats, wheat, rye, or barley, was planted in Field A one year, while Field B was left fallow. The following year, Field B was planted, and Field A was left fallow, and so forth. Beginning in the eighth century, a three-field system was introduced. The first field was planted with a winter cereal, the second was planted with a spring cereal, and the third was left fallow. As a result, each field yielded four harvests every six years, compared to three every six years under the two-field system.

A four-field system was introduced in Europe during the eighteenth century. The first year, the farmer could plant a root crop (such as turnips) in Field A, a cereal in Field B, a "rest" crop (such as clover, which helps restore the field) in Field C, and a cereal in Field D. The second year, the farmer might select a cereal for Field A, a rest crop for Field B, a cereal for Field C, and a root for Field D. The rotation would continue for two more years before the cycle would start again. Each field thus passed through a cycle of four crops—root, cereal, rest crop, and another cereal.

Cereals such as wheat and barley were sold for flour and beer production, and straw (the stalks remaining after the heads of wheat are threshed) was retained for animal bedding. Root crops such as turnips were fed to the animals during the winter. Clover and other rest crops were used for cattle grazing and for restoring nitrogen to the soil.

### Pause and Reflect 10.3.6

What are the principal differences between harvesting of maize in the United States (Figure 10-34) and harvesting of rice in Thailand (Figure 10-28)?

## COMMERCIAL GARDENING AND FRUIT FARMING

Commercial gardening and fruit farming is the predominant type of agriculture in the southeastern United States. The region has a long growing season and humid climate, and it is accessible to the large markets of New York, Philadelphia, Washington, and other eastern U.S. urban areas. The type of agriculture practiced in this region is frequently called **truck farming**, from the Middle English word *truck*, meaning "bartering" or "exchange of commodities." Truck farms grow many of the fruits and vegetables that consumers in developed countries demand, such as apples, asparagus, cherries, lettuce, mushrooms, and tomatoes. Some of these fruits and vegetables are sold fresh to consumers, but most are sold to large processors for canning or freezing.

Truck farms are highly efficient large-scale operations that take full advantage of machines at every stage of the growing process. Truck farmers are willing to experiment with new varieties, seeds, fertilizers, and other inputs to maximize efficiency. Labor costs are kept down by hiring migrant farm workers, some of whom are undocumented immigrants from Mexico who work for very low wages. Farms tend to specialize in a few crops, and a handful of farms may dominate national output of some fruits and vegetables.

A form of truck farming called specialty farming has spread to New England, among other places. Farmers are profitably growing crops that have limited but increasing demand among affluent consumers, such as asparagus, peppers, mushrooms, strawberries, and nursery plants. Specialty farming represents a profitable alternative for New England farmers at a time when dairy farming is declining because of relatively high operating costs and low milk prices.

## DAIRY FARMING

### Learning Outcome 10.3.7

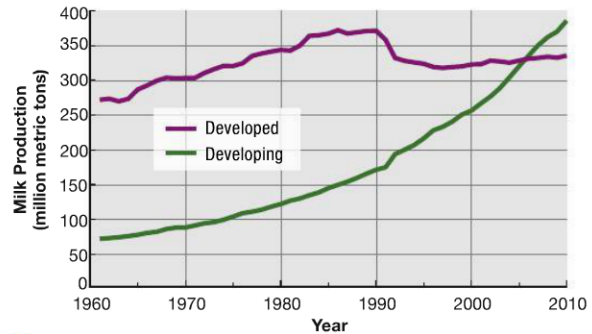
Describe how dairy farming and commercial gardening work.

Dairy farming is the most important commercial agriculture practiced on farms near the large urban areas of the northeastern United States, southeastern Canada, and northwestern Europe (Figure 10-36). Dairying has also become an important type of farming in South and East Asia. Traditionally, fresh milk was rarely consumed except directly on the farm or in nearby villages. With the rapid growth of cities in developed countries during the nineteenth century, demand for the sale of milk to urban residents increased. Rising incomes permitted urban residents to buy milk products, which were once considered luxuries.

**REGIONAL DISTRIBUTION OF DAIRYING.** For most of the twentieth century, the world's milk production was clustered in a handful of developed countries. However, the share of the world's dairy farming conducted in developing countries has risen dramatically, from 26 percent in 1980 to 53 percent in 2010 (Figure 10-37). In the twenty-first century, India has become the world's largest milk producer, ahead of the United States, the traditional leader, and China and Pakistan are now third and fourth largest (Figure 10-38).

