

## *Chapter 10*

# Agriculture

By Eugene Stanton

# Food Production

- Providing food in the United States and Canada is a vast industry.
- The mechanized, highly productive American or Canadian farm contrasts with the subsistence farm found in much of the world.
- This sharp contrast in agricultural practices constitutes one of the most fundamental differences between the more developed and less developed countries of the world.



# Key Issues

1. Where did agriculture originate?
2. Where are agricultural regions in less developed countries?
3. Where are agricultural regions in more developed countries?
4. Why do farmers face economic difficulties?



# The Economics of Farming



- The reason why farming varies around the world relates to distribution across space of cultural and environmental factors.
- Elements of the physical environment, such as climate, soil, and topography, set broad limits on agricultural practices, and farmers make choices to modify the environment in a variety of ways.
- Broad climate patterns influence the crops planted in a region, and local soil conditions influence the crops planted on an individual farm.
- Farmers choose from a variety of agricultural practices, based on their perception of the value of each alternative.
- These values are partly economic and partly cultural.
- How farmers deal with their physical environment varies according to dietary preferences, availability of technology, and other cultural traditions.
- At a global scale, farmers increasingly pursue the most profitable agriculture.

# Agricultural Origins and Regions

- Origins of agriculture
  - Hunters and gatherers
  - Invention of agriculture
- Location of agricultural hearths
  - Vegetative planting
  - Seed agriculture
- Classifying agricultural regions
  - Subsistence vs. commercial agriculture
  - Mapping agricultural regions

# Origins of Agriculture

- Determining the origin of agriculture first requires a definition of what it is—and agriculture is not easily defined.
- We will use this definition: **Agriculture is deliberate modification of Earth's surface through cultivation of plants and rearing of animals to obtain sustenance or economic gain.**



# Hunters and Gatherers

- Before the invention of agriculture, all humans probably obtained the food they needed for survival through hunting for animals, fishing, or gathering.
- Hunters and gatherers lived in small groups.
- The men hunted game or fished, and the women collected berries, nuts, and roots.
- This division of labor sounds like a stereotype but is based on evidence from archaeology and anthropology.
- The group traveled frequently, establishing new home bases or camps.
- The direction and frequency of migration depended on the movement of game and the seasonal growth of plants at various locations.



# Contemporary Hunting and Gathering

- Today perhaps a quarter-million people, or less than 0.005 percent of the world's population, still survive by hunting and gathering.
- Contemporary hunting and gathering societies are isolated groups living on the periphery of world settlement, but they provide insight into human customs that prevailed in prehistoric times, before the invention of agriculture.



