

## KEY ISSUE 3

## Where Is Agriculture Distributed?

- Agriculture in Developing Regions
- Agriculture in Developed Regions

### Learning Outcome 10.3.1

Identify the 11 major agricultural regions.

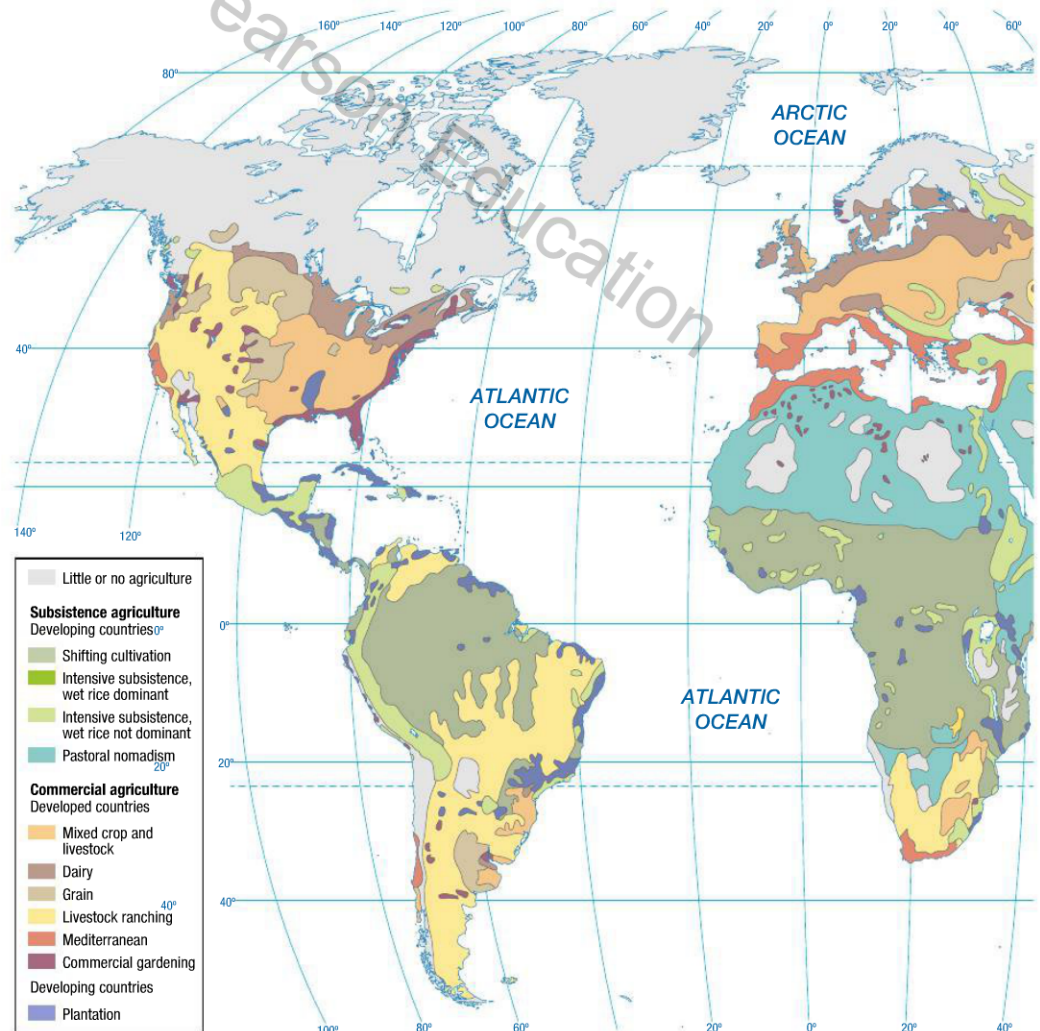
People have been able to practice agriculture in a wide variety of places. The most widely used map of world agricultural regions is based on work done by geographer