In developed countries, dairying is the most important type of commercial agriculture in the first ring outside large cities because of transportation factors. Dairy farms must be closer to their market than other types of farms because their products are highly perishable. The ring surrounding a city from which milk can be supplied without spoiling is known as the **milkshed**. Improvements in transportation have permitted dairying to be undertaken farther from the market. Until the 1840s, when railroads were first

▼ **FIGURE 10-36 DAIRY FARM** Many cows are milked simultaneously at this dairy farm in Wiltshire, England.



▲ **FIGURE 10-37 CHANGING MILK PRODUCTION**

Developing countries now produce more milk than developed countries.

used for transporting dairy products, milksheds rarely had a radius beyond 50 kilometers (30 miles). Today, refrigerated railcars and trucks enable farmers to ship milk more than 500 kilometers (300 miles). As a result, nearly every farm in the northeastern United States and northwestern Europe is within the milkshed of at least one urban area.

Dairy farmers, like other commercial farmers, usually do not sell their products directly to consumers. Instead, they generally sell milk to wholesalers, who distribute it in turn to retailers. Retailers then sell milk to consumers in shops or at home. Farmers also sell milk to butter and cheese manufacturers.

In general, the farther the farm is from large urban concentrations, the smaller is the percentage of output devoted to fresh milk. Farms located farther from consumers are more likely to sell their output to processors that make butter, cheese, or dried, evaporated, and condensed milk. The reason is that these products keep fresh longer than milk does and therefore can be safely shipped from remote farms.

Countries likewise tend to specialize in certain products. New Zealand, the world's largest per capita producer of dairy products, devotes about 5 percent to liquid milk, compared to more than 50 percent in the United Kingdom.

New Zealand farmers do not sell much liquid milk because the country is too far from North America and northwestern Europe, the two largest relatively wealthy population concentrations.

**CHALLENGES FOR DAIRY FARMERS.** Like other commercial farmers, dairy farmers face economic difficulties because of declining revenues and rising costs. Dairy farmers who have quit farming most often cite lack of profitability and excessive workload as reasons for getting out of the business. Distinctive features of dairy farming have exacerbated the economic difficulties:

- **Labor intensive.** Cows must be milked twice a day, every day; although the actual milking can be done by machines, dairy farming nonetheless requires constant attention throughout the year.

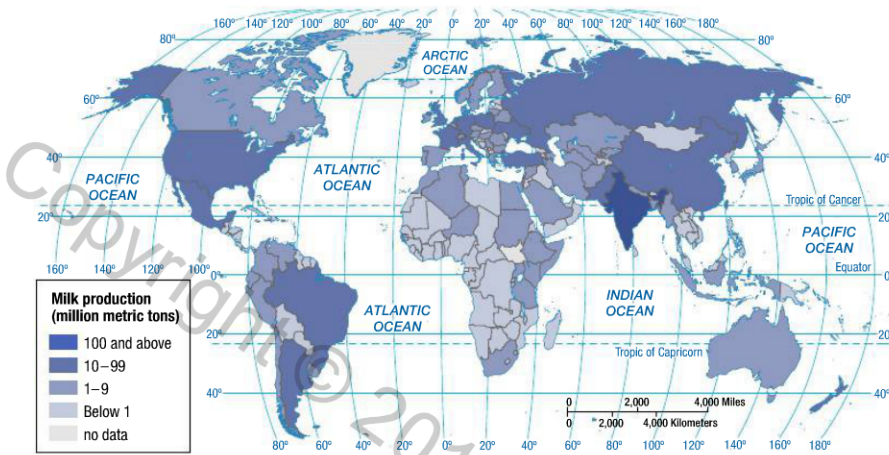


FIGURE 10-38 MILK PRODUCTION India has replaced the United States as the world's leading milk producer.

- **Winter feed.** Dairy farmers face the expense of feeding the cows in the winter, when they may be unable to graze on grass. In northwestern Europe and in the northeastern United States, farmers generally purchase hay or grain for winter feed. In the western part of the U.S. dairy region, crops are more likely to be grown in the summer and stored for winter feed on the same farm.

