CHAPTER 11: AGRICULTURE
11.1 What is agriculture and where did agriculture begin?

11.2 How did agriculture change with industrialization?

11.3 What imprint does agriculture make on the cultural landscape?

11.4 How is agriculture currently organized geographically, and how has agribusiness influenced the contemporary geography of agriculture?
“Driving across the semiarid ranchlands of western South Dakota, I noticed the presence of a crop in the landscape that was recently found only in the eastern, moister region of the state: soybeans. I called a colleague who works in agriculture at South Dakota State University to ask, “When did the cattle ranchers of western South Dakota start growing soybeans?” He replied, “When the soy biodiesel plants started popping up in Nebraska and Kansas and when genetically modified soybeans made it possible to grow the crop here.”
Key Question 11.1

What is agriculture, and where did agriculture begin?
What is agriculture, and where did agriculture begin?

- **Agriculture** is the deliberate tending of crops and livestock to produce food, feed, fiber, and fuel.
- **Primary economic activities:** Economic activities that involve the extraction of economically valuable products from the earth (including agriculture, ranching, hunting and gathering, fishing, forestry, mining, and quarrying).
What is agriculture, and where did agriculture begin?

- **Secondary economic activities**: Activities (e.g., manufacturing) that take a primary product and change it into something else such as toys, ships, processed foods, chemicals, and buildings.

- **Tertiary economic activities** are those service industries that connect producers to consumers and facilitate commerce and trade or help people meet their needs.
60 Second Reflection

In the United States, less than 2 % of the workforce is involved in agricultural production.

In your notes, respond to the following:

Explain why the proportion of the labor force in agriculture is at an all-time low in the U.S., even though total agricultural production is at an all-time high.
After watching the commercial, respond to the following:

1. What impression does this video give the viewer about farming in America?
2. How does this compare to what you have learned so far about agriculture in the U.S.?
What is food security?

Four major issues that affect food security worldwide:

1. Varying abilities to balance production and consumption across regions and countries
2. Accelerating conversions of agricultural land to urban uses
3. Increasingly energy-intensive food production methods in a world of shrinking fossil fuel resources
4. Expanding use of food crops for biofuel production
Hunting, Gathering, and Fishing

• Before the advent of agriculture, hunting, gathering, and fishing were the most common means of subsistence throughout the world.
• The size of hunting and gathering clans varied according to climate and resource availability.
• Hunting and gathering communities in areas of abundance could support larger populations.
What is agriculture, and where did agriculture begin?

Terrain and Tools

- The first tools used in hunting were simple clubs.
- The development of spears made hunting far more effective.
- In addition to hunting game on land, humans also fished.
- Using tools and fire, human communities altered their environments, which helped to establish more reliable food supplies.
What is agriculture, and where did agriculture begin?

The First Agricultural Revolution

- Geographer Carl Sauer: the experiments necessary to establish agriculture and settle in one place occurred in lands of plenty.
- Sauer suggested that Southeast and South Asia may have been where the first tropical plant domestication occurred, more than 14,000 years ago.
What is agriculture, and where did agriculture begin?

The First Agricultural Revolution

- The cultivation of seed crops marked the beginning of what has been called the First Agricultural Revolution.
- The first domestication of seed plants took place in the Fertile Crescent.
Figure 11.4

What is agriculture, and where did agriculture begin?

Domestication of Animals

- Some scholars believe that animal domestication began earlier than plant cultivation, but others argue that animal domestication began as recently as 8000 years ago—well after crop agriculture.

- The advantages of animal domestication:
  - use as beasts of burden
  - source of meat
  - providers of milk

- Jared Diamond, *Guns, Germs, and Steel*: only five domesticated mammals are important throughout the world: the cow, sheep, goat, pig, and horse.
Field Note

“Attempts to tame wildlife started in ancient times, and still continue. At Hunter’s Lodge on the Nairobi-Mombasa road, we met an agricultural officer who reported that an animal domestication experiment station was located not far into the bush, about 10 miles south. On his invitation, we spent the next day observing this work. In some herds, domestic animals (goats) were combined with wild gazelles, all penned together in a large enclosure. This was not working well; all day the gazelles seek to escape. By comparison, these eland were docile, manageable, and in good health. Importantly, they also were reproducing in captivity. Here, our host describes the program.”
What is agriculture, and where did agriculture begin?

