

V. Agriculture, Food Production, and Rural Land Use

Tuesday, May 2, 2017 8:10 AM

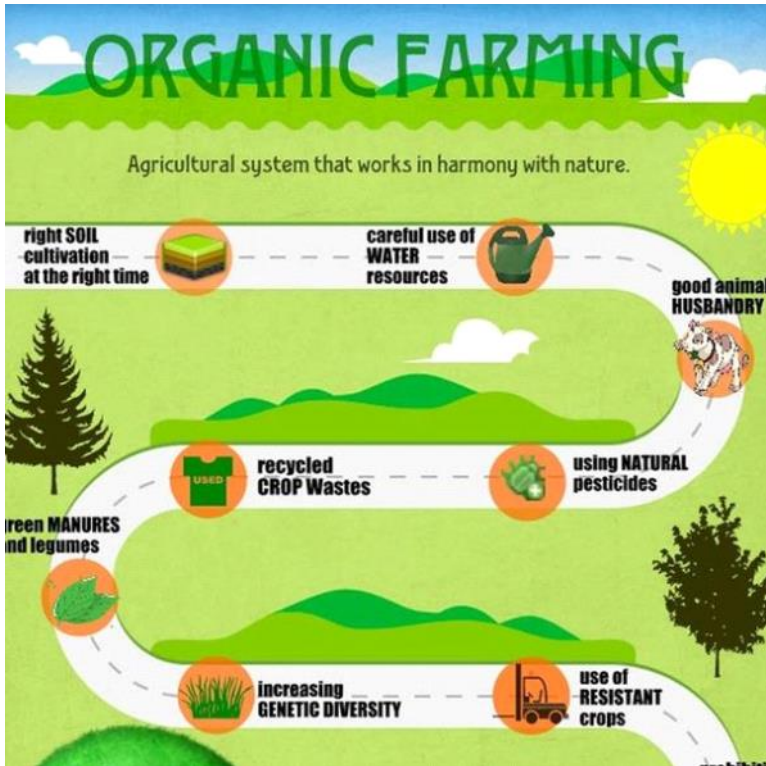
Enduring Understandings	Learning Objectives	Essential Knowledge
A. The development of agriculture led to widespread alteration of the natural environment	Identify major centers of domestication of plants and animals and patterns of diffusion in the first (Neolithic) agricultural revolution	Early hearths of domestication of plants and animals include Southwest Asia (e.g., the Fertile Crescent), Southeast Asia, and the Americas
		Patterns of diffusion (e.g., Columbian Exchange) resulted in the globalization of various plants and animals
	Explain the connection between physical geography and agricultural practices	Agricultural regions are influenced by the natural environment (e.g., climate, soils, landforms)
		Populations alter the landscape (e.g., terraces, irrigation, deforestation, draining wetlands) to increase food production
	Explain the advances and impacts of the second agricultural revolution	New technology and increased food production led to better diet, longer life, and more people available for work in factories
	Analyze the consequences of the Green Revolution on food supply and the environment	The Green Revolution began with the development of high-yield seeds (e.g., rice, wheat, maize), resulting in the increased use of chemical and mechanized farming
		Positive consequences of the Green Revolution include increased food production and a relative reduction in hunger at the global scale
	Negative consequences of the Green Revolution include environmental damage resulting from irrigation and chemical use (e.g., pesticides, herbicides, fertilizers) and the cost of technology and seeds	
B. Major agricultural regions reflect physical geography and economic forces	Identify agricultural production regions associated with major bioclimatic zones	Plant and animal production is dependent on climatic conditions, including spatial variations in temperature and rainfall
		Some agricultural regions are associated with particular bioclimatic zones (e.g., Mediterranean, shifting agriculture, pastoral nomadism)
	Analyze the economic forces that influence agricultural practices	Agricultural production regions are defined by the extent to which they reflect subsistence or commercial practices , or intensive or extensive use of land
		Intensive farming practices include market gardening, plantation agriculture, mixed crop/livestock systems, etc.
		Extensive farming practices include shifting cultivation, nomadic herding, ranching, etc.
	Explain the spatial organization of large-scale commercial agriculture and agribusiness	Large-scale commercial agricultural operations are replacing small family farms
		The transformation of agriculture into large-scale agribusiness has resulted in complex commodity chains linking production and consumption of agricultural products