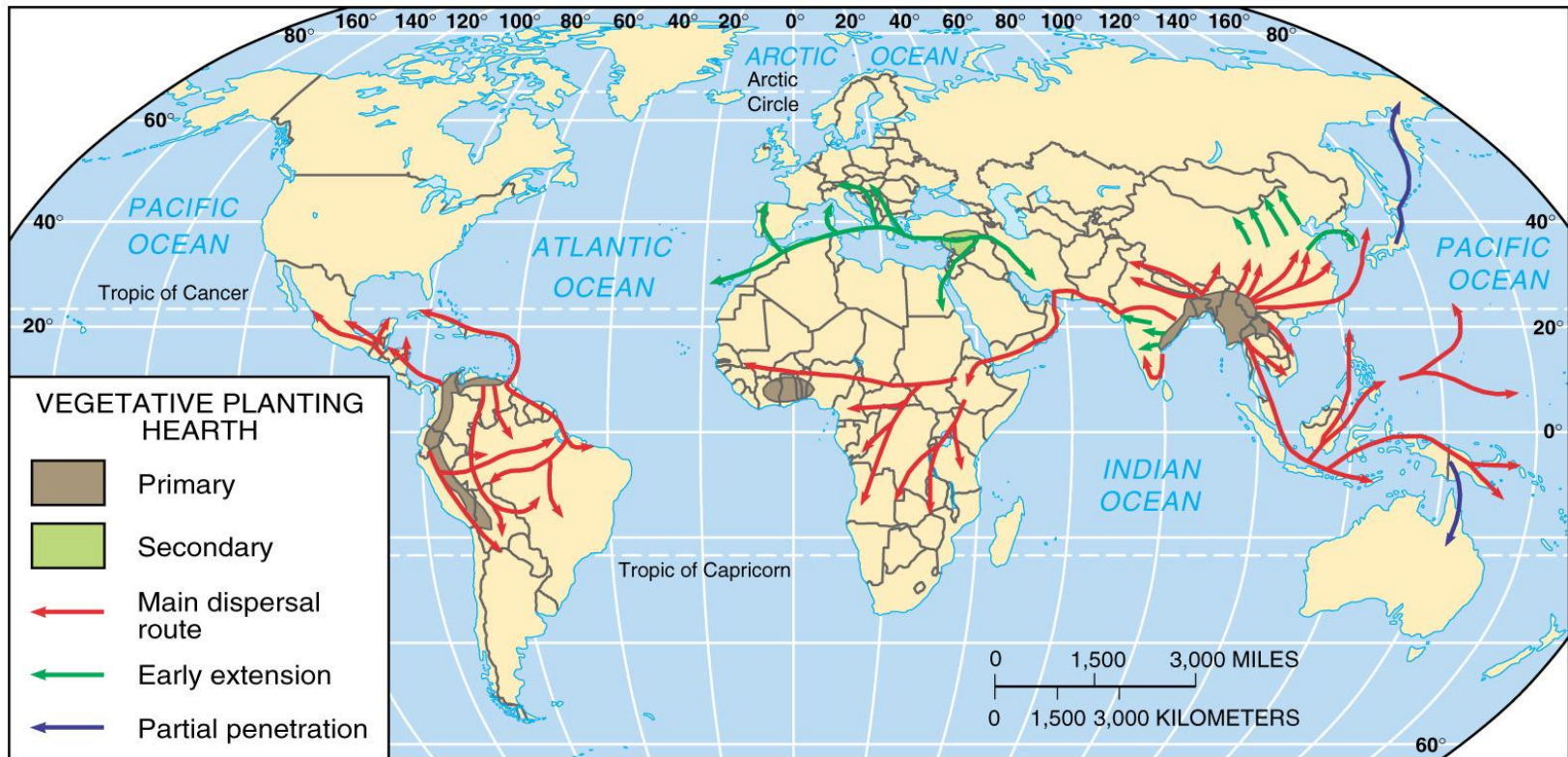


# Two Types of Cultivation

- Over thousands of years, plant cultivation apparently evolved from a combination of accident and deliberate experiment.
- The earliest form of plant cultivation, according to . . . Carl Sauer, was vegetative planting, direct cloning from existing plants, such as cutting stems and dividing roots.
- Coming later, according to Sauer, was seed agriculture. Seed agriculture is practiced by most farmers today.



# Vegetative Planting Hearths

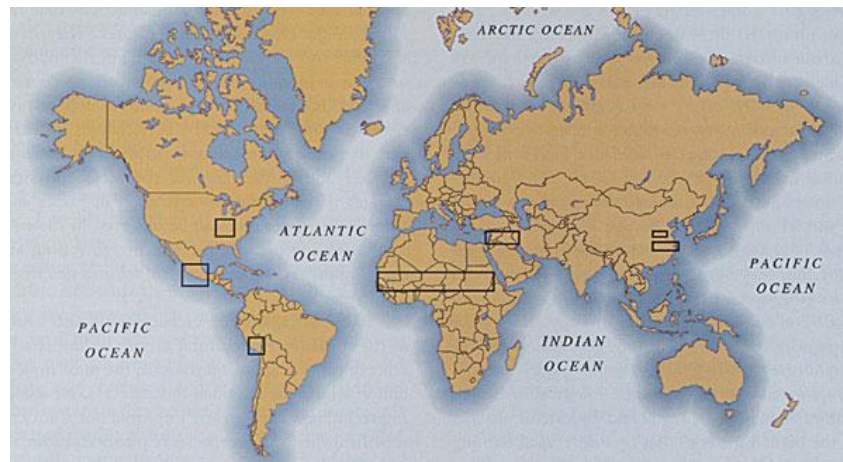


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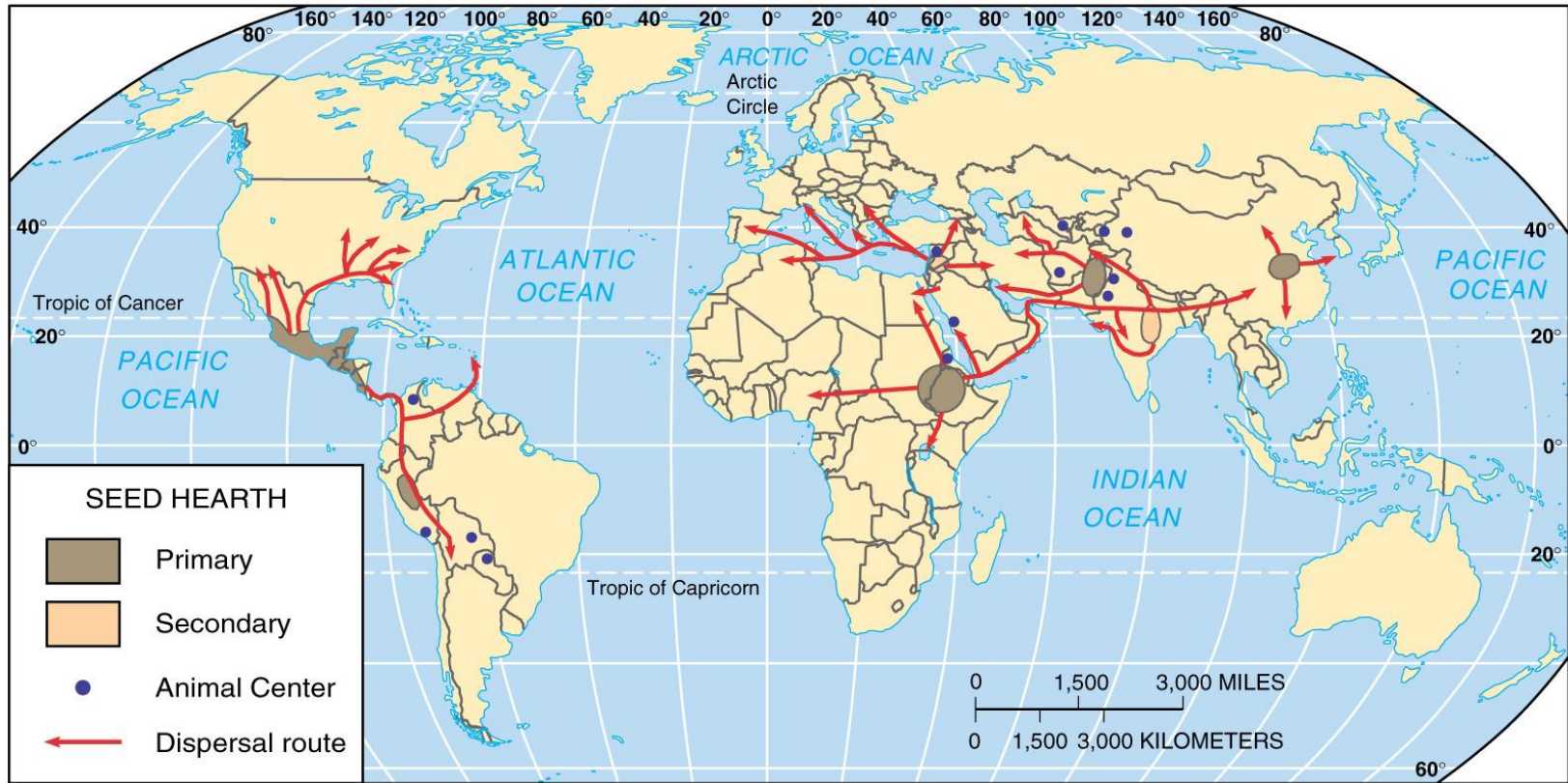
Fig. 10-1: There were several main hearths, or centers of origin, for vegetative crops (roots and tubers, etc.), from which the crops diffused to other areas.