**Pause and Reflect 10.3.7**  
Look on the label of your milk carton. How far away from you is the dairy?

## CONTEMPORARY GEOGRAPHIC TOOLS

# Protecting Farmland

Loss of farmland to urban growth is especially severe at the edge of the string of large metropolitan areas along the East Coast of the United States. Some of the most threatened agricultural land lies in Maryland, a small state where two major cities—Washington and Baltimore—have coalesced into a continuous built-up area (see Chapter 13). In Maryland, a geographic information system (GIS) was used to identify which farms should be preserved.

Maps generated through GIS were essential in identifying agricultural land to protect because the most appropriate farms to preserve were not necessarily those with the highest-quality soil. Why should the state and nonprofit organizations spend scarce funds to preserve “prime” farmland that is nowhere near the path of urban sprawl? Conversely, why purchase an expensive, isolated farm already totally surrounded by residential developments, when the same amount of money could buy several large contiguous farms that effectively blocked urban sprawl elsewhere?

To identify the “best” lands to protect, GIS consultants produced

a series of soil quality, environmental, and economic maps that were combined into a single composite map (Figure 10-39). The map shows that 4 percent of the state's farmland had prime soils, significant environmental features, and high projected population growth, and 25 percent had two of the three factors.

Maryland officials are making use of the results of the GIS as part of an overall strategy to minimize sprawl. For example, state highway money is allocated to improving roads in existing built-up areas rather than extending new roads through important conservation areas.

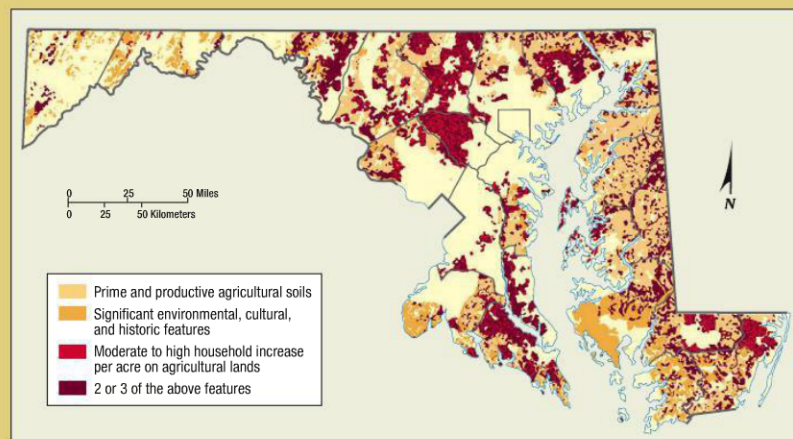


FIGURE 10-39 PROTECTING FARMLAND IN MARYLAND Prime farmland is typically flat and well drained. Significant environmental features included water quality, flood control, species habitats, historic sites, and especially attractive scenery.

## GRAIN FARMING

### Learning Outcome 10.3.8

Describe how grain and Mediterranean farming work.

Some form of grain is the major crop on most farms. Grain is the seed from various grasses, such as wheat, corn, oats, barley, rice, millet, and others. Commercial grain agriculture is distinguished from mixed crop and livestock farming because crops on a grain farm are grown primarily for consumption by humans rather than by livestock. Farms in developing countries also grow crops for human consumption, but the output is directly consumed by the farmers. Commercial grain farms sell their output to manufacturers of food products, such as breakfast cereals and breads.

The most important crop grown is wheat, used to make bread flour. Wheat generally can be sold for a higher price than other grains, such as rye, oats, and barley, and it has more uses as human food. It can be stored relatively easily without spoiling and can be transported a long distance. Because wheat has a relatively high value per unit weight, it can be shipped profitably from remote farms to markets.

As was the case with milk production, the share of world production of wheat in developing countries has increased rapidly. Much of this increased production results from growth in large-scale commercial agriculture. Developing countries accounted for more than one-half of world wheat production in 2010, compared to only one-fourth in 1960. The United States is by far the largest producer of wheat among developed countries, but it now ranks third among all countries, behind China and India (Figure 10-40). China has been the world leader since 1983, and India has been second since 1999.