**Subsistence Agriculture**

- **Subsistence agriculture**: growing only enough food to survive; norm throughout most of human history.

- Subsistence agriculture is returning in parts of the world where farmers feel production for the global market has not benefited them financially or culturally.

- **Shifting cultivation**: many farmers move from place to place in search of better land.
  - Found primarily in tropical and subtropical zones

- **Slash-and-burn agriculture**: farmers use tools (machetes and knives) to slash down trees and tall vegetation, and then burn the vegetation on the ground. A layer of ash from the fire settles on the ground and contributes to the soil's fertility.
Settling down in one place, a rising population, and the switch to agriculture are interrelated occurrences in human history. Hypothesize which of these three happened first, second, and third and explain why.
Key Question 11.2

How did agriculture change with industrialization?
How did agriculture change with industrialization?

Second Agricultural Revolution

- 17th – 18th centuries
- Went hand-in-hand with the Industrial Revolution
- Composed of a series of innovations, improvements, and techniques that began in England and diffused to Europe and N. America
- Moved agriculture beyond subsistence
- Generated the kinds of surpluses needed to feed thousands of people working in factories instead of in agricultural fields.
How did agriculture change with industrialization?
How did agriculture change with industrialization?

Second Agricultural Revolution

- New technologies (the seed drill, fertilizers, mechanical reaper)
- Advances in breeding livestock.
- Innovations in machinery that occurred with the Industrial Revolution helped sustain the Second Agricultural Revolution.
  - Railroads enabled migration into the Great Plains
  - Internal combustion engine — tractors, combines, and other large farm equipment
  - New banking and lending practices
Cyrus McCormick’s mechanical reaper cut and bundled grain, which sped up harvesting.
How did agriculture change with industrialization?

Understanding the Spatial Layout of Agriculture

- German farmer Johann Heinrich von Thünen: The greater the distance to market, the higher the transport costs that had to be added to the cost of producing a crop or commodity.
Reproduce this diagram of the von Thunen model in your notes.

Figure 11.7
Von Thünen’s Model.
© H. J. de Blij, P. O. Muller, and John Wiley & Sons, Inc.
How did agriculture change with industrialization?

The Third Agricultural Revolution

- Also called the **Green Revolution**.
- Dates as far back as the 1930s, when agricultural scientists in the American Midwest began experimenting with technologically manipulated seed varieties to increase crop yields.
How did agriculture change with industrialization?

The Third Agricultural Revolution

- **1960s**: The focal point of the Green Revolution shifted to growing rice in India (IR8).
- **1982**: IR36 was produced, bred from 13 parents to achieve genetic resistance against 15 pests and a growing cycle of 110 days under warm conditions.
- The Green Revolution also brought new high-yield varieties of wheat and corn from the U.S. to other parts of the world, particularly S. and SE Asia.
How did agriculture change with industrialization?

Criticism of the Green Revolution

- **Disease-resistant plants and super-pests:** Environmentalists have speculated about the impacts of pollen dispersal from genetically modified plants and the potential for disease-resistant plants to spur the evolution of super-pests.

- **Reduced organic matter in the soil:** Higher inputs of chemical fertilizers, herbicides, and pesticides associated with Green Revolution agriculture can lead to reduced organic matter in the soil and to groundwater pollution.

- **Poverty:** The Green Revolution has done little to alleviate poverty in areas where most farmers still work small plots of land.
How did agriculture change with industrialization?