		Technological improvements have changed the economies of scale in the agricultural sector
	Explain the interdependence among regions of food production and consumption	Food is part of a global supply chain; products from less developed low-latitude regions (e.g., coffee, bananas) are often consumed globally
		Patterns of global food distribution are affected by political systems, infrastructure, and patterns of world trade
C. Settlement patterns and rural land use are reflected in the cultural landscape	Identify rural settlement patterns	Rural settlement patterns are classified as clustered, dispersed, or linear
	Compare and contrast the land use zones of von Thünen's model	Von Thünen's model helps to explain rural land use by emphasizing the importance of transportation costs associated with distance from the market
	Analyze the application of von Thünen's land use model to agricultural production in the real world	Von Thünen's model helps explain the contemporary distribution of agricultural regions (e.g., dairy, horticulture, wheat)
		Regions of specialty farming (e.g., South Florida, California's Central Valley) do not always conform to von Thünen's concentric rings
	Evaluate the environmental consequences of agricultural practices	Environmental systems are affected by land use/land cover change (e.g., irrigation, desertification, deforestation, wetland destruction, conservation efforts)
D. Changes in food production and consumption present challenges and opportunities	Explain issues related to the changing nature of contemporary agriculture	Agricultural innovations (e.g., biotechnology, genetically modified organisms, organic farming, aquaculture) have resulted in ongoing debates over environmental, cultural, and health impacts
		Environmental issues related to agriculture include sustainability, soil degradation, reduction in biodiversity, overgrazing, river and aquifer depletion, animal wastes, and extensive fertilizer and pesticide use
		Patterns of food production and consumption are influenced by food-choice issues (e.g., organic farming, value-added specialty crops, fair trade, local-food movements)
	Explain issues related to the location of food- production facilities	Factors affecting the location of food-processing facilities include markets, economies of scale, transportation, government policies, etc.
	Explain the changing role of women in food production and consumption	The role of women in food production has changed (e.g., food gathering, farming, managing agribusiness)
		The role of women has changed the types of food a family consumes and the way food is prepared

From <<https://sites.google.com/a/lphs.org/lphumangeo/unit-v---agriculture-food-production-and-rural-land-use>>

Vocabulary

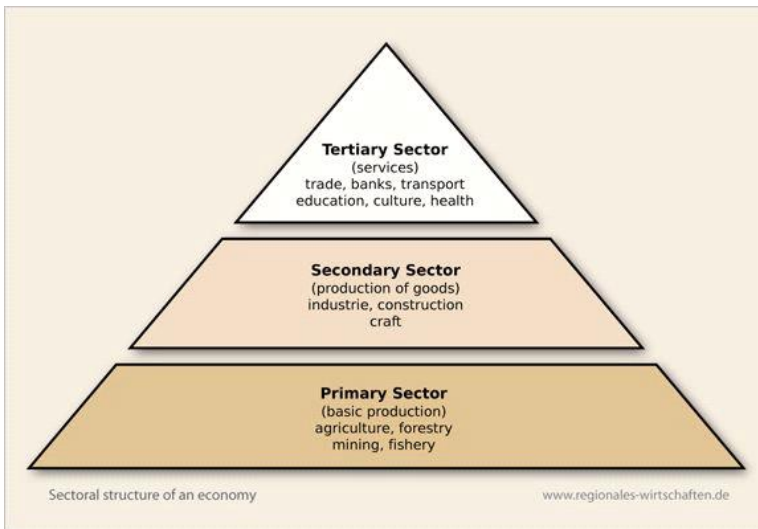
Thursday, May 4, 2017 2:40 PM



organic agriculture: growing crops without man made pesticides or fertilizers



agriculture: tending of crops and livestock



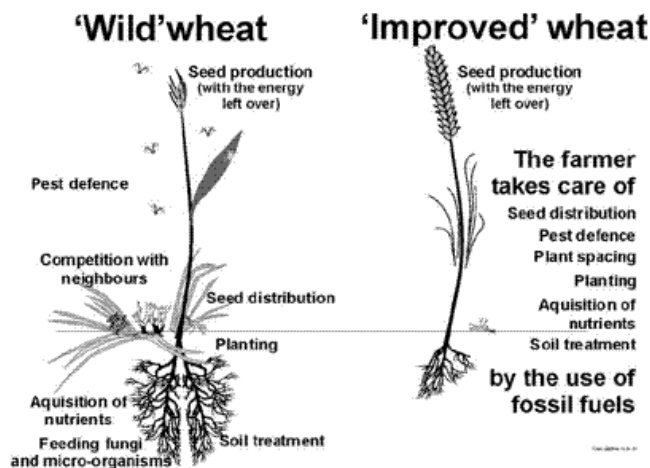
primary economic activities: direct taking of a resource (growing, fishing, mining)

secondary economic activities: making/processing a primary resource into something

