

## Topic 5.1

# Introduction to Agriculture

## You will learn to:

- Explain how agricultural practices are influenced by the physical environment and climatic conditions.
- Describe intensive farming practices, which include market gardening, plantation agriculture, and mixed crop/livestock systems.
- Describe extensive farming practices, which include shifting cultivation, nomadic herding, and ranching.

## Agriculture

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The earliest humans were exclusively hunters and gatherers and did not produce any food. Instead, they depended on what the natural landscape provided. However, around 12,000 years ago, humans began to domesticate plants and animals—marking the invention of agriculture.

Since then, agriculture has been the primary means of feeding human populations. Agriculture is an intentional human activity in which land is used to cultivate crops and raise livestock.

## Environment's influence on agricultural practices

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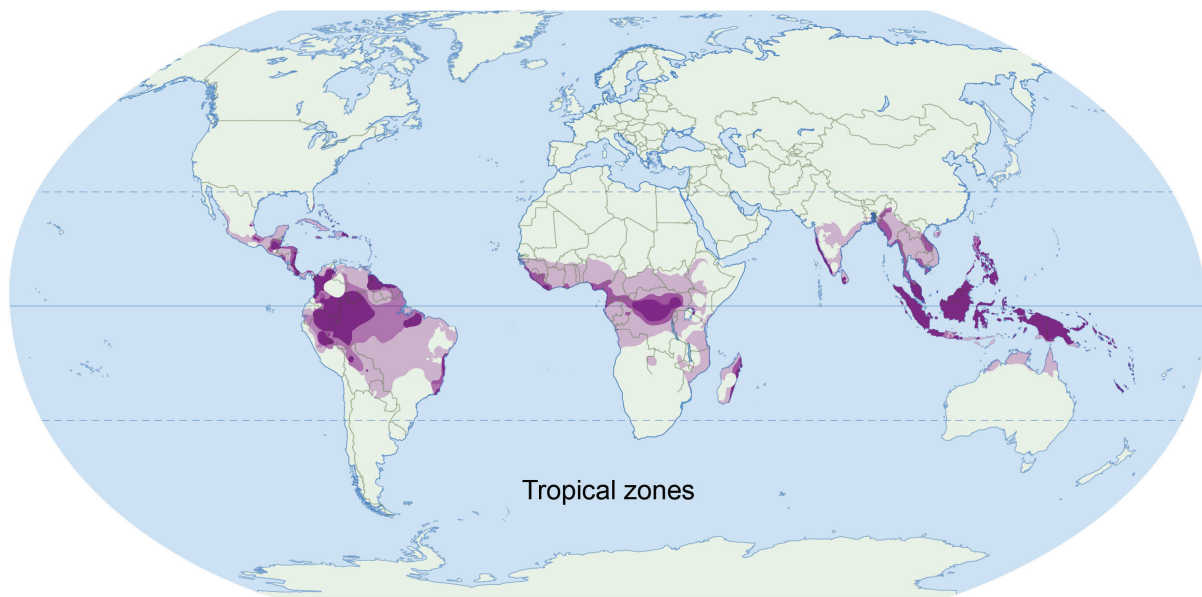
The environment has the greatest influence on the agricultural practices found in a location. Climate refers to the long-term weather patterns, often averaged over a span of 30 years, that are common to a location. The successful cultivation of crops depends largely on how well a region's climate supports the crops' growth.

Crops tend to need specific types of soil, an even terrain, and differing amounts of sunlight and water. Therefore, some crops may be naturally suited to a certain region while others are not. For example, rice cultivation works best in low-lying wet soils in hot and humid climates, with frequent rainfall and lots of sunshine. Rice is very difficult to grow in dry, mountainous terrain.

The influence of climate and land on the kind of agriculture practiced in a place is part of environmental determinism, which we introduced in Topic 1.5. Let's discuss two types of climates favorable to agriculture: tropical and Mediterranean climates.

### **Tropical climates**

Tropical climates are characteristic of warm regions near the equator, which typically have a wet and dry season. The warm temperatures and plentiful rainfall allow plants to grow all year.