# Location of First Vegetative Planting

- Sauer believes that vegetative planting probably originated in Southeast Asia.
- The region's diversity of climate and topography. . . encouraged. . . plants suitable for dividing.
- Also, the people obtained food primarily by fishing rather than by hunting and gathering, so they may have been more sedentary and therefore able to devote more attention to growing plants.
- The first plants domesticated in Southeast Asia.. . probably included roots such as the taro and yam, and tree crops such as the banana and palm.
- The dog, pig, and chicken probably were domesticated first in Southeast Asia.
- Other early hearths of vegetative planting also may have emerged independently in West Africa and northwestern South America.



# Seed Agriculture Hearths



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Fig. 10-2: Seed agriculture also originated in several hearths and diffused from those elsewhere.

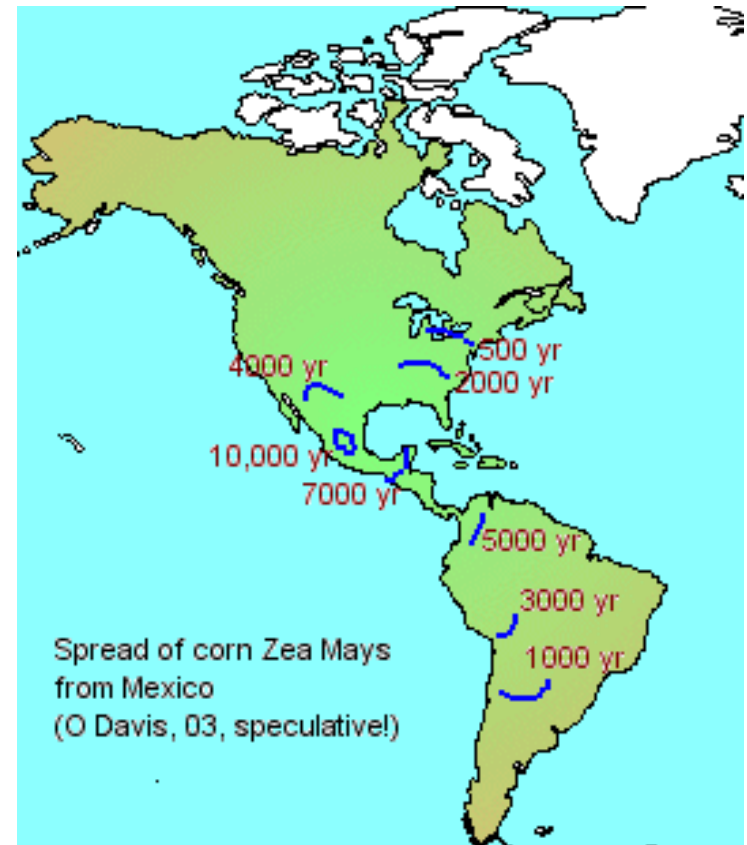
# Diffusion of Seed Agriculture

- Seed agriculture diffused from Southwest Asia across Europe and through North Africa.
- Greece, Crete, and Cyprus display the earliest evidence of seed agriculture in Europe.
- Seed agriculture also diffused eastward from Southwest Asia to northwestern India and the Indus River plain.
- Again, various domesticated plants and animals were brought from Southwest Asia, although other plants, such as cotton and rice, arrived in India from different hearths.
- From the northern China hearth, millet diffused to South Asia and Southeast Asia.
- Rice... has an unknown hearth.
- Sauer identified a third independent hearth in Ethiopia, where millet and sorghum were domesticated early.
- However, he argued that agricultural advances in Ethiopia did not diffuse widely to other locations.



# Diffusion of Seed Agriculture in the Western Hemisphere

- Two independent seed agriculture hearths originated in the Western Hemisphere: southern Mexico and northern Peru.
- Agricultural practices diffused to other parts of the Western Hemisphere.
- That agriculture had multiple origins means that, from earliest times, people have produced food in distinctive ways in different regions.
- This diversity derives from a unique legacy of wild plants, climatic conditions, and cultural preferences in each region.
- Improved communications in recent centuries have encouraged the diffusion of some plants to varied locations around the world.