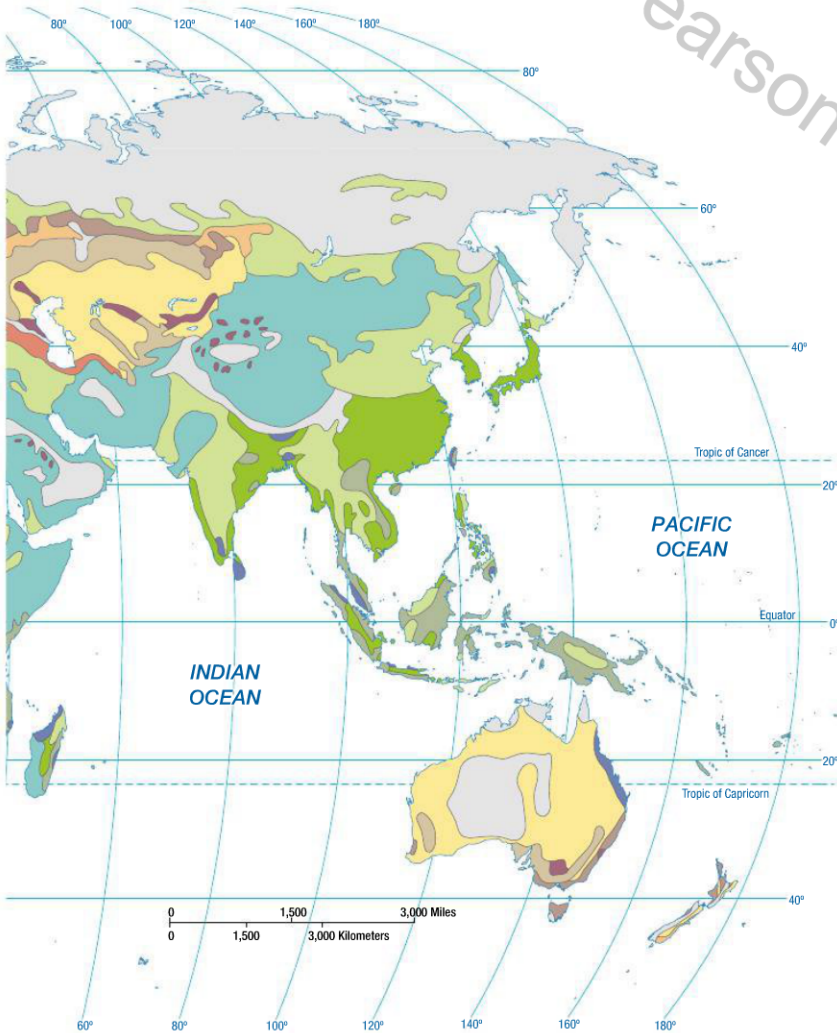
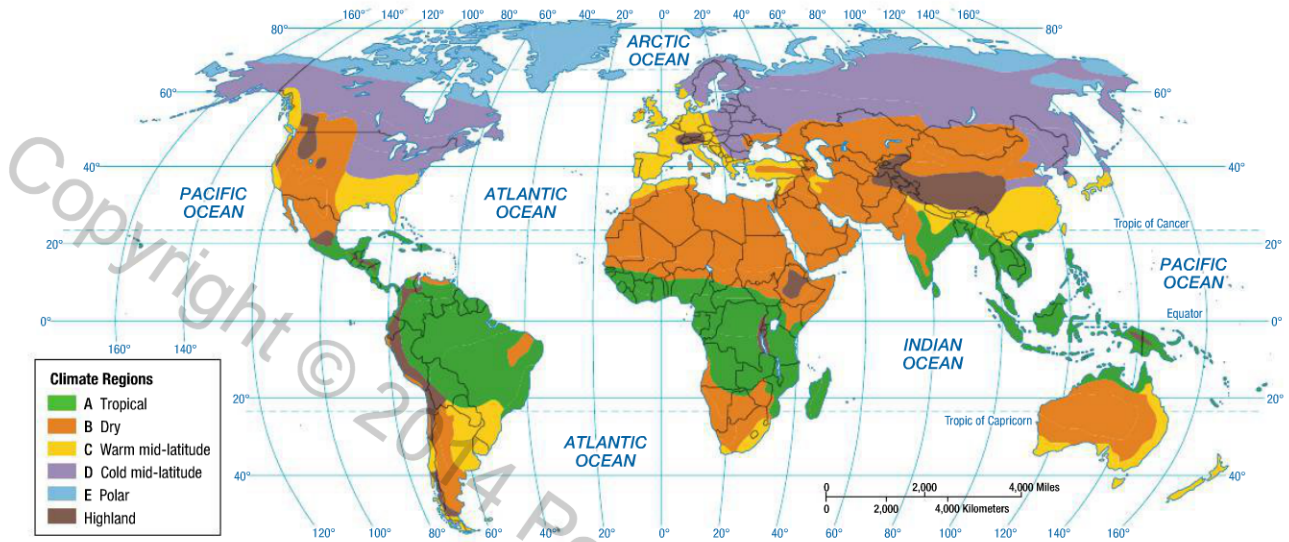
Derwent Whittlesey in 1936. Whittlesey identified 11 main agricultural regions, plus an area where agriculture was nonexistent. Whittlesey's 11 regions are divided between 5 that are important in developing countries and 6 that are important in developed countries (Figure 10-18). The 5 agricultural regions that predominate in developing countries are:

- *Pastoral nomadism*—primarily the drylands of Southwest Asia & North Africa, Central Asia, and East Asia
- *Shifting cultivation*—primarily the tropical regions of Latin America, sub-Saharan Africa, and Southeast Asia
- *Intensive subsistence, wet rice dominant*—primarily the large population concentrations of East Asia and South Asia
- *Intensive subsistence, crops other than rice dominant*—primarily the large population concentrations of East Asia and South Asia, where growing rice is difficult

### ► FIGURE 10-18 AGRICULTURE AND CLIMATE REGIONS

(right) The major agricultural practices of the world can be divided into those that are prevalent in developing countries and those that are prevalent in developed countries (upper right). Climate plays a large role in the practice of agriculture. Figure 1-40 is a more detailed version of the climate map shown here.