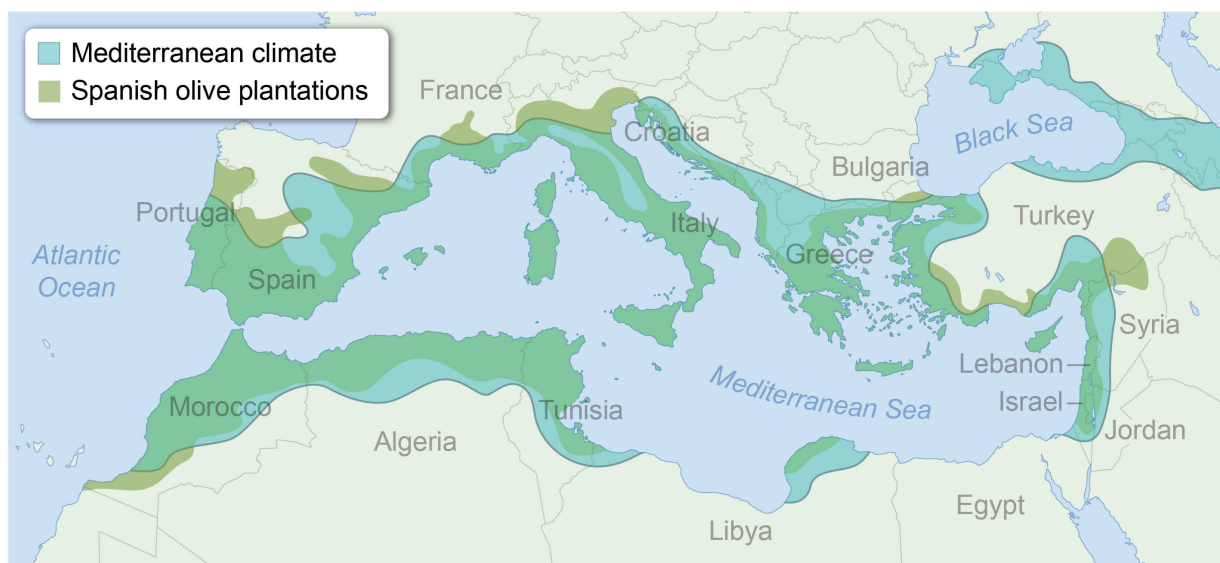
Some tropical climatic regions contain rainforests or densely vegetated areas. Sunlight rarely penetrates the tree canopies in these areas, making farming difficult. Nonetheless, practices such as slash-and-burn agriculture, discussed later in this topic, allow for small-scale subsistence farming.

The most favorable tropical climatic regions are found in places such as northern Australia, South Asia, central Africa, and Latin America. These regions are relatively flat areas of woodlands and grasslands, which support the growth of crops such as cocoa, palm oil, and coffee.

### **Mediterranean climates**

Mediterranean climates provide mild, wet winters and warm, dry summers, which are favorable conditions for many crops—some of which are grown almost entirely in the Mediterranean Basin.

For example, the cultivation of olive trees is best supported by Mediterranean climates, which explains their near-exclusive distribution in those climates. Along with up to an inch of water per week per tree during winter, the warm and dry Mediterranean summers provide a stable environment for this crop.



Besides those shown here, other Mediterranean climates that support olive groves are found in areas of the southwestern US and the central Chilean coast.

## Intensive farming practices

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Intensive farming is a category of agricultural production characterized by high investments of machinery, labor, capital, and/or fertilizers compared with the acreage of land used. For instance, the cultivation of olives requires investing large amounts of these resources per acre. Intensive farming tends to be more common in developed nations, where commercial agriculture is widespread.

### Market gardening

Market gardening is intensive agriculture because it uses either small-scale machinery or high levels of human labor to maximize production on comparatively small plots of land. This form of small-scale commercial agriculture produces a variety of crops that are typically sold to local customers.