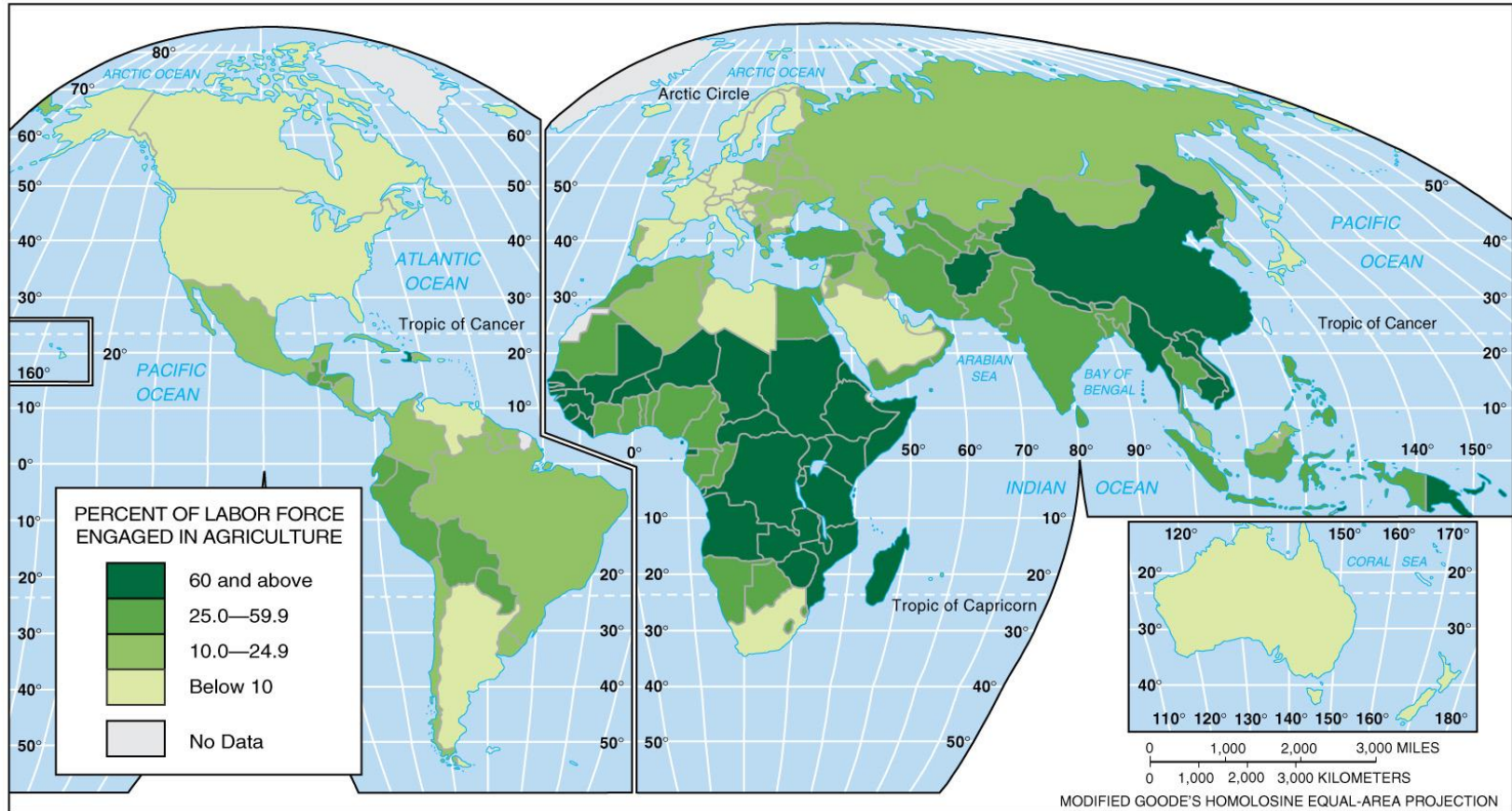


# Differences between Subsistence and Commercial Agriculture

- The most fundamental differences in agricultural practices are between those in less developed countries and those in more developed countries.
- Subsistence agriculture... is the production of food primarily for consumption by the farmer's family.
- Commercial agriculture... is the production of food primarily for sale off the farm.
- Five principal features distinguish commercial... from subsistence agriculture:
  - purpose of farming;
  - percentage of farmers in the labor force;
  - use of machinery;
  - farm size;
  - (and) relationship of farming to other businesses.