tertiary economic activities: service sector

quaternary economic activities: information, knowledge base service sector

quinary economic activities: high level decision making sector



plant domestication: adopting wild plants for human farming/use



root crops: crops by cultivation the roots or plant cuttings



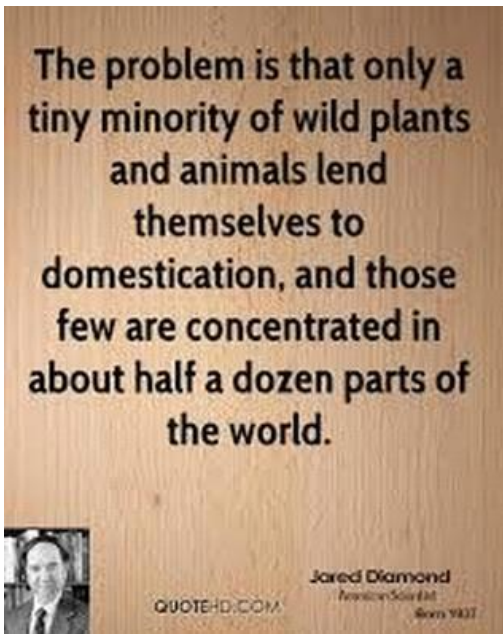
seed crops: plants reproduced by cultivation seeds



First Agricultural Revolution: cultivation & domestication/Neolithic Revolution



animal domestication: making an animal more hospitable to humans



Jared Diamond: wrote *Guns, Germs, and Steel* (5 major animals cow, sheep, goat, pig, horse)



Download from [Dreamstime.com](https://www.dreamstime.com)

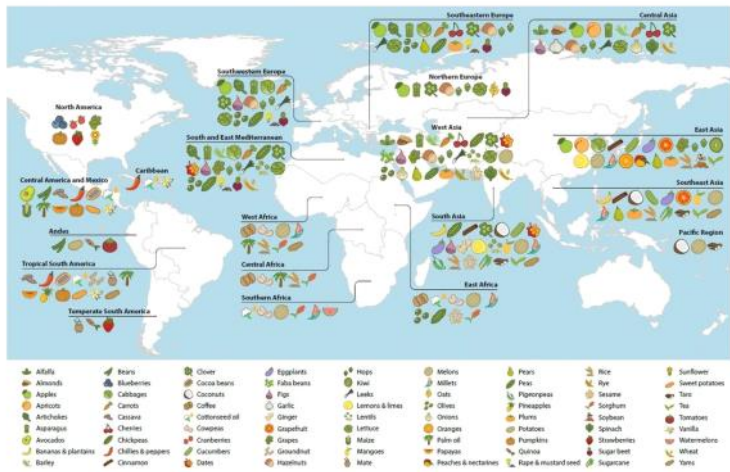
subsistence agriculture: growing food for survival



shifting cultivation: moving farming from place to place

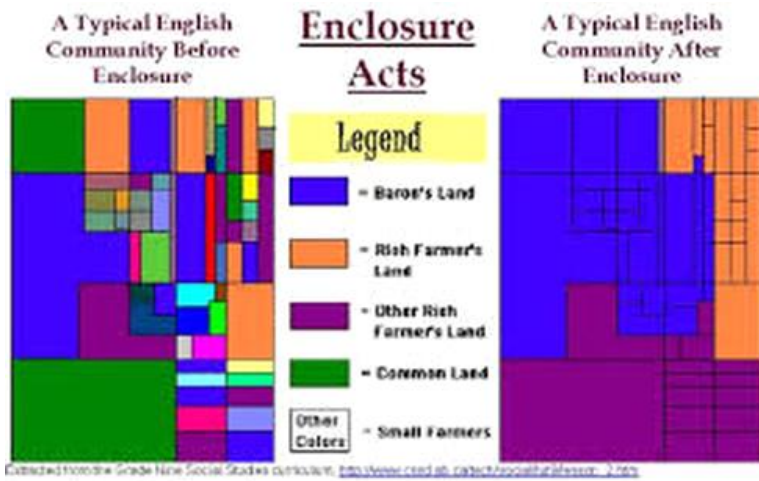


slash-and-burn agriculture: using fire to clear land to grow food

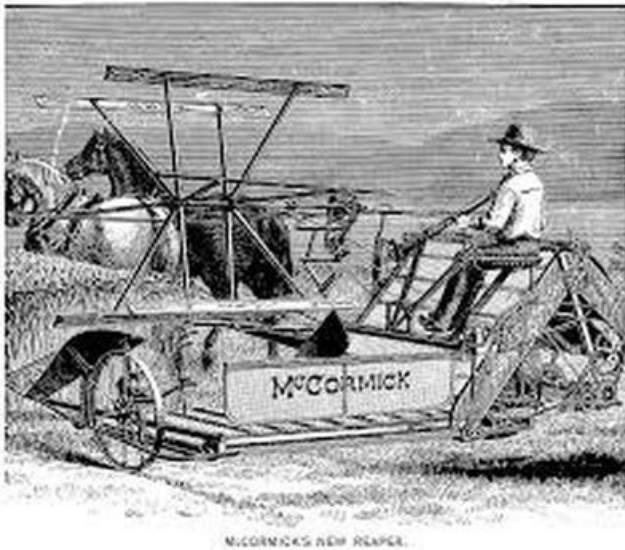


- Seventeenth and eighteenth century
- Allowed for the industrial revolution to take place
- New technology and tools