- *Plantation*—primarily the tropical and sub-tropical regions of Latin America, sub-Saharan Africa, South Asia, and Southeast Asia

The six agricultural regions that predominate in developed countries are:

- *Mixed crop and livestock*—primarily the U.S. Midwest and central Europe
- *Dairying*—primarily near population clusters in the northeastern United States, southeastern Canada, and northwestern Europe
- *Grain*—primarily the north-central United States, south-central Canada, and Eastern Europe
- *Ranching*—primarily the drylands of western North America, southeastern Latin America, Central Asia, sub-Saharan Africa, and the South Pacific
- *Mediterranean*—primarily lands surrounding the Mediterranean Sea, the western United States, the southern tip of Africa, and Chile
- *Commercial gardening*—primarily the southeastern United States and southeastern Australia

**Pause and Reflect 10.3.1**  
**In which agricultural region do you live?**

## Agriculture in Developing Regions

### Learning Outcome 10.3.2

Explain how pastoral nomadism works in the drylands of developing regions.

In developing countries, most people produce food for their own consumption. Some surplus may be sold to the government or to private firms, but the surplus product is not the farmer's primary purpose and may not even exist some years because of growing conditions. This section considers five agricultural types characteristic of developing countries—pastoral nomadism, shifting cultivation, intensive subsistence with wet rice dominant, intensive subsistence with crops other than rice, and plantation farming.

### AGRICULTURAL REGIONS AND CLIMATE

One factor that contributes to the different types of agriculture in both developed and developing countries is climate. Similarities between the agriculture and climate maps on the previous page are striking. For example, pastoral nomadism is the predominant type of agriculture in Southwest Asia & North Africa, which has a dry climate, whereas shifting cultivation is the predominant type of agriculture in sub-Saharan Africa, which has a tropical climate. Note the division between southeastern China (warm mid-latitude climate, intensive subsistence agriculture with wet rice dominant) and northeastern China (cold mid-latitude climate, intensive subsistence agriculture with wet rice not dominant). In the United States, much of the West is distinguished from the rest of the country according to climate (dry) and agriculture (livestock ranching). Thus, agriculture varies between the drylands and the tropics within developing countries—as well as between the drylands of developing and developed countries.

Because of the problems involved with the concept of environmental determinism, discussed in Chapter 1, geographers are wary of placing too much emphasis on the role

of climate. Cultural preferences discussed in Key Issue 2 also explain agricultural differences in areas of similar climate. Hog production is virtually nonexistent in predominantly Muslim regions because of that religion's taboo against consuming pork products. Wine production is relatively low in Africa and Asia, even where the climate is favorable for growing grapes, because of alcohol avoidance in predominantly non-Christian countries (Figure 4-22).

### PASTORAL NOMADISM

**Pastoral nomadism** is a form of subsistence agriculture based on the herding of domesticated animals. The word *pastoral* refers to shepherding. It is adapted to dry climates, where planting crops is impossible. Pastoral nomads live primarily in the large belt of arid and semiarid land that includes Central and Southwest Asia and North Africa. The Bedouins of Saudi Arabia and North Africa and the Masai of East Africa are examples of nomadic groups. Only about 15 million people are pastoral nomads, but they sparsely occupy about 20 percent of Earth's land area.

Unlike other subsistence farmers, pastoral nomads depend primarily on animals rather than crops for survival. The animals provide milk, and their skins and hair are used for clothing and tents. Like other subsistence farmers, though, pastoral nomads consume mostly grain rather than meat. To obtain grain, many present-day nomads do raise crops. Their animals are usually not slaughtered, although dead ones may be consumed. To nomads, the size of their herd is both an important measure of power and prestige and their main security during adverse environmental conditions.

Some pastoral nomads obtain grain from sedentary subsistence farmers in exchange for animal products. More often, part of a nomadic group—perhaps the women and children—may plant crops at a fixed location while the rest of the group wanders with the herd. Nomads might hire workers to practice sedentary agriculture in return for grain and protection. Other nomads might sow grain in recently flooded areas and return later in the year to harvest the crop. Yet another strategy is to remain in one place and cultivate the land when rainfall is abundant; then, during periods that are too dry to grow crops, the group can increase the size of the herd and migrate in search of food and water.

▼ FIGURE 10-19 PASTORAL NOMADISM: CHOICE OF ANIMALS Goats are herded in Zantaram, Niger.