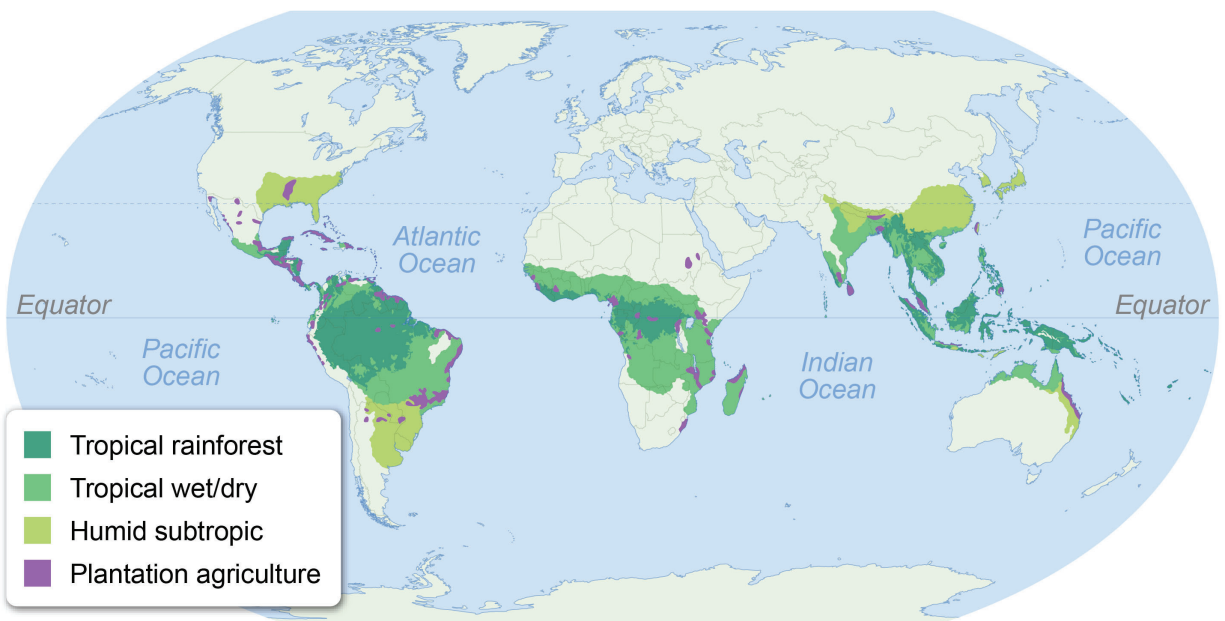


In the US, land used in market gardening can be as much as 4 acres but is often smaller than one acre. In addition to small-scale machinery and manual labor, the level of fertilization can also be high when market gardeners do not cultivate their crops organically.

### Plantation agriculture

As another form of intensive agriculture, plantation agriculture also requires high investments of land, machinery, labor, capital, and/or fertilizers. Typically used in tropical or subtropical environments, it's a type of commercial agriculture in which cash crops are cultivated for profit on large estates.

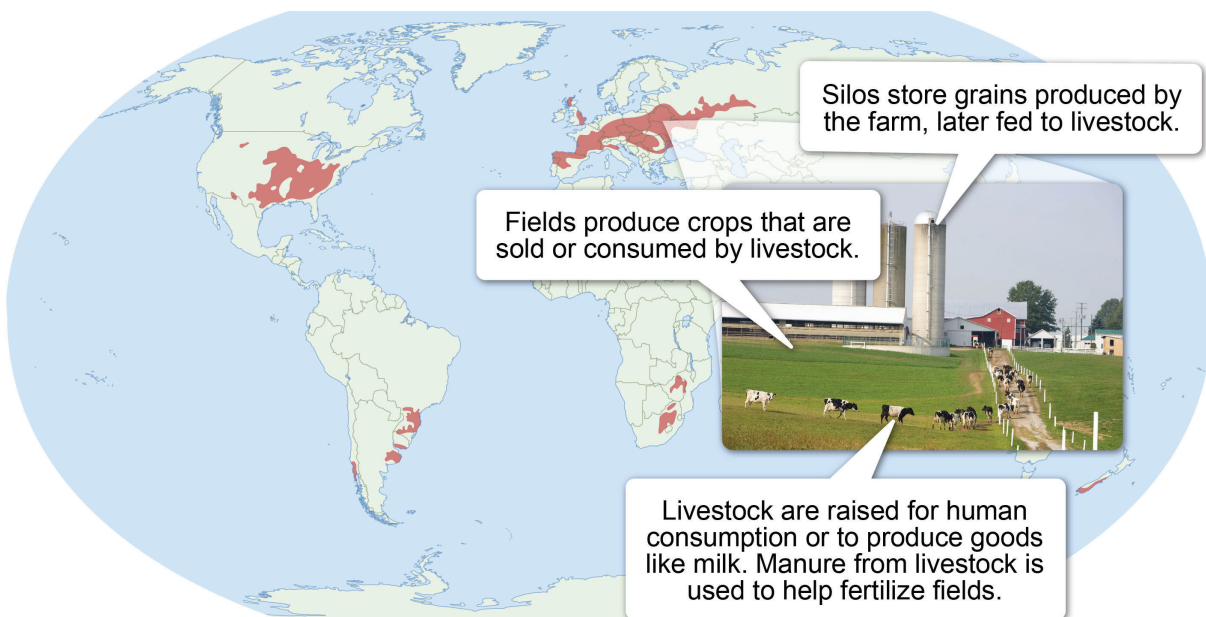




Today, countries profit immensely from the export of cash crops grown on plantations, including cotton, tea, and sugarcane, which grows in tropical climates. Worldwide, plantations produced about 177 million metric tons of sugarcane in 2022.