New Genetically Modified Foods

- **Genetically modified organisms (GMOs)** are found in 75% of all processed foods in the United States.
- Many of the poorer countries of the world do not have access to the necessary capital and technology.
- In regions where seeds are a cultural commodity, reflecting agricultural lessons learned over generations, many resist the invasion of foreign, genetically engineered crops.
Regional and Local Change

• Shifts from subsistence agriculture to commercial agriculture have had dramatic impacts on rural life.
• Dramatic increases in the production of export crops have occurred at the expense of crop production for local consumption.
• Environmental, economic, and social changes have affected local rural communities.
“I am interested in women and rural development in Subsaharan Africa. In 1983, I went to Gambia to study an irrigated rice project that was being implemented to improve the availability of rice, the dietary staple. What grabbed my attention? The donors’ assurance that the project would benefit women, the country’s traditional rice growers. Imagine my surprise a few months after project implementation when I encountered hundreds of angry women refusing to work because they received nothing for their labor from the first harvest.”
The Impacts of Agricultural Modernization on Earlier Practices

- Subsistence farming continues to be a relatively common practice in Africa, Middle America, tropical South America, and parts of Southeast Asia.
- From 1500 to 1950, European powers sought to “modernize” the economies of their colonies by ending subsistence farming and integrating farmers into colonial systems of production and exchange.
- The colonial powers would demand that farmers pay some taxes.
- The colonial powers would conduct soil surveys, build irrigation systems, and establish lending agencies that provided loans to farmers.
Many arguments have been raised about the impacts of the Green Revolution, both pro and con. How might the scale at which the Green Revolution is examined affect the arguments that are made about it? What types of factors are likely to be considered if the question is, “has the Green Revolution been good for Asia” as opposed to “has the Green Revolution been good for a village or a particular agricultural community in India?”
Key Question 11.3

What imprint does agriculture make on the cultural landscape?
What imprint does agriculture make on the cultural landscape?

• The **cadastral system**: the method of land survey through which land ownership and property lines are defined.

• **Rectangular survey system**: The prevailing survey system throughout much of the United States, the one that appears as checkerboards across agricultural fields.
Figure 11.10
Willamette Valley, Oregon. The township-and-range system has left its imprint on the landscape near Eugene, Oregon, where the grid pattern of six mile by six mile townships and the sections of one square mile each are marked by property lines and roads. © Alexander B. Murphy.
What imprint does agriculture make on the cultural landscape?

- **Metes and bounds survey**: natural features were used to demarcate irregular parcels of land.

- **Long-lot survey system**: divided land into narrow parcels stretching back from rivers, roads, or canals.

- **Primogeniture**: the Germanic practice in which all land passes to the eldest son.
Figure 11.11
What imprint does agriculture make on the cultural landscape?

Villages

- True farm villages, in which farming or providing services for farmers are the dominant activities, are disappearing.

Figure 11.12
*Acquitaine, France.* The agricultural landscape of Aquitaine demonstrates three features of rural France: people living in nucleated villages, a highly fragmented land ownership pattern, and land divided according to the French long-lot system.
Villages

- A - Linear village: In many low-lying areas of Western Europe, villages are located on dikes and levees.

- B - Cluster village may have begun as a small hamlet at the intersection of two roads.
What imprint does agriculture make on the cultural landscape?

Villages

- C - Round village or rundling was first used by Slavic farmer-herdsmen in eastern Europe and was later modified by Germanic settlers.

- D - Walled village: as a means of protection.

- E - Grid village: more modern.
What imprint does agriculture make on the cultural landscape?

**Functional Differentiation within Villages**

- Social stratification: reflected in the range in size and quality of houses, representing their owners’ wealth and standing in the community.
- The functional differentiation of buildings within farm villages is more elaborate in some societies than in others.
- Protection of livestock and storage of harvested crops are primary functions of farm villages.
Figure 11.14
Siem Reap, Cambodia. A stilt village in the Mekong Basin of Cambodia. © Barbara A. Weightman

Figure 11.15
Winthrop, Minnesota. The modern American farm typically has a two-story farm house surrounded by several outbuildings. © Erin H. Fouberg.

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Key Question 11.4

How is agriculture currently organized geographically, and how has agribusiness influenced the contemporary geography of agriculture?
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Commercial agriculture

- Began in the 18th and 19th centuries when Europe became a market for agricultural products from around the world.
- Commercial farming has come to dominate in the world’s economic core.

Monoculture

- Dependence on a single agricultural commodity
- Ex. – Ghana: cacao; Sri Lanka: tea
Field Note: Dunedin, New Zealand

“The technology of refrigeration has kept pace with the containerization of seaborne freight traffic. When we sailed into the port of Dunedin, New Zealand, I was unsure of just what those red boxes were. Closer inspection revealed that they are refrigeration units, to which incoming containers are attached. Meats and other perishables can thus be kept frozen until they are transferred to a refrigerator ship.”
How is agriculture currently organized geographically, and how has agribusiness influenced the contemporary geography of agriculture?