**CHOICE OF ANIMALS.** Nomads select the type and number of animals for the herd according to local cultural and physical characteristics. The choice depends on the relative prestige of animals and the ability of species to adapt to a particular climate and vegetation. The camel is the most highly desired animal in North Africa and Southwest Asia, along with sheep and goats. The horse is particularly important in Central Asia.



▲ FIGURE 10-20 PASTORAL NOMADISM: MOVEMENT Nomads pitch tents in Turkey.

- Camels are well suited to arid climates because they can go long periods without water, carry heavy baggage, and move rapidly, but they are particularly bothered by flies and sleeping sickness and have a relatively long gestation period—12 months from conception to birth.
- Goats need more water than do camels but are tough and agile and can survive on virtually any vegetation, no matter how poor (Figure 10-19).
- Sheep are relatively slow moving and affected by climatic changes; they require more water than camels and goats and are more selective about which plants they will eat.

The minimum number of animals necessary to support each family adequately varies according to the particular group and animal. The typical nomadic family needs 25 to 60 goats or sheep or 10 to 25 camels.

**MOVEMENTS OF PASTORAL NOMADS.** Pastoral nomads do not wander randomly across the landscape but have a strong sense of territoriality (Figure 10-20). Every group controls a piece of territory and will invade another group's territory only in an emergency or if war is declared. The goal of each group is to control a territory large enough to contain the forage and water needed for survival. The actual amount of land a group controls depends on its wealth and power.

The precise migration patterns evolve from intimate knowledge of the area's physical and cultural characteristics. Groups frequently divide into herding units of five or six families and choose routes based on the most likely water sources during the various seasons of the year. The selection of routes varies in unusually wet or dry years and is influenced by the condition of the animals and the area's political stability.

Some pastoral nomads practice **transhumance**, which is seasonal migration of livestock between mountains and lowland pasture areas. **Pasture** is grass or other plants grown for feeding grazing animals, as well as land used for

grazing. Sheep or other animals may pasture in alpine meadows in the summer and be herded back down into valleys for winter pasture.

#### THE FUTURE OF PASTORAL NOMADISM.

Agricultural experts once regarded pastoral nomadism as a stage in the evolution of agriculture—between the hunters and gatherers who migrated across Earth's surface in search of food and sedentary farmers who cultivated grain in one place. Because they had domesticated animals but not plants, pastoral nomads were considered more advanced than hunters and gatherers but less advanced than settled farmers.

Pastoral nomadism is now generally recognized as an offshoot of sedentary agriculture, not as a primitive precursor of it. It is simply a practical way of surviving on land that receives too little rain for cultivation of crops. The domestication of animals—the basis for pastoral nomadism—

probably was achieved originally by sedentary farmers, not by nomadic hunters. Pastoral nomads therefore had to be familiar with sedentary farming, and in many cases they practiced it.

Today, pastoral nomadism is a declining form of agriculture, partly a victim of modern technology. Before recent transportation and communications inventions, pastoral nomads played an important role as carriers of goods and information across the sparsely inhabited drylands. They used to be the most powerful inhabitants of the drylands, but now, with modern weapons, national governments can control nomadic population more effectively.

Government efforts to resettle nomads have been particularly vigorous in China, Kazakhstan, and several countries of Southwest Asia, including Israel, Saudi Arabia, and Syria. Nomads are reluctant to cooperate, so these countries have experienced difficulty in trying to force their settlement in collectives and cooperatives. Governments force groups to give up pastoral nomadism because they want the land for other uses. Land that can be irrigated is converted from nomadic to sedentary agriculture. In some instances, the mining and petroleum industries now operate in drylands formerly occupied by pastoral nomads. Some nomads are encouraged to try sedentary agriculture or to work for mining or petroleum companies. Others are still allowed to move about, but only within ranches of fixed boundaries. In the future, pastoral nomadism will be increasingly confined to areas that cannot be irrigated or that lack valuable raw materials.

#### Pause and Reflect 10.3.2

A few trees are growing in the background in Figure 10-19 and none in Figure 10-20. What natural resource needs to be present so that trees can grow?

## SHIFTING CULTIVATION

### Learning Outcome 10.3.3

Explain how shifting cultivation works in the tropics of developing regions.

**Shifting cultivation** is practiced in much of the world's Tropical, or A, climate regions, which have relatively high temperatures and abundant rainfall. It is practiced by roughly 250 million people across 36 million square kilometers (14 million square miles), especially in the tropical rain forests of Latin America, sub-Saharan Africa, and Southeast Asia.

Two distinctive features of shifting cultivation are:

- Farmers clear land for planting by slashing vegetation and burning the debris (shifting cultivation is sometimes called **slash-and-burn agriculture**).
- Farmers grow crops on a cleared field for only a few years, until soil nutrients are depleted, and then leave it fallow (with nothing planted) for many years so the soil can recover.

People who practice shifting cultivation generally live in small villages and grow food on the surrounding land, which the village controls. Well-recognized boundaries usually separate neighboring villages.