Second Agricultural Revolution: happens with the Industrial Revolution (IR), new tech



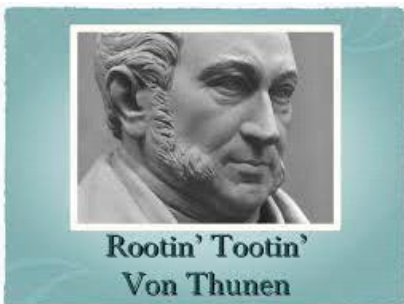
Enclosure Act: large farms by one owner



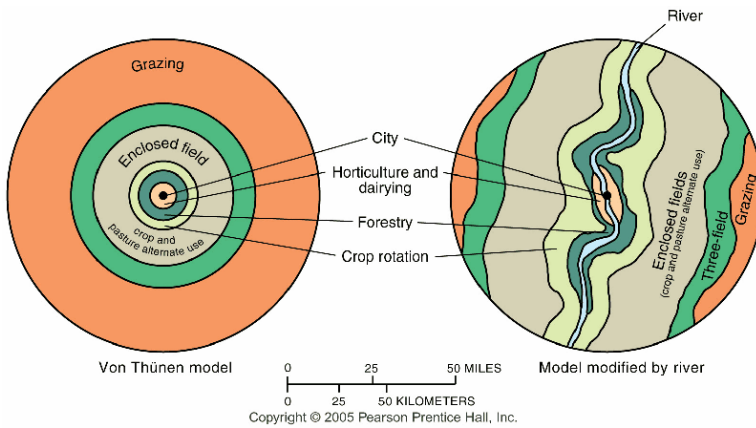
Cyrus Mc Cormick: reaper

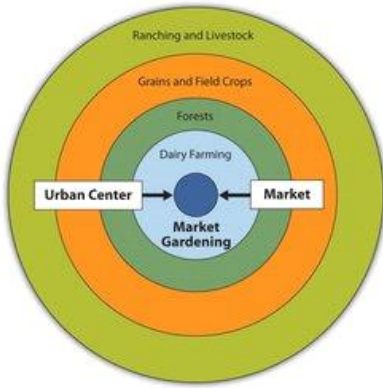


Livestock: farm animals



von Thunen: German theorist about farm land usage

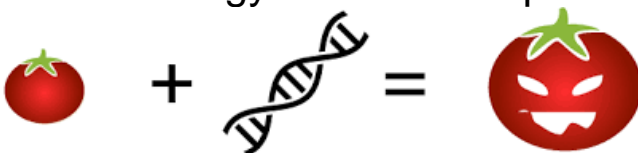




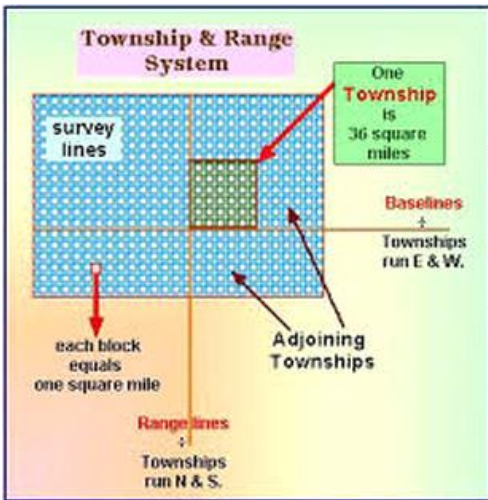
Third Agricultural Revolution: most recent/Green Revolution
 Green Revolution higher yield/faster growing crops



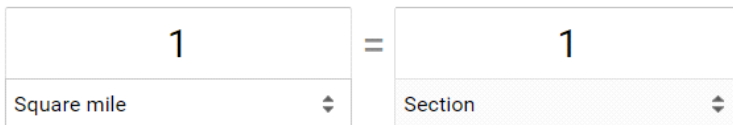
Biotechnology: tech to manipulate seeds to increase crop yields



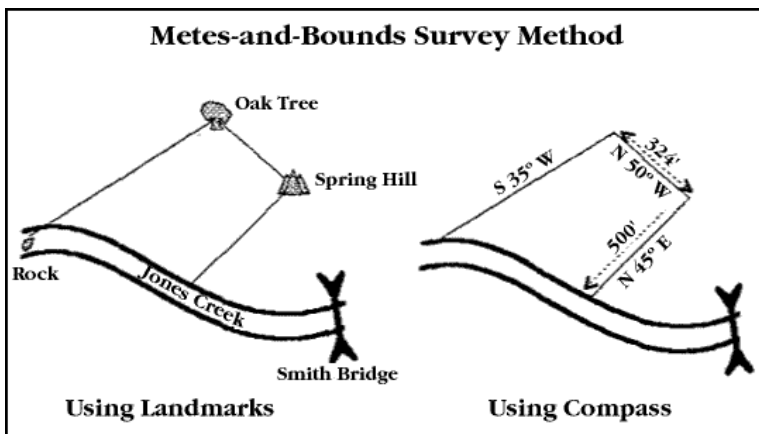
CROP UNRELATED GENE GMO
 GMOs: crops with new traits made genetically engineered