### Mixed farming and livestock model

The agricultural model of mixed farming and livestock involves growing crops primarily for livestock feed, rather than for humans.



The dark-shaded areas on the map show the global distribution of the mixed crop and livestock farming model, in which crops are produced and farm animals are raised in a mutually beneficial relationship. For instance, a farm's livestock produces manure, which fertilizes crops that are then fed to the farm animals.

Although mixed crop and livestock farming tends to be more environmentally friendly in developing nations, it is also used as an intensive farming practice in developed nations. Estimates suggest that it takes roughly 2,000 gallons of water to produce 1 pound of beef in a mixed crop/livestock system.

## Extensive farming practices

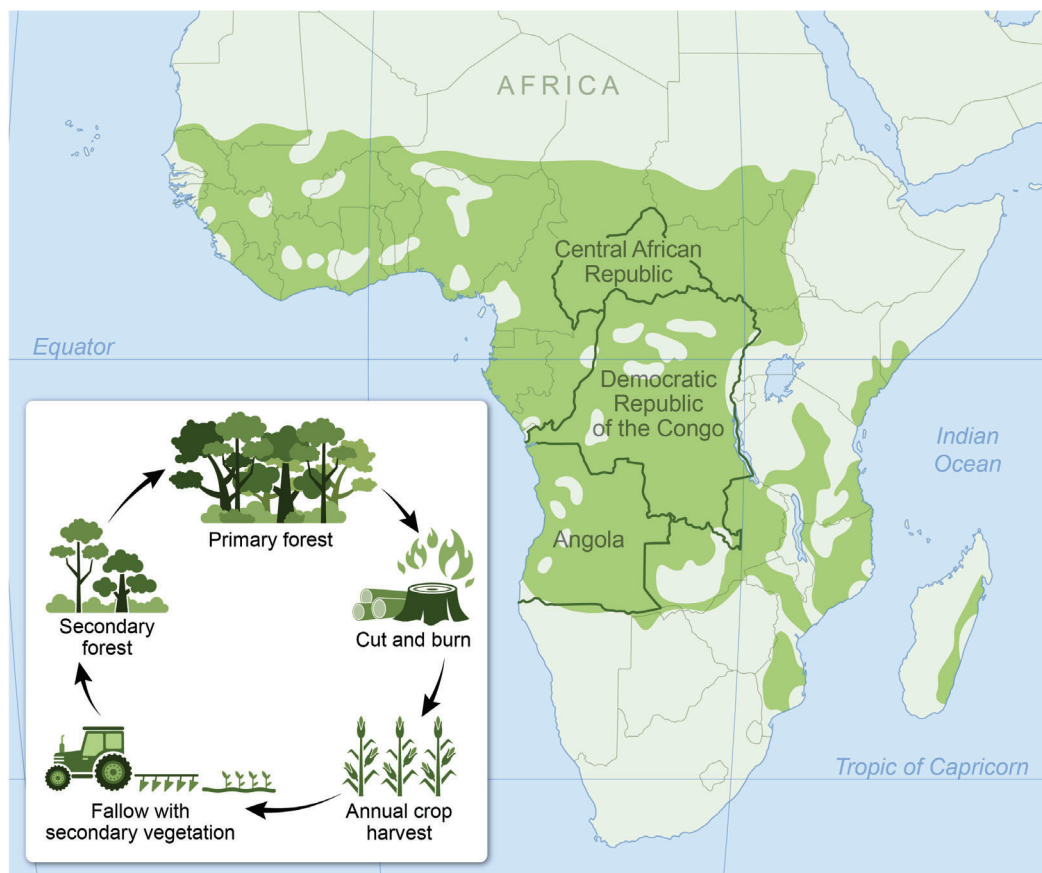
Extensive agriculture requires little in the way of money and machinery and is typically associated with subsistence farming. Therefore, extensive agriculture tends to be common in less developed nations.

### Shifting cultivation

When subsistence agriculture involves shifting cultivation, each farming family needs large amounts of land because the fields are fallow (unplanted) for long periods. This makes shifting cultivation unsuitable for areas with high population density.