# Labor Force in Agriculture

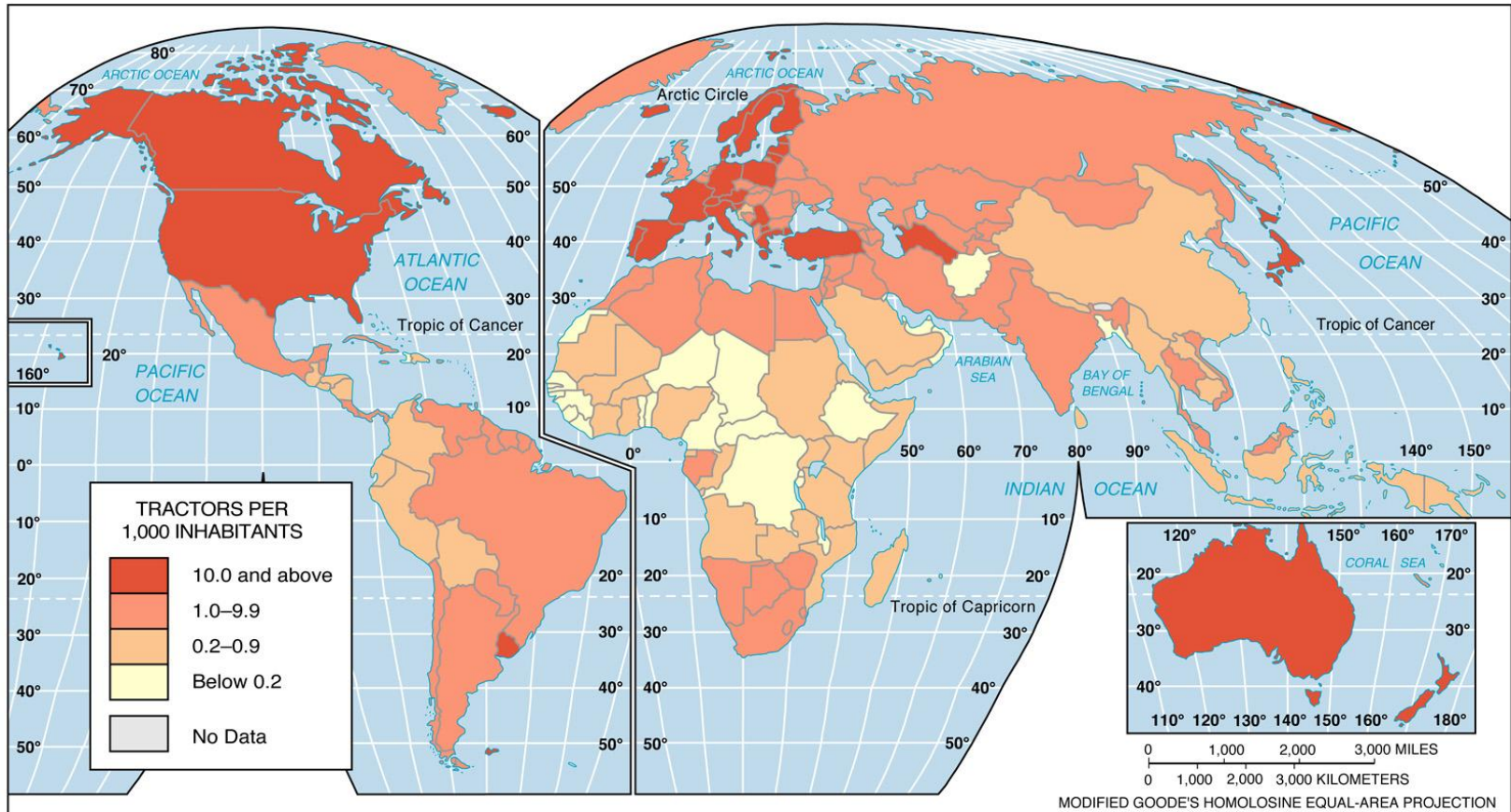


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Fig. 10-3: A large proportion of workers in most LDCs are in agriculture, while only a small percentage of workers in MDCs are engaged in agriculture.



# Tractors, per Population



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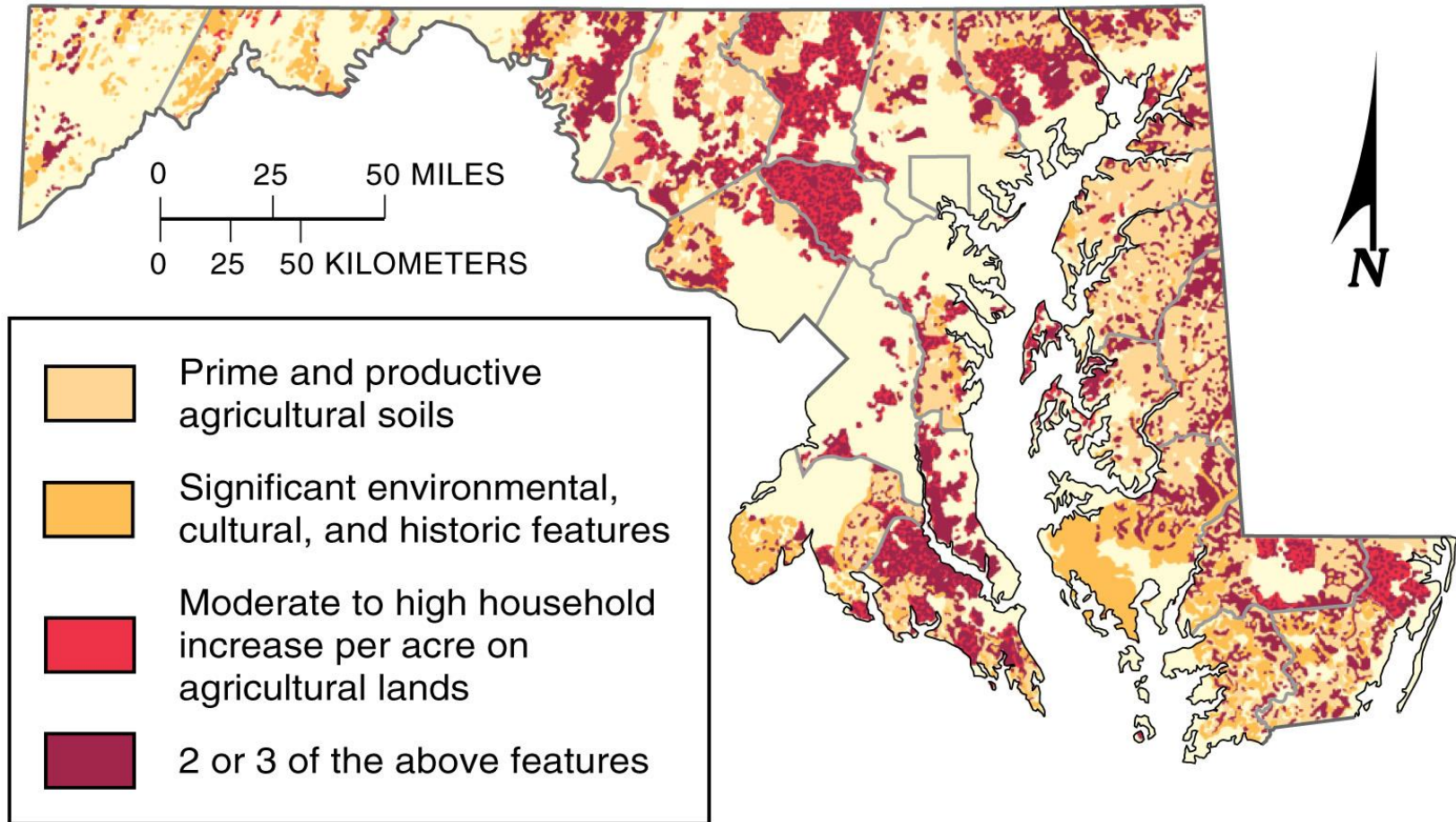
Fig. 10-4: Tractors per 1,000 people. Use of machinery is extensive in most MDC agriculture, but it is much less common in LDCs.