**THE PROCESS OF SHIFTING CULTIVATION.** Each year villagers designate for planting an area surrounding the settlement. Before planting, they must remove the dense vegetation that typically covers tropical land. Using axes, they cut down most of the trees, sparing only those that are economically useful. An efficient strategy is to cut down selected large trees, which bring down smaller trees that may have been weakened by notching. The undergrowth is cleared away with a machete or other long knife. On a windless day the debris is burned under carefully controlled conditions. The rains wash the fresh ashes into the soil, providing needed nutrients (Figure 10-21).

▼ **FIGURE 10-21 SHIFTING CULTIVATION: SLASH AND BURN** This field in Mozambique is being prepared through slash and burn.



▲ **FIGURE 10-22 SHIFTING CULTIVATION: PREPARING THE LAND** This field in Côte d'Ivoire is being prepared for planting.

Before planting, the cleared area, known by a variety of names in different regions, including **swidden**, **lading**, **milpa**, **chena**, and **kaingin**, is prepared by hand, perhaps with the help of a simple implement such as a hoe; plows and animals are rarely used (Figure 10-22). The only fertilizer generally available is potash (potassium) from burning the debris when the site is cleared. Little weeding is done the first year that a cleared patch of land is farmed; weeds may be cleared with a hoe in subsequent years.

The cleared land can support crops only briefly, usually three years or less. In many regions, the most productive harvest comes in the second year after burning. Thereafter, soil nutrients are rapidly depleted, and the land becomes too infertile to nourish crops. Rapid weed growth also contributes to the abandonment of a swidden after a few years. When the swidden is no longer fertile, villagers identify a new site and begin clearing it. They leave the old site uncropped for many years, allowing it to become over-run again by natural vegetation. The field is not actually abandoned; the villagers will return to the site someday, perhaps as few as 6 years or as many as 20 years later, to begin the process of clearing the land again. In the meantime, they may still care for fruit-bearing trees on the site.

If a cleared area outside a village is too small to provide food for the population, then some of the people may establish a new village and practice shifting cultivation there. Some farmers may move temporarily to another settlement if the field they are clearing that year is distant.

**CROPS OF SHIFTING CULTIVATION.** The crops grown by each village vary by local custom and taste. The predominant crops include upland rice in Southeast Asia, maize (corn) and manioc (cassava) in South America, and millet and sorghum in Africa. Yams, sugarcane, plantain, and vegetables are also grown in some regions. These crops have originated in one region of shifting cultivation and have diffused to other areas in recent years.

The Kayapo people of Brazil's Amazon tropical rain forest do not arrange crops in the rectangular fields and rows that are familiar to us. They plant in concentric rings. At

first they plant sweet potatoes and yams in the inner area, with corn and rice, and more yams in successive rings. In subsequent years the inner area of potatoes and yams expands to replace corn and rice. The outermost ring contains plants that require more nutrients, including papaya, banana, pineapple, mango, cotton, and beans. It is here that the leafy crowns of cut trees fall when the field is cleared, and their rotting releases more nutrients into the soil.

Most families grow only for their own needs, so one swidden may contain a large variety of intermingled crops, which are harvested individually at the best time. In shifting cultivation a “farm field” appears much more chaotic than do fields in developed countries, where a single crop such as corn or wheat may grow over an extensive area. In some cases, families may specialize in a few crops and trade with villagers who have a surplus of others.

**OWNERSHIP AND USE OF LAND IN SHIFTING CULTIVATION.** Traditionally, land was owned by the village as a whole rather than separately by each resident. The chief or ruling council allocated a patch of land to each family and allowed it to retain the output. Individuals may also have had the right to own or protect specific trees surrounding the village. Today, private individuals now own the land in some communities, especially in Latin America.

Shifting cultivation occupies approximately one-fourth of the world’s land area, a higher percentage than any other type of agriculture. However, less than 5 percent of the world’s people engage in shifting cultivation. The gap between the percentage of people and land area is not surprising because the practice of moving from one field to another every couple years requires more land per person than do other types of agriculture.

**FUTURE OF SHIFTING CULTIVATION.** Land devoted to shifting cultivation is declining in the tropics at a rate of about 75,000 square kilometers (30,000 square miles), or 0.2 percent, per year, according to the United Nations (Figure 10-23). The amount of Earth’s surface allocated to tropical rain forests has already been reduced to less than half of its original area, for until recent years the World Bank supported deforestation with loans to finance development schemes that required the clearing of forests. Shifting cultivation is being replaced by logging, cattle ranching, and the cultivation of cash crops. Selling timber to builders and raising beef cattle for fast-food restaurants are more effective development strategies than maintaining shifting cultivation. Developing countries also see shifting cultivation as an inefficient way to grow food in a hungry world. Indeed, compared to other forms of agriculture, shifting cultivation can support only a small population in an area without causing environmental damage.

To its critics, shifting cultivation is at best a preliminary step in economic development. Pioneers use shifting cultivation to clear forests in the tropics and to open land for development where permanent agriculture never existed.