Rectangular Survey System - made rectangular plots of the interior US, by Thomas Jefferson



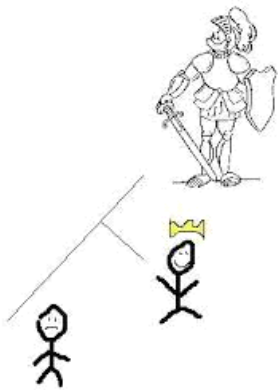
Section = 1 square mile



Metes-and-bounds survey - used natural features to demarcate land plots, used east of the Appalachian Mtns



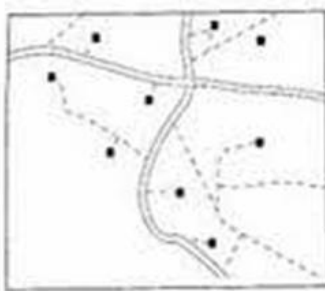
Long Lots Survey: narrow parcels of land from rivers, roads, or canals, mostly French America (Louisiana, Quebec, etc)



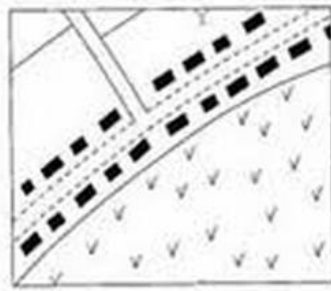
primogeniture: all land goes to the eldest son (Northern European and colonies)



Traditional Farm -Village Life: subsistence farming, India, Sub-Saharan Africa, China, SE Asia



a) Dispersed settlement



b) Linear settlement



c) Nucleated settlement

dispersed settlement patterns: far apart homes, machinery

nucleated settlement pattern: hand worked, intense land use, most prevalent

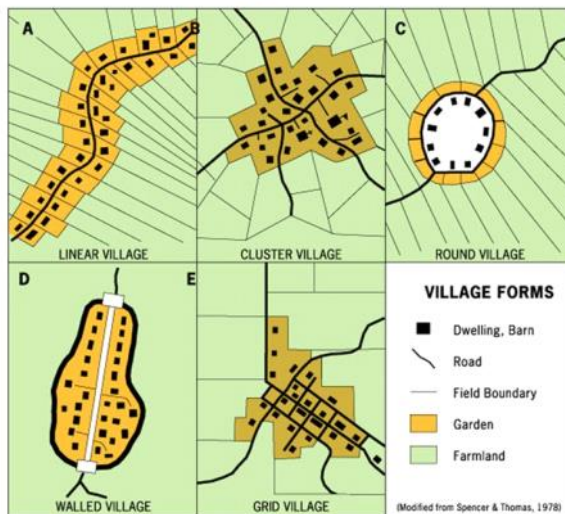


rundling: round village, Slavic/Germanic



walled villages: surrounding wall for protection

Village Forms



different types of village forms



commercial agriculture - large scale crop/livestock production for sale



monoculture: almonds



monoculture:
wheat



monoculture: soy

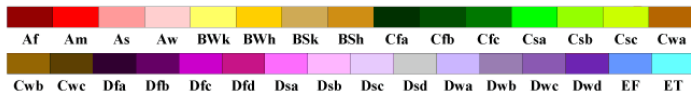


monoculture:
corn/maize

monoculture: dependence on 1 crop

World Map of Köppen–Geiger Climate Classification

updated with CRU TS 2.1 temperature and VASCLimO v1.1 precipitation data 1951 to 2000