# Farm Size

- The average farm size is relatively large in commercial agriculture, especially in the United States and Canada.
- Commercial agriculture is increasingly dominated by a handful of large farms.
- In the United States the largest 4 percent of farms... account for more than one half of the country's total output.
- One half of U.S. farms generate less than \$10,000 a year in sales.
- Large size is partly a consequence of mechanization.
- As a result of the large size and the high level of mechanization, commercial agriculture is an expensive business.



# Farmland Loss in Maryland



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Fig. 10-1-1: Overlaps of soil quality, environmental and cultural features, and population growth may show areas of greatest threat of farmland loss in Maryland.

# Relationship of Farming to Other Businesses

- Commercial farming is closely tied to other businesses.
- Commercial farming has been called agribusiness, integrated into a large food production industry.
- Although farmers are less than 2 percent of the U.S. labor force, more than 20 percent of U.S. labor works in food production related to agribusiness: food processing, packaging, storing, distributing, and retailing.



# Mapping Agricultural Regions

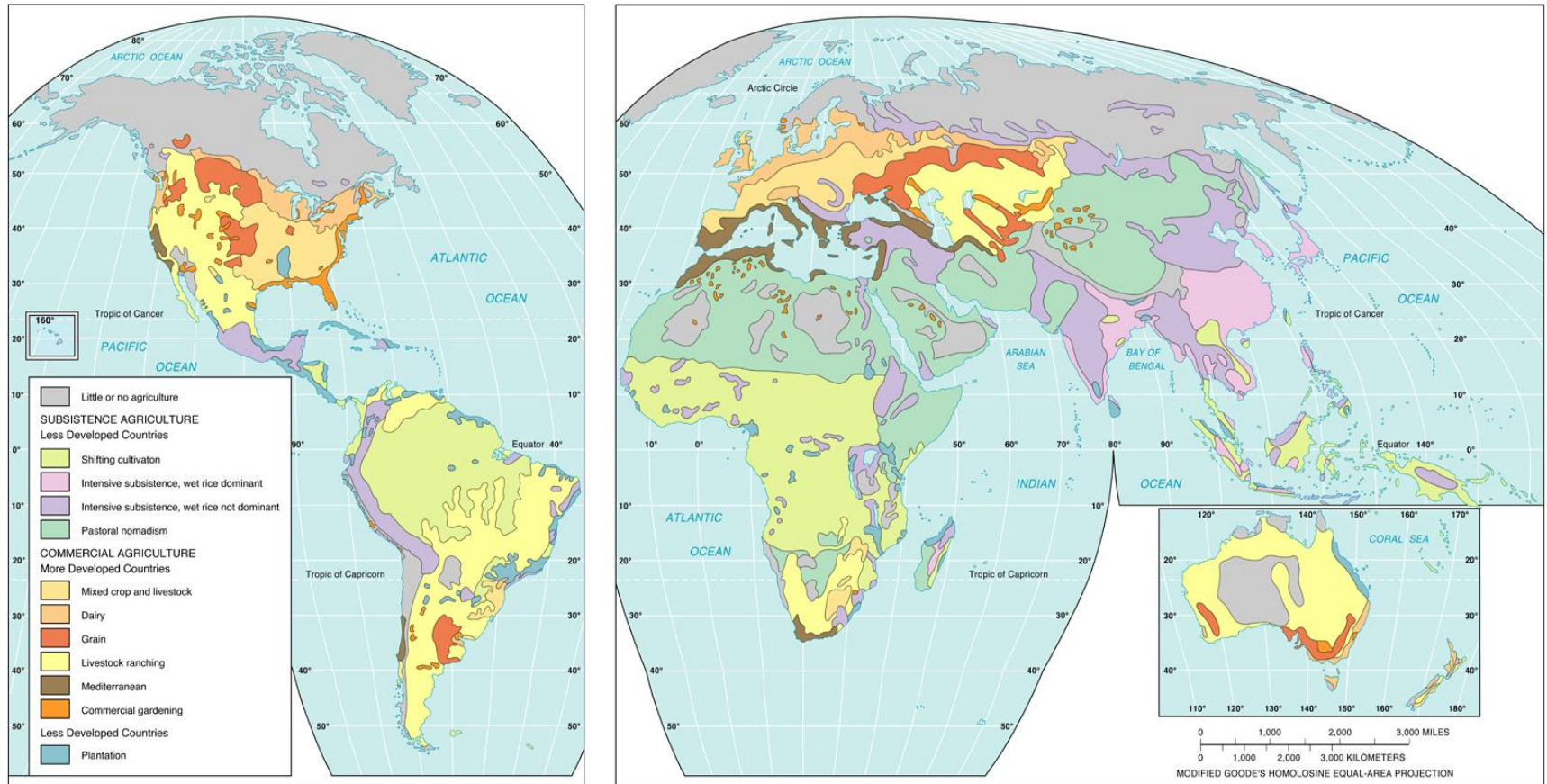
- Several attempts have been made to outline the major types of subsistence and commercial agriculture currently practiced in the world, but few of these classifications include maps that show regional distributions.
- The most widely used map of world agricultural regions was prepared by geographer Derwent Whittlesey in 1936.
- Whittlesey identified 11 main agricultural regions, plus an area where agriculture was nonexistent.
- Whittlesey sorted out agricultural practices primarily by climate.
- Agriculture varies between the drylands and the tropics within LDCs—as well as between the drylands of less developed and more developed countries.
- Because of the problems with environmental determinism discussed in Chapter 1, geographers are wary of placing too much emphasis on the role of climate.
- Cultural preferences, discussed in Chapter 4, explain