Large-scale grain production, like other commercial farming ventures in developed countries, is heavily mechanized, conducted on large farms, and oriented to consumer preferences. The McCormick **reaper** (a machine that

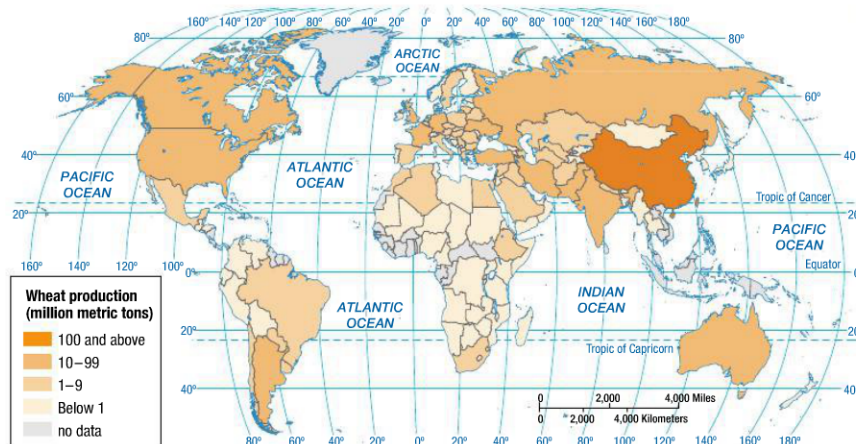
cuts grain standing in the field), invented in the 1830s, first permitted large-scale production. Today the **combine** machine performs in one operation the three tasks of reaping, threshing, and cleaning.

Unlike work on a mixed crop and livestock farm, the effort required to grow wheat is not uniform throughout the year. Some individuals or firms may therefore have two sets of fields—one in the spring wheat belt and one in the winter wheat belt. Because the planting and harvesting in the two regions occur at different times of the year, the workload can be distributed throughout the year. In addition, the same machinery can be used in the two regions, thus spreading the cost of the expensive equipment. Combine harvesting contractors start working in Oklahoma in early summer and work their way northward.

Commercial grain farms are generally located in regions that are too dry for mixed crop and livestock agriculture. Within North America, large-scale grain production is concentrated in three areas:

- **The winter wheat belt through Kansas, Colorado, and Oklahoma.** The **winter wheat** crop is planted in the autumn and develops a strong root system before growth stops for the winter. The wheat survives the winter, especially if it is insulated beneath a snow blanket, and is ripe by the beginning of summer.
- **The spring wheat belt through the Dakotas, Montana, and southern Saskatchewan in Canada.** Winters are usually too severe for winter wheat in this region, so **spring wheat** is planted in the spring and harvested in the late summer.
- **The Palouse region of Washington State.** Wheat comprises a smaller percentage of agricultural output than in the other two wheat-growing regions. The Palouse is also an important source of legumes; for example, 80 percent of U.S. lentils are grown in the region.

Wheat's significance extends beyond the amount of land or number of people involved in growing it. Unlike other agricultural products, wheat is grown to a



◀ **FIGURE 10-40 WHEAT PRODUCTION**

China and India are the leading wheat producers, followed by the United States.



▲ **FIGURE 10-41 MEDITERRANEAN AGRICULTURE** Nearly all olives are produced in countries that border the Mediterranean Sea or have similar climates, including Sifnos, Greece.

considerable extent for international trade, and it is the world's leading export crop. The United States and Canada account for about half of the world's wheat exports; consequently, the North American prairies are accurately called the world's "breadbasket." The ability to provide food for many people elsewhere in the world is a major source of economic and political strength for these two countries.

## MEDITERRANEAN AGRICULTURE

Mediterranean agriculture exists primarily on the lands that border the Mediterranean Sea in Southern Europe, North Africa, and western Asia (Figure 10-41). Farmers in California, central Chile, the southwestern part of South Africa, and southwestern Australia practice Mediterranean agriculture as well.

These Mediterranean areas share a similar physical environment (refer to Figures 10-18 and 10-40). Every Mediterranean area borders a sea, and most are on west coasts of continents (except for some lands surrounding the Mediterranean Sea). Prevailing sea winds provide moisture and moderate the winter temperatures. Summers are hot and dry, but sea breezes provide some relief. The land is very hilly, and mountains frequently plunge directly to the sea, leaving very narrow strips of flat land along the coast.

Farmers derive a smaller percentage of income from animal products in the Mediterranean region than in the mixed crop and livestock region. Livestock production is hindered during the summer by the lack of water and good grazing land. Some farmers living along the Mediterranean

Sea traditionally used transhumance to raise animals, although the practice is now less common. Under transhumance, animals—primarily sheep and goats—are kept on the coastal plains in the winter and transferred to the hills in the summer.

Most crops in Mediterranean lands are grown for human consumption rather than for animal feed. **Horticulture**—which is the growing of fruits, vegetables, and flowers—and tree crops form the commercial base of Mediterranean farming. A combination of local physical and cultural characteristics determines which crops are grown in each area. The hilly landscape encourages farmers to plant a variety of crops within one farming area.