Main climates

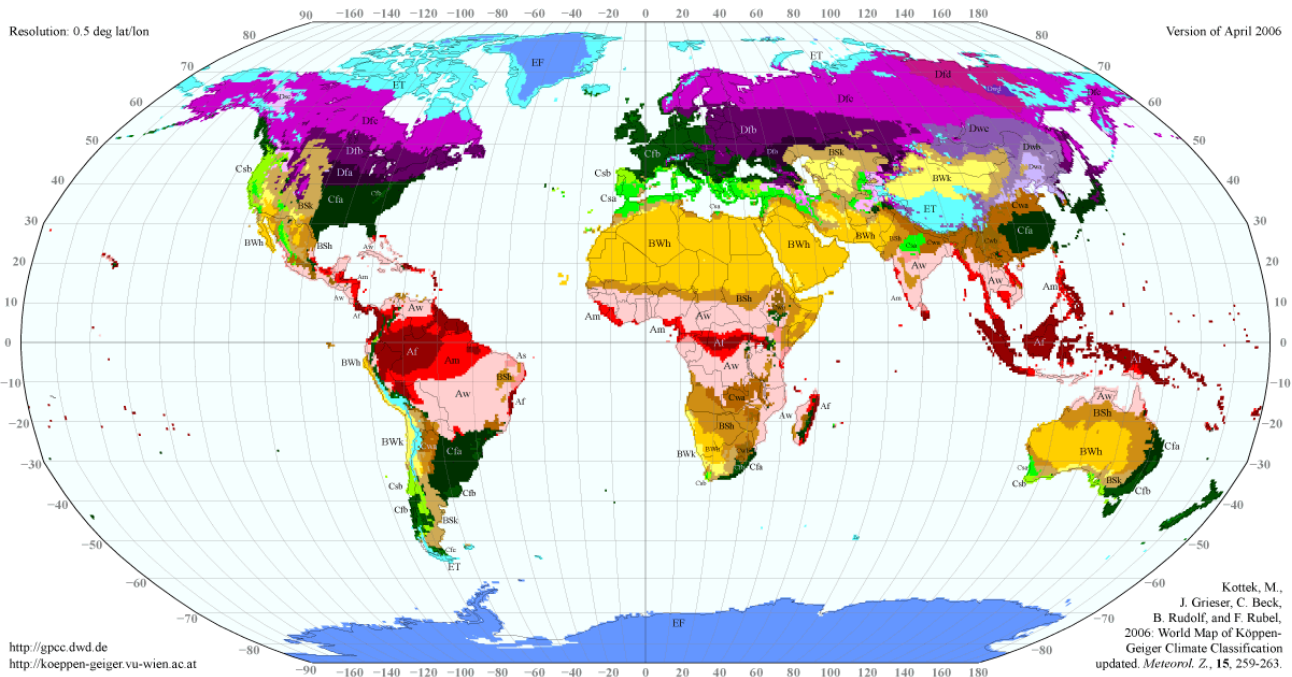
- A: equatorial
- B: arid
- C: warm temperate
- D: snow
- E: polar

Precipitation

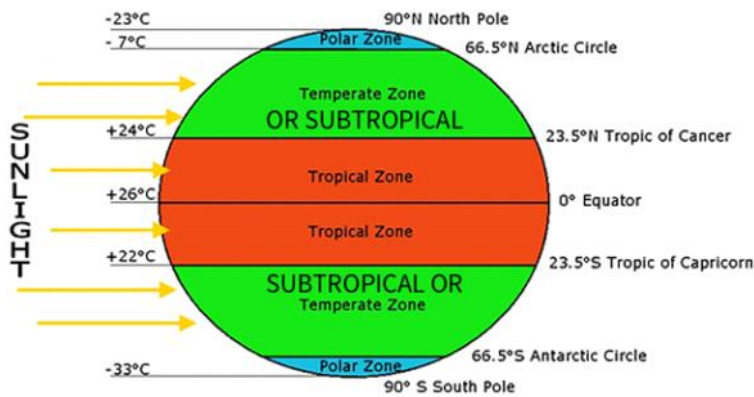
- W: desert
- S: steppe
- f: fully humid
- s: summer dry
- w: winter dry
- m: monsoonal

Temperature

- h: hot arid
- k: cold arid
- a: hot summer
- b: warm summer
- c: cool summer
- d: extremely continental
- F: polar frost
- T: polar tundra



Koppen Climate Scale: classify's climate based on temperature and precipitation



climatic regions: areas with similar climatic characteristics



plantation agriculture: large estates, cash crops farming



livestock ranching: raising animals for meat and by products (wool, leather, etc)

Figure 4.5
Areas of Mediterranean agriculture in the world



Mediterranean agriculture

22

- Specialized farming that occurs only in areas where the dry summer Mediterranean climate prevails (grapes, olives, figs, citrus, fruits, dates.)



Mediterranean agriculture: agriculture in the dry Mediterranean climate

(grapes, olives, citrus, figs, etc)



drug crops: poppy, coca, marijuana, etc (poppy shown)



Indian Cash Crops

cash crops: crops intended for (large) profit



Luxury crops: non subsistence crops (tea, coffee, cocoa, tobacco)



Fair Trade: gives workers living wages

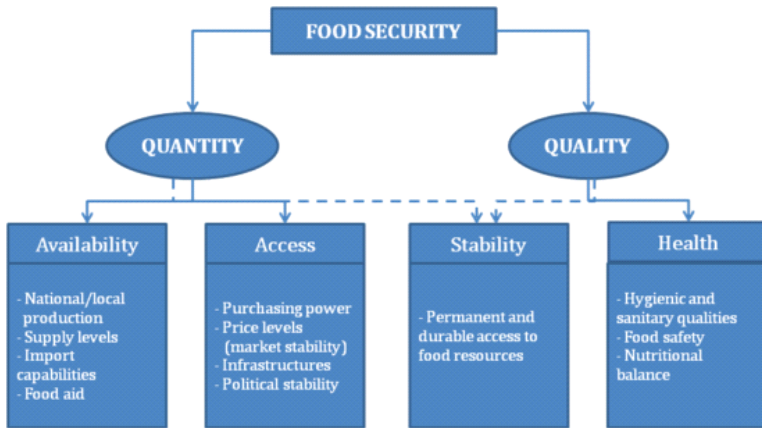
Expertise Across the Supply Chain



Agribusiness: all businesses that provide good and services that support agriculture