The World Map of Climates

- **Wladimir Köppen**: Köppen climate classification system for classifying the world’s climates on the basis of temperature and precipitation.

- Köppen’s map provides one means of understanding the distribution of climatic regions (areas with similar climatic characteristics) across the planet.
The World Map of Climates

A. Humid Equatorial Climate
   - Af: No dry season
   - Am: Short dry season
   - Aw: Dry winter

B. Dry Climate
   - BS: Semiarid
   - BW: Arid

C. Humid Temperate Climate
   - Cf: No dry season
   - Cw: Dry winter
   - Cs: Dry summer

D. Humid Cold Climate
   - Df: No dry season
   - Dw: Dry winter

E. Cold Polar Climate
   - E: Tundra and ice

H. Highland Climate
   - H: Unclassified highlands

Figure 11.17
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Cash Crops and Plantation Agriculture

- Cash farming continues to provide badly needed money in poorer countries

- **Plantation agriculture**: When cash crops are grown on large estates:
  - Plantations are colonial legacies that persist in poorer, primarily tropical, countries along with subsistence farming.
How is agriculture currently organized geographically, and how has agribusiness influenced the contemporary geography of agriculture?

- Commercial livestock, fruit, and grain - outside the tropics
- **Mediterranean agriculture** – specialized farming in a particular climate zone (shores of Mediterranean, California and Oregon, central Chile, South Africa’s Cape)
  - Grapes, olives, citrus fruits, figs, dates, etc.
- Drug agriculture – crops that are turned into illegal drugs; particularly in the periphery
  - Poppy (heroin & opium), coca (cocaine), marijuana, etc.
How is agriculture currently organized geographically, and how has agribusiness influenced the contemporary geography of agriculture?

Political Influences on Agriculture

- Cotton began as a cash crop when colonial powers established a trading network that led to the globalization of the cotton industry.
- As countries emerged from colonial control, they were left with a legacy of large landholdings owned or controlled by wealthy individuals or business entities.
- Tax regulations and subsidies favoring certain land uses.
  - Ex. – US subsidies that favor large-scale farms and guarantee floor prices
How is agriculture currently organized geographically, and how has agribusiness influenced the contemporary geography of agriculture?

**Socio-cultural Influences on Agriculture**

- **Luxury crops**, such as coffee:
  - In most cases, coffee is produced on enormous, foreign-owned plantations, where it is picked by local laborers who are hired at very low wage rates.
  - Fair trade: guarantees coffee producers a “fair trade price” of $1.40 per pound of coffee (plus bonuses of $0.30 per pound for organic).
How is agriculture currently organized geographically, and how has agribusiness influenced the contemporary geography of agriculture?

**Agribusiness and the Changing Geography of Agriculture**

- **Agribusiness**: the businesses that provide a vast array of goods and services to support the agricultural industry.

- A global network of farm production is oriented to the one-fifth of the world’s population that is highly urbanized, wealthy, and powerful.
The Meatrix
Environmental Impacts of Commercial Agriculture

- Overfishing
- Land clearing and deforestation
- Concerns over the introduction of chemical fertilizers and pesticides into the environment - as well as soil erosion.
- Ecological degradation and desertification
- The growth of organic farming and the move toward the use of local foods in some communities can benefit the environment.
Grocery Store Wars
The Challenge of Feeding Everyone

- Worldwide, about 1 billion people are malnourished.
- Inadequate distribution systems and widespread poverty.
- Some of the most fertile, productive farmlands are lost to housing and retail developments.
- Commercial agricultural areas are converted into regions for second homes.
- Population growth and the loss of agricultural land help to explain why global food prices have been on the rise for more than a decade.

- **Food deserts** are areas with limited access to fresh, nutritious foods.
HIGH QUALITY FARMLAND IN THE PATH OF DEVELOPMENT

Figure 11.23
Food production and development
http://www.foodfirst.org/media/opeds/2000/4-greenrev.html

Preservation of agricultural lands
http://www.farmland.org/