# Key Issue 2: Agriculture in Less Developed Countries

- Shifting cultivation
  - Characteristics of shifting cultivation
  - Future of shifting cultivation
- Pastoral nomadism
  - Characteristics of pastoral nomadism
  - Future of pastoral nomadism
- Intensive subsistence agriculture
  - Intensive subsistence with wet rice dominant
  - Intensive subsistence with wet rice not dominant

# World Agriculture Regions



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Fig. 10-5a: Locations of the major types of subsistence and commercial agriculture.

# Shifting Cultivation

- Shifting cultivation is practiced in much of the world's Humid Low-Latitude, or A, climate regions, which have relatively high temperatures and abundant rainfall.
- It is called shifting cultivation rather than shifting agriculture because “agriculture” implies greater use of tools and animals and more sophisticated modification of the landscape.
- Shifting cultivation has two distinguishing hallmarks: farmers clear land for planting by slashing vegetation and burning the debris; and farmers grow crops on a cleared field for only a few years.
- People who practice shifting cultivation generally live in small villages and grow food on the surrounding land, which the village controls.

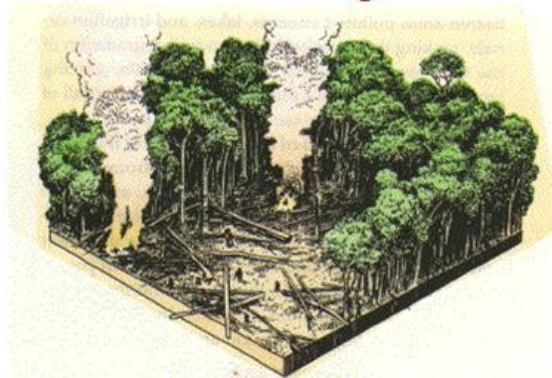




# The Process of Shifting Cultivation

- Each year villagers designate (an area) for planting.
- They must remove the dense vegetation that typically covers tropical land.
- Using axes, they cut most of the trees, sparing only those that are economically useful.
- The debris is burned under carefully controlled conditions.
- Rains wash the fresh ashes into the soil, providing needed nutrients.
- The cleared area is known by a variety of names in different regions, including swidden, ladang, milpa, chena, and kaingin.
- The cleared land can support crops only briefly, usually three years or less.
- Villagers... leave the old site uncropped for many years.
- The villagers will return to the site, . . . 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.

## Shifting Cultivation



Leaching

# Crops of Shifting Cultivation

- The precise 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 also are grown in some regions.
- The Kayapo people of Brazil's Amazon tropical rain forest... plant in concentric rings.
- Plants that require more nutrients are located in the outer ring.
- It is here that the leafy crowns of cut trees fall when the field is cleared.
- Most families grow only for their own needs, so one swidden may contain a large variety of intermingled crops.
- Families may specialize in a few crops and trade with villagers who have a surplus of others.



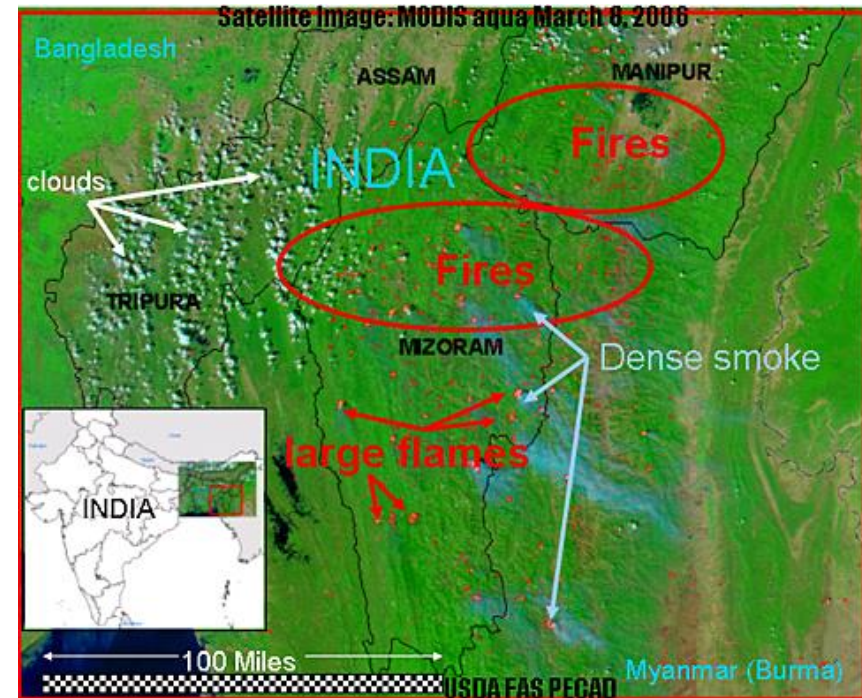
# Ownership and Use of Land in Shifting Cultivation

- Traditionally, land is owned by the village as a whole rather than separately by each resident.
- 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, only 5 percent of the world's population engages in shifting cultivation.