In the lands bordering the Mediterranean Sea, the two most important cash crops are olives and grapes. Two-thirds of the world's wine is produced in countries that border the Mediterranean, especially Italy, France, and Spain. Mediterranean agricultural regions elsewhere in the world produce most of the remaining one-third (refer to Figure 4-22). The lands near the Mediterranean Sea are also responsible for a large percentage of the world's supply of olives, an important source of cooking oil. Despite the importance of olives and grapes to commercial farms bordering the Mediterranean Sea, approximately half of the land is devoted to growing cereals, especially wheat for pasta and bread. As in the U.S. winter wheat belt, the seeds are sown in the fall and harvested in early summer. After cultivation, cash crops are planted on some of the land, and the remainder of the land is left fallow for a year or two to conserve moisture in the soil.

Cereals occupy a much lower percentage of the cultivated land in California than in other Mediterranean climates. Instead, a large portion of California farmland is devoted to fruit and vegetable horticulture, which supplies a large portion of the citrus fruits, tree nuts, and deciduous fruits consumed in the United States. Horticulture is practiced in other Mediterranean climates, but not to the extent found in California. The rapid growth of urban areas in California, especially Los Angeles, has converted high-quality agricultural land into housing developments. Thus far, the loss of farmland has been offset by the expansion of agriculture into arid lands. However, farming in drylands requires massive irrigation to provide water. In the future, California agriculture may face stiffer competition for the Southwest's increasingly scarce water supply.

### Pause and Reflect 10.3.8

At least 1 million metric tons of wine are produced in eight countries (Argentina, Australia, China, France, Italy, South Africa, Spain, and the United States). Referring to Figures 4-22 and 10-18, which one of the eight countries does not appear to have Mediterranean agriculture?

## LIVESTOCK RANCHING

### Learning Outcome 10.3.9

Describe how livestock ranching works.

**Ranching** is the commercial grazing of livestock over an extensive area (Figure 10-42). This form of agriculture is adapted to semiarid or arid land and is practiced in developed countries where the vegetation is too sparse and the soil too poor to support crops.

**CATTLE RANCHING IN THE UNITED STATES.** The importance of ranching in the United States extends beyond the people who choose this form of commercial farming. Its prominence in popular culture, especially in Hollywood films and television, has not only helped to draw attention to this form of commercial farming but has also served to illustrate, albeit in sometimes romanticized ways, the crucial role that ranching played in the history and settlement of areas of the United States. Cattle ranching in Texas, as glamorized in popular culture, did actually dominate commercial agriculture, but only for a short period—from 1867 to 1885.

Cattle ranching expanded in the United States during the 1860s because of the demand for beef in East Coast cities. If they could get their cattle to Chicago, ranchers were paid \$30 to \$40 per head, compared to only \$3 or \$4 per head in Texas. Once in Chicago, the cattle could be slaughtered and processed by meat-packing companies and shipped in packages to consumers in the East. To reach Chicago, cattle were driven on hoof by cowboys over trails from Texas to the nearest railhead. There the cattle were driven into cattle cars for the rest of their journey. The western terminus of the rail line reached Abilene, Kansas, in 1867. Wichita, Caldwell, Dodge City, and other towns in Kansas took their turns as the main destination for cattle

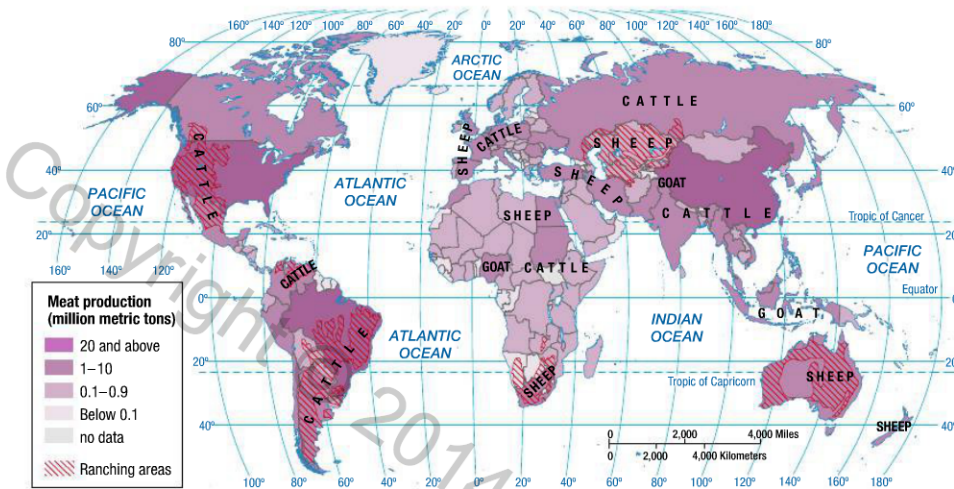
▼ **FIGURE 10-42 RANCHING** Cattle on a west Texas ranch are rounded up for shipping.