▲ **FIGURE 10-23 DEFORESTATION** The rain forest in Parana, Brazil, once used for shifting cultivation, was cleared plant soybeans.

People unable to find agricultural land elsewhere can migrate to the tropical forests and initially practice shifting cultivation. Critics say it then should be replaced by more sophisticated agricultural techniques that yield more crops per land area. Defenders of shifting cultivation consider it the most environmentally sound approach for the tropics. Practices used in other forms of agriculture, such as applying fertilizers and pesticides and permanently clearing fields, may damage the soil, cause severe erosion, and upset balanced ecosystems.

Large-scale destruction of the rain forests also may contribute to global warming. When large numbers of trees are cut, their burning and decay release large volumes of carbon dioxide. This gas can build up in the atmosphere, acting like the window glass in a greenhouse to trap solar energy in the atmosphere, resulting in the “greenhouse effect,” discussed in Chapter 11. Elimination of shifting cultivation could also upset the traditional local diversity of cultures in the tropics. The activities of shifting cultivation are intertwined with other social, religious, political, and various folk customs. A drastic change in the agricultural economy could disrupt other activities of daily life.

As the importance of tropical rain forests to the global environment has become recognized, developing countries have been pressured to restrict further destruction of them. In one innovative strategy, Bolivia agreed to set aside 1.5 million hectares (3.7 million acres) in a forest reserve in exchange for cancellation of \$650 million of its debt to developed countries. Meanwhile, in Brazil’s Amazon rain forest, deforestation has increased from 2.7 million hectares (7 million acres) per year during the 1990s to 3.1 million hectares (8 million acres) since 2000.

### Pause and Reflect 10.3.3

**How does rapid population growth in sub-Saharan Africa make it difficult to practice shifting cultivation there?**

## INTENSIVE SUBSISTENCE WITH WET RICE DOMINANT

### Learning Outcome 10.3.4

Explain how intensive subsistence farming works in the high population concentrations of developing regions.

Shifting cultivation and pastoral nomadism are forms of subsistence agriculture found in regions of low density. But three-fourths of the world's people live in developing countries, and the form of subsistence agriculture that feeds most of them is **intensive subsistence agriculture**. The term *intensive* implies that farmers must work intensively to subsist on a parcel of land. In densely populated East, South, and Southeast Asia, most farmers practice intensive subsistence agriculture.

**CHARACTERISTICS OF INTENSIVE SUBSISTENCE FARMING.** The typical farm in Asia's intensive subsistence agriculture regions is much smaller than farms elsewhere in the world. Many Asian farmers own several fragmented plots, frequently a result of dividing individual holdings among several children over several centuries. Because the agricultural density—the ratio of farmers to arable land—is so high in parts of East and South Asia, families must produce enough food for their survival from a very small area of land. They do this through careful agricultural practices, refined over thousands of years in response to local environmental and cultural patterns. Most of the work is done by hand or with animals rather than with machines, in part due to abundant labor, but largely from lack of funds to buy equipment.

To maximize food production, intensive subsistence farmers waste virtually no land. Corners of fields and irregularly shaped pieces of land are planted rather than left idle. Paths and roads are kept as narrow as possible to

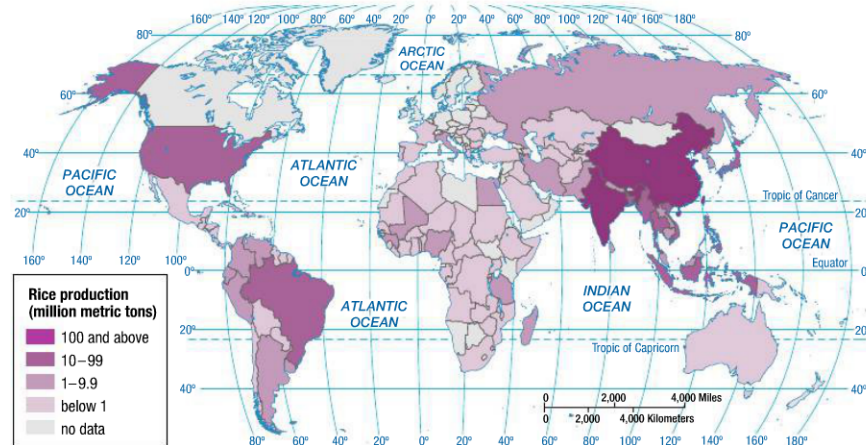


▲ **FIGURE 10-25 GROWING RICE: PREPARING THE FIELD** Plowing a field with a water buffalo in the Philippines.

minimize the loss of arable land. Livestock are rarely permitted to graze on land that could be used to plant crops, and little grain is grown to feed the animals.