Food riot: protest (often violent) due to lack of food



Food security: having reliable food resources

Food desert: area with a lack of affordable, fresh, and nutritious food

Von Thunen Agriculture Land Use Model

So again, the guys that design these things are important, because the AP Test likes to ask about them by name. In this case the guy in question is J.H. Von Thunen, who was an economist and land owner in Germany in the early 1800s. His model outlines rural land use in Germany before industrialization. He based his model on a few assumptions:

- 1) **The city is located at the center of an isolated state with no government regulation**
- 2) **The isolated state is surrounded by an unoccupied wilderness.**
- 3) **The land of the state is completely flat and has no other natural landmarks**
- 4) **The soil quality and climate are consistent throughout the state**
- 5) **Farmers in the state transport their own good to the central city; so there are no roads**
- 6) **Farmers act to maximize profit.**

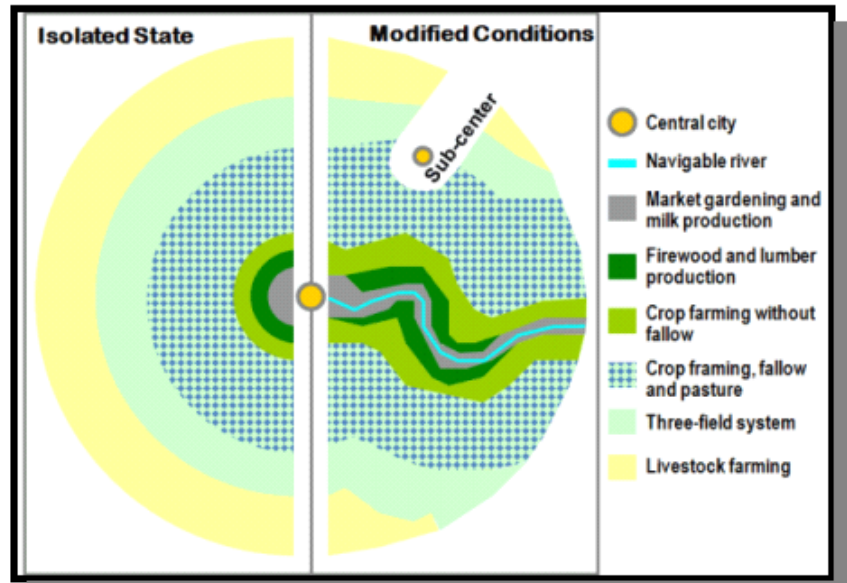
The two main things that Von Thunen's model shows is the balance between land cost (it costs more closer to the city) and transportation cost (the heavier the item, the more it costs to move). To maximize profit, the farmer had to take the transportation cost and production cost and subtract it from the market value.

The left side of the model at the left is a representation of Von Thunen's original model. It has five basic layers:

- ~ **Central City**
- ~ **Dairy & Intensive Farming**
- ~ **Timber & Firewood**
- ~ **Extensive field grains**
(which this map breaks into two levels)
- ~ **Ranching**

Past ranching would be wilderness.

The left side of our map shows how small things could change the equation. If a river ran to the city it would change the shape of the rings around the city, because people could get perishables from further away in a timely manner down the river.