In some areas of the world, shifting cultivation requires using fire to clear land and prepare the soil for short-term planting. After trees are cut from future cropland, the debris and loose grasses covering the ground are burned, adding nutrients such as nitrogen to the soil.

Fields used in shifting cultivation are established or restored through a practice known as slash-and-burn agriculture. Trees are cut down and burned on-site, and then the area is planted. The burnt vegetation helps fertilize the crops. A typical field is cultivated for 3 to 5 years, then left fallow for up to 20 years, during which time the regrowth of small trees and grasses occurs.



Due to environmental factors that include a tropical climate and poor soil conditions, sub-Saharan farmers frequently engage in shifting cultivation. Once a sub-Saharan field has been cultivated for a few years, farmers abandon the plot for about 20 years before burning it again and replanting.

### Nomadic herding

Nomadic herding, another type of subsistence farming, is regarded as the most extensive form of agriculture. The practice involves herding livestock over distances of several hundred miles annually.

Nomadic herding is common in dry and rocky conditions where raising crops is nearly impossible. In such climates, hardy animals—most frequently sheep and goats—can survive on the grasses found across the landscape.

However, herders must travel massive distances with their animals to provide them with as much grass as possible. This requires guiding the flocks between summer and winter pastures that may be separated by hundreds of miles. This is known as transhumance migration—a concept introduced in Topic 2.1.

In the Pyrenees Mountains of Europe, pastoralists have practiced transhumance for centuries. In the late spring, livestock are moved farther up the mountains to graze on wild grasses available only in warm weather. Many lowland villagers move to the highlands with their livestock and live in basic shelters. In the fall, the people and animals migrate back toward the lowland valleys to spend the winter in their towns and villages.

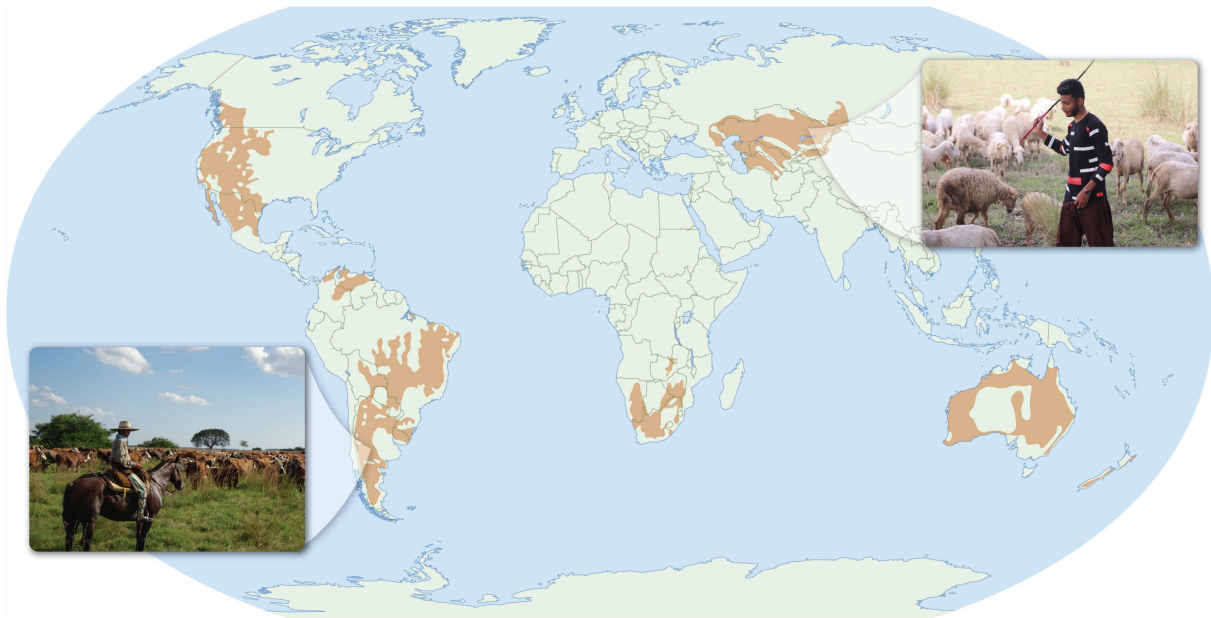


The Tuareg people of North Africa are traditionally seminomadic pastoralists. The Tuareg overcome the harsh Saharan environment by surviving on what their herds provide: milk, cheese, and meat, as well as wool and skins for clothing and dung used as fuel.