The intensive agriculture region of Asia can be divided between areas where wet rice dominates and areas where it does not (refer to Figure 10-18). The term **wet rice** refers to rice planted on dry land in a nursery and then moved as seedlings to a flooded field to promote growth. Wet rice occupies a relatively small percentage of Asia's agricultural land but is the region's most important source of food. China and India account for nearly 50 percent of the world's rice production, and more than 90 percent is produced in East, South, and Southeast Asia (Figure 10-24). Intensive wet-rice farming is the dominant type of agriculture in southeastern China, East India, and much of Southeast Asia. Successful production of large yields of rice is an elaborate process that is time-consuming and done mostly by hand. The consumers of the rice also perform the work, and all family members, including children, contribute to the effort.

▼ **FIGURE 10-24 RICE PRODUCTION** China and India produce one-half of the world's rice.



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### CULTIVATION OF WET RICE.

Growing rice involves four principal steps:

- **Field preparation.** A farmer prepares the field for planting, often using a plow drawn by water buffalo or oxen (Figure 10-25). The use of a plow and animal power is one characteristic that distinguishes subsistence agriculture from shifting cultivation.
- **Flooding.** The plowed land is then flooded with water (Figure 10-26). The water is collected from rainfall, river overflow, or irrigation. Too much or too little water can



▲ FIGURE 10-26 GROWING RICE: FLOODING THE FIELD Flooded fields in Japan.

damage the crop—a particular problem for farmers in South Asia who depend on monsoon rains, which do not always arrive at the same time each summer. Before planting, dikes and canals are repaired to ensure the right quantity of water in the field. The flooded field is called a **sawah** in the Austronesian language widely spoken in Indonesia, including Java. Europeans and North Americans frequently, but incorrectly, call it a **paddy**, the Malay word for wet rice.

- **Transplanting.** The customary way to plant rice is to grow seedlings on dry land in a nursery and then transplant the seedlings into the flooded field (Figure 10-27). Typically, one-tenth of a sawah is devoted to the cultivation of seedlings. After about a month they are transferred to the rest of the field. Rice plants grow submerged in water for approximately three-fourths of the growing period. Another method of planting rice is to broadcast dry seeds by scattering them through the field, a method used to some extent in South Asia.
- **Harvesting.** Rice plants are harvested by hand, usually with knives (Figure 10-28). To separate the husks, known as **chaff**, from the seeds, the heads are **threshed** by beating them on the ground or treading on them barefoot. The threshed rice is placed in a tray, and the lighter chaff is **winnowed**—that is, allowed to be blown away by the wind. If the rice is to be consumed directly by the farmer, the **hull**, or outer covering, is removed using a mortar and pestle. Rice that is sold commercially is frequently whitened and polished, a process that removes some nutrients but leaves rice more pleasing in appearance and taste to many consumers.

Wet rice is most easily grown on flat land because the plants are submerged in water much of the time. Thus



▲ FIGURE 10-27 GROWING RICE: TRANSPLANTING PLANTS Transplanting rice by hand in Malaysia.

most wet-rice cultivation takes place in river valleys and deltas. But the pressure of population growth in parts of East Asia has forced expansion of areas under rice cultivation. One method of developing additional land suitable for growing rice is to terrace the hillsides of river valleys.

Land is used even more intensively in parts of Asia by obtaining two harvests per year from one field, a process known as **double cropping**. Double cropping is common in places that have warm winters, such as southern China and Taiwan, but is relatively rare in India, where most areas have dry winters. Normally, double cropping involves alternating between wet rice, grown in the summer when precipitation is higher, and wheat, barley, or another dry crop, grown in the drier winter season. Crops other than rice may be grown in the wet-rice region in the summer on nonirrigated land.

#### Pause and Reflect 10.3.4

Describe the sequence of tasks in wet rice cultivation. How can growing this very labor-intensive crop be cost effective for farmers?

▼ FIGURE 10-28 GROWING RICE: HARVESTING Harvesting rice by hand in Thailand.





## INTENSIVE SUBSISTENCE WITH WET RICE NOT DOMINANT

### Learning Outcome 10.3.5

Describe reasons for growing crops other than wet rice in intensive subsistence regions.

Climate prevents farmers from growing wet rice in portions of Asia, especially where summer precipitation levels are too low and winters are too harsh (refer to Figure 10-18). Agriculture in much of the interior of India and northeastern China is devoted to crops other than wet rice. Wheat is the most important crop, followed by barley (Figure 10-29). Various other grains and legumes are grown for household consumption, including millet, oats, corn, sorghum, and soybeans. In addition, some crops are grown in order to be sold for cash, such as cotton, flax, hemp, and tobacco.

Aside from what is grown, this region shares most of the characteristics of intensive subsistence agriculture with the wet-rice region. Land is used intensively and worked primarily by human power, with the assistance of some hand implements and animals. In milder parts of the region where wet rice does not dominate, more than one harvest can be obtained some years through skilled use of **crop rotation**, which is the practice of rotating use of different fields from crop to crop each year to avoid exhausting the soil. In colder climates, wheat or another crop is planted in the spring and harvested in the fall, but no crops can be sown through the winter.