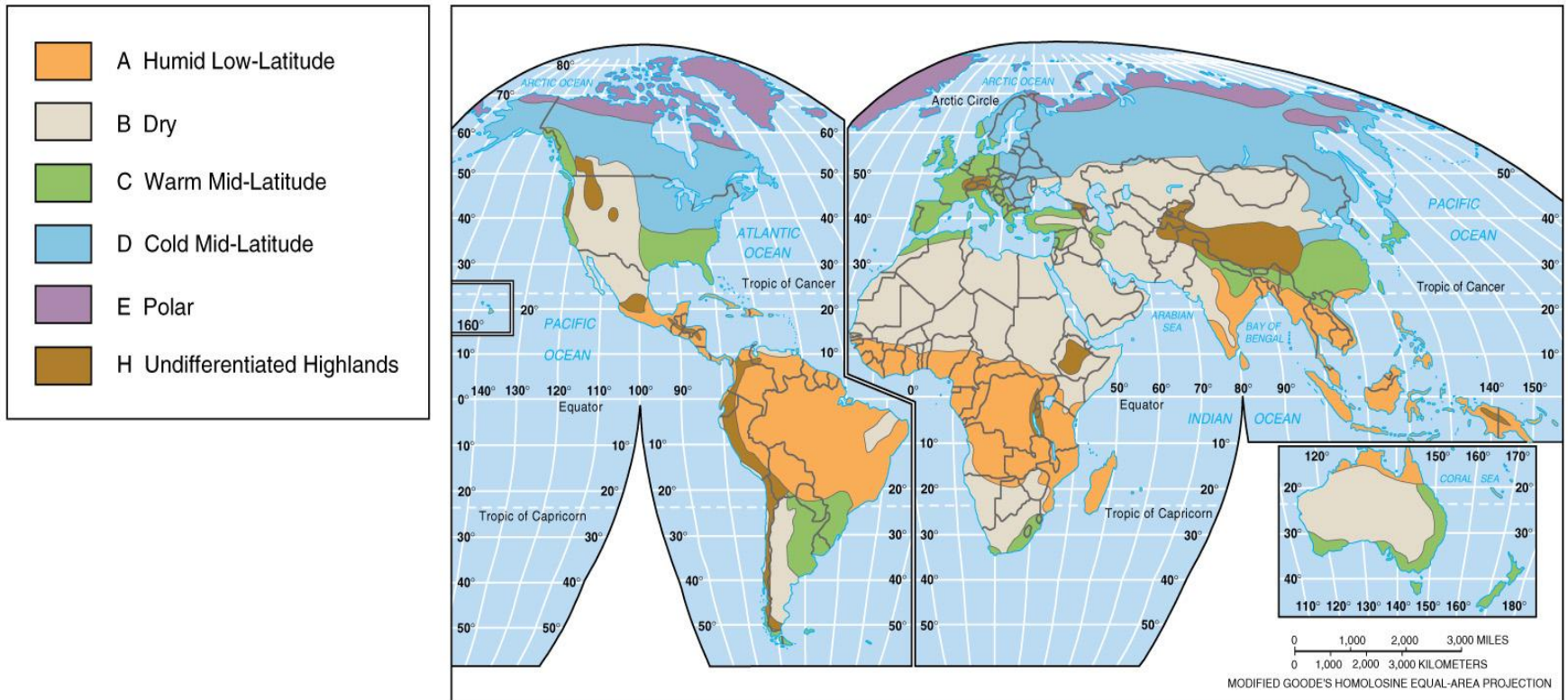


# Future of Shifting Cultivation

- The percentage of land devoted to shifting cultivation is declining in the tropics at the rate of about 100,000 square kilometers (40,000 square miles), or 1 percent per year.
- The amount of Earth's surface allocated to tropical rain forests has already been reduced to less than half of its original area.
- Practices used in other forms of agriculture 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.
- 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.



# World Climate Regions



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Fig. 10-5b: Simplified map of the main world climate regions (see also Fig. 2.2).

# Pastoral Nomadism

- Pastoral nomadism is a form of subsistence agriculture based on the herding of domesticated animals.
- The word pastoral refers to sheep herding.
- It is adapted to dry climates, where planting crops is impossible.
- Only about 15 million people are pastoral nomads, but they sparsely occupy about 20 percent of Earth's land area.



# Characteristics of Pastoral Nomadism

- 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.
- 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.
- Other nomads might sow grain in recently flooded areas and return later in the year to harvest the crop.



# 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.





# Movements of Pastoral Nomads

- Pastoral nomads do not wander randomly across the landscape but have a strong sense of territoriality.
- Every group controls a piece of territory and will invade another group's territory only in an emergency or if war is declared.
- The precise migration patterns evolve from intimate knowledge of the area's physical and cultural characteristics.
- The selection of routes varies in unusually wet or dry years and is influenced by the condition of their animals and the area's political stability.
- Some pastoral nomads practice transhumance, which is seasonal migration of livestock between mountains and lowland pasture areas.



# The Future of Pastoral Nomadism

- Nomads used to be the most powerful inhabitants of the drylands, but now, with modern weapons, national governments can control the nomadic population more effectively.
- Government efforts to resettle nomads have been particularly vigorous in China, Kazakhstan, and several Middle Eastern countries, including Egypt, Israel, Saudi Arabia, and Syria.
- Governments force groups to give up pastoral nomadism because they want the land for other uses.
- In the future, pastoral nomadism will be increasingly confined to areas that cannot be irrigated or that lack valuable raw materials.