▲ **FIGURE 10-43 CHISHOLM TRAIL** The Chisholm Trail was used to move cattle from Texas to railroad stations in Kansas during the 1860s and 1870s.

driven north on trails from Texas. The most famous route from Texas northward to the rail line was the Chisholm Trail, which began near Brownsville at the Mexican border and extended northward through Texas (Figure 10-43).

Cattle ranching declined in importance during the 1880s, after it came into conflict with sedentary agriculture. Most early U.S. ranchers adhered to “the Code of the West,” although the system had no official legal status. Under the code, ranchers had range rights—that is, their cattle could graze on any open land and had access to scarce water sources and grasslands. The early cattle ranchers in the West owned little land, only cattle. The U.S. government, which owned most of the land used for open grazing, began to sell it to farmers to grow crops, leaving cattle ranchers with no legal claim to it. For a few years the ranchers tried to drive out the farmers by cutting fences and then illegally erecting their own fences on public land, and “range wars” flared. The farmers’ most potent weapon proved to be barbed wire, first commercially produced in 1873. The farmers eventually won the battle, and ranchers were compelled to buy or lease land to accommodate their cattle. Large cattle ranches were established, primarily on land that was too dry to support crops. Ironically, 60 percent of cattle grazing today takes place on land leased from the U.S. government.



◀ **FIGURE 10-44 MEAT PRODUCTION**  
China is now the world's largest meat producer.

With the spread of irrigation techniques and hardier crops, land in the United States has been converted from ranching to crop growing. Ranching generates lower income per area of land, although it has lower operating costs. Cattle are still raised on ranches but are frequently sent for fattening to farms or to local feed lots along major railroad and highway routes rather than directly to meat processors.

#### COMMERCIAL RANCHING IN OTHER REGIONS.

Commercial ranching is conducted in several developed countries besides the United States and, increasingly, in developing countries. The interior of Australia was opened for grazing in the nineteenth century, although sheep are more common there than cattle. Ranching is rare in Europe, except in Spain and Portugal. In South America, a large portion of the pampas of Argentina, southern Brazil, and Uruguay is devoted to grazing cattle and sheep. The cattle industry grew rapidly in Argentina in part because the land devoted to ranching was relatively accessible to the ocean, making it possible for meat to be transported to overseas markets.

As with other forms of commercial agriculture, the growth in ranching has been in developing countries. China is the leading producer of meat, ahead of the United States, and Brazil is third (Figure 10-44). China passed the United States as the world's leading meat producer in 1990 and now produces twice as much. Developed countries were responsible for only one-third of world meat production in 2010, compared to two-thirds in 1980.

Ranching has followed similar stages around the world. First was the herding of animals over open ranges, in a semi-nomadic style. Then ranching was transformed into fixed

farming by dividing the open land into ranches. When many of the farms converted to growing crops, ranching was confined to the drier lands. To survive, the remaining ranches experimented with new methods of breeding and sources of water and feed. Ranching has become part of the meat-processing industry rather than an economic activity carried out on isolated farms. In this way, commercial ranching differs from pastoral nomadism, the form of animal herding practiced in less developed regions.

#### Pause and Reflect 10.3.9

What are the two most important ranched animals, according to Figure 10-45?

#### CHECK-IN: KEY ISSUE 3

##### Where Is Agriculture Distributed?

- ✓ Agriculture can be divided into 11 major regions, including 5 in developing regions and 6 in developed regions.
- ✓ In developing regions, pastoral nomadism is prevalent in drylands, shifting cultivation in tropical forests, and intensive subsistence in regions with high population concentrations.
- ✓ In developed regions, mixed crop and livestock is the most common form of agriculture. Dairy, commercial gardening, grain, Mediterranean, and livestock ranching are also important.