Since the Communist Revolution in 1949, private individuals have owned little agricultural land in China. Instead, the Communist government organized agricultural producer communes, which typically consisted of several villages of several hundred people each. By combining

▼ FIGURE 10-29 CHINA BARLEY FIELDS Hillsides are terraced to create flat fields.



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▲ FIGURE 10-30 CHINA COMMUNE A commune in Changsha, China.

several small fields into a single large unit, China's government hoped to promote agricultural efficiency; scarce equipment and animals and larger improvement projects, such as flood control, water storage, and terracing, could be shared (Figure 10-30). In reality, productivity did not increase as much as the government had expected because people worked less efficiently for the commune than when working for themselves.

China has therefore dismantled the agricultural communes. The communes still hold legal title to agricultural land, but villagers sign contracts that entitle them to farm portions of the land as private individuals. Chinese farmers may sell to others the right to use the land and to pass on the right to their children. Reorganization has been difficult because irrigation systems, equipment, and other infrastructure were developed to serve large communal farms rather than small individually managed ones, which cannot afford to operate and maintain the machinery. But production has increased greatly.

## PLANTATION FARMING

The types of agriculture in developing countries discussed so far are considered subsistence agriculture because the principal purpose is production of food for consumption by the farmer's family. Plantation farming is a form of commercial agriculture found in developing countries. A **plantation** is a large commercial farm in a developing country that specializes in one or two crops.

Most plantations are located in the tropics and subtropics, especially in Latin America, Africa, and Asia (Figure 10-31). Although generally situated in developing countries, plantations are often owned or operated by Europeans or North Americans, and they grow crops for sale primarily to developed countries. Crops are normally processed at the plantation before being shipped because processed goods are less bulky and are therefore cheaper to ship the long distances to the North American and European markets.

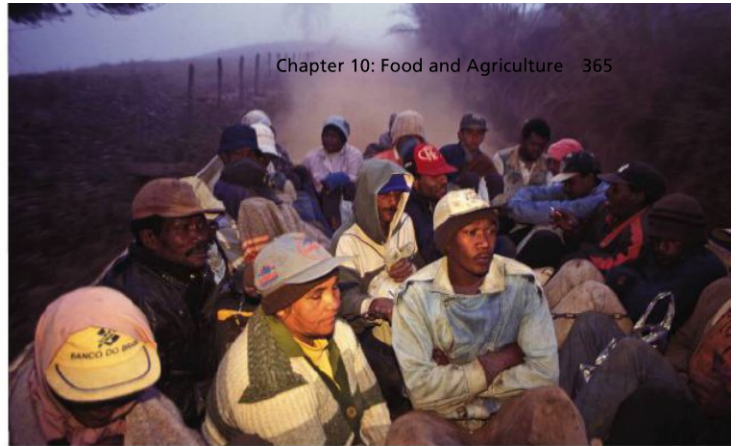
Among the most important crops grown on plantations are cotton, sugarcane, coffee, rubber, and tobacco (Figure 10-32). Also produced in large quantities are cocoa, jute, bananas, tea, coconuts, and palm oil. Latin American



▲ **FIGURE 10-31 COFFEE PLANTATION** This plantation is in Minas Gerais, Brazil.

plantations are most likely to grow coffee, sugarcane, and bananas, whereas Asian plantations may provide rubber and palm oil. Crops such as tobacco, cotton, and sugarcane, which can be planted only once a year, are less likely to be grown on large plantations today than in the past.

Because plantations are usually situated in sparsely settled locations, they must import workers and provide them with food, housing, and social services (Figure 10-33).



▲ **FIGURE 10-33 PLANTATION WORKERS**

Temporary laborers are transported to a coffee plantation in Minas Gerais, Brazil.

Plantation managers try to spread the work as evenly as possible throughout the year to make full use of the large labor force. Where the climate permits, more than one crop is planted and harvested annually. Rubber tree plantations try to spread the task of tapping the trees throughout the year.

Until the Civil War, plantations were important in the U.S. South, where the principal crop was cotton, followed by tobacco and sugarcane. Demand for cotton increased dramatically after the establishment of textile factories in England at the start of the Industrial Revolution in the late eighteenth century. Cotton production was stimulated by the improvement of the cotton gin by Eli Whitney in 1793 and the development of new varieties of cotton that were hardier and easier to pick. Slaves brought from Africa performed most of the labor until the abolition of slavery and the defeat of the South in the Civil War. Thereafter, plantations declined in the United States; they were subdivided and either sold to individual farmers or worked by tenant farmers.

**Pause and Reflect 10.3.5**

**What foods do you consume that are grown on plantations?**

▼ **FIGURE 10-32 COFFEE BEAN PRODUCTION** One-third of the world's coffee beans are grown in Brazil.