Nomadic herding is also common in high, mountainous terrain. The peoples who occupy the middle hills of the Himalayan Mountains, including the Kham Magar, cannot grow crops due to the cool, dry climate and steep terrain. Instead, they move herds between winter and summer pastures.

### Ranching

Livestock ranching is a form of extensive agriculture that requires vast tracts of land for the animals to graze. Livestock ranching can be small or large in scale, and it is also a type of commercial agriculture. In ranching, animals are raised to produce commodities sold at market, such as wool or meat.



Livestock ranching typically occurs in arid regions, where herds of domesticated animals are raised for their meat or by-products. According to estimates, livestock ranching requires up to six acres of native grass to feed one beef cow. As a result, ranchers are forced to commit most of their money to purchasing or renting land, so it is advantageous to locate massive ranches in places where land prices are lower.

### Vocabulary for 5.1

<b>Agriculture</b>	Intentional human activity in which land is used to cultivate crops and raise livestock.
<b>Climate</b>	Long-term weather patterns (often averaged over a span of 30 years) that predominate in a given location and are heavily influenced by latitude, altitude, and proximity to large bodies of water.
<b>Climate region</b>	Broad global areas, also known as climate zones, that share similar long-term weather patterns.
<b>Extensive agriculture</b>	A category of agricultural production that, unlike intensive agriculture, requires low investments of machinery, labor, capital, or fertilizers compared with the amount of land used.
<b>Intensive agriculture</b>	A category of agricultural production that requires high investments of machinery, labor, capital, or fertilizers compared with the amount of land used.
<b>Livestock ranching</b>	A form of commercial agriculture, often used in arid regions, in which herds of domesticated animals raised for their meat or by-products graze vast tracts of land.
<b>Market gardening</b>	A form of small-scale commercial agriculture in which work is largely done by hand. The farmers often produce a variety of crops and typically sell to local customers.



<b>Migrate</b>	The unforced movement of people to a new location. The movement usually occurs because of a potential opportunity in the new location.
<b>Mixed crop and livestock farming</b>	A type of agriculture, found in both developed and developing nations, in which farms produce crops and raise livestock. In this model, crops are primarily fed to livestock rather than being produced for human consumption.
<b>Nomadic herding</b>	A type of agriculture in which people move flocks of domesticated animals seasonally or in order to find the best grazing locations.
<b>Pastoralist</b>	People who raise livestock, generally for subsistence, and whose lives revolve around tending to the animals under their care.
<b>Plantation agriculture</b>	A system of commercial farming, typically used in tropical or subtropical environments, in which cash crops are cultivated for profit on large estates.
<b>Shifting cultivation</b>	A type of subsistence agriculture often used in the tropics in which forests are cleared—often by fire—and then left fallow for relatively long periods as the soil rejuvenates. Thereafter, production is shifted to another crop for short-term use.
<b>Slash-and-burn agriculture</b>	A farming technique in which fields are cleared by cutting vegetation and setting fire to the debris. As an agricultural system, slash-and-burn typically leads to the long-term or permanent agricultural use of the fields.
<b>Subsistence agriculture</b>	Self-sufficient, small-scale production of food, intended primarily for consumption by a farmer's family.
<b>Transhumance migration</b>	A voluntary seasonal movement of pastoralists and their livestock between highland and lowland pastures.



## 5.1 Check for Understanding

- 1. Which of the following is the correct list of characteristics of a tropical climate?**
  - A. Mild, wet winters and warm, dry summers
  - B. Warm temperatures and plentiful rainfall
  - C. Cool, dry conditions with little rainfall
- 2. Which of the following climates is best for growing olives?**
  - A. Hot and humid
  - B. Tropical
  - C. Mediterranean
- 3. Olive cultivation is an example of intensive farming.**
  - A. True
  - B. False
- 4. Mixed crop and livestock farming is a form of agriculture in which the crops grown are primarily intended for humans rather than for livestock feed.**
  - A. True
  - B. False
- 5. Subsistence agriculture involves the use of shifting cultivation and the slash-and-burn method. This type of agriculture is more commonly used in which of the following?**
  - A. Areas with high population density
  - B. Less developed nations
  - C. Regions with nutrient-rich soil
- 6. Livestock ranching is a form of subsistence agriculture.**
  - A. True
  - B. False