Modern applications of Von Thunen

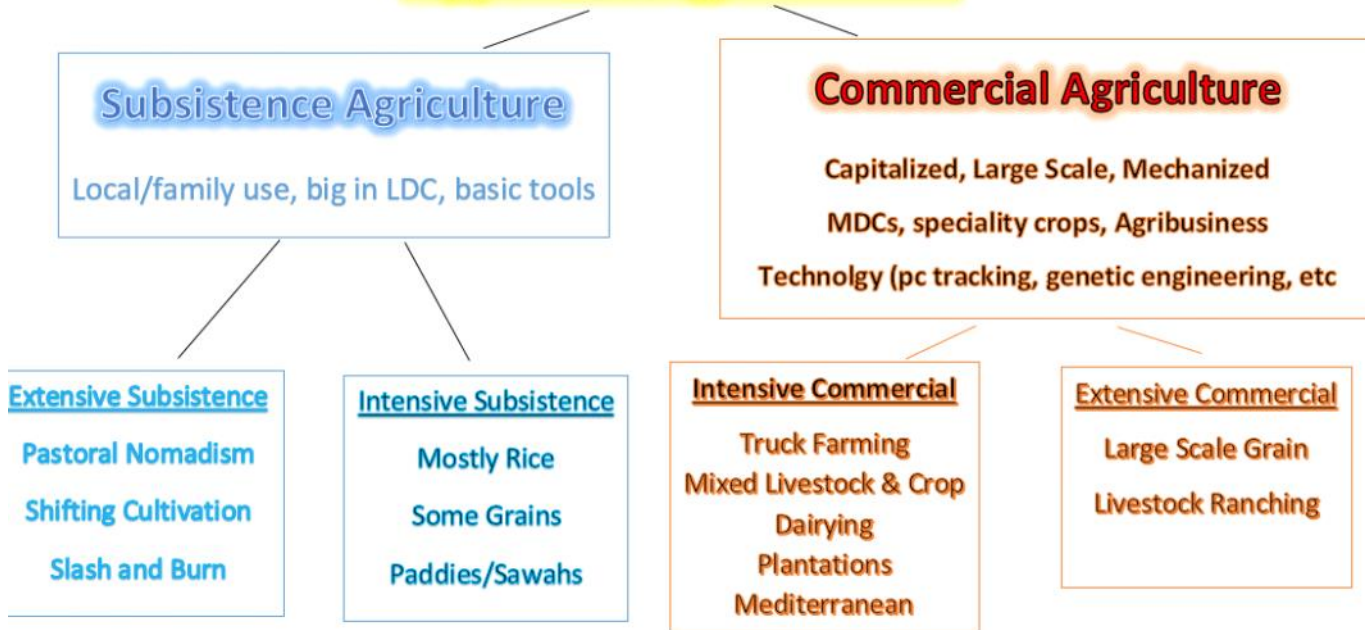
That marks just a small change by putting in a river, but development and innovation over the 150 plus years since Von Thunen first proposed his model is much greater than that. Some of the biggest changes are in the box to the right.

- ~ **Modern transportation is more efficient.**
- ~ **Transportation cost is no longer proportional to the distance traveled.**
- ~ **Firewood is no longer a large factor**
- ~ **Technology has reduced threat of perishability**

Types of Agriculture

Thursday, May 4, 2017 2:30 PM

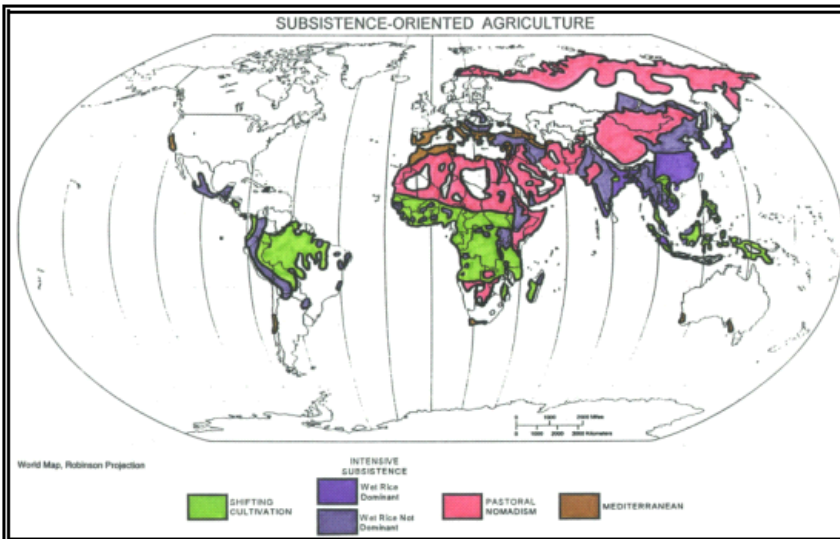
Types of Agriculture



Extensive Subsistence Farming: Large areas of land, minimal labor input, low yields per acre, and low population densities
Intensive Subsistence Farming: Small farms, large amounts of manual labor, high yields per acre, and high population densities
Intensive Commercial Agriculture: Large amounts of capital and labor that produce crops with high yields & market value per unit of land
Extensive Commercial Agriculture: Large farms with small amounts of capital and labor per unit of land

Subsistence Agriculture vs. Commercial Agriculture

Type	Subsistence Agriculture	Commercial Agriculture
Definition	A farming system that grows crops mainly for consumption by farmers and their families.	A farming system that grows crops primarily for sale rather than for consumption on the farm.
Examples	<p>~ Shifting cultivation: a crop rotation system sometimes called slash and burn, that uses fire to create fields for crops but only plants there a short time</p> <p>~ Pastoralism: grazing animals on wide spaces (usually in arid regions)</p> <p>~ Wet Rice Farming: rice cultivation in a flooded field</p>	<p>~ Plantations: Usually done in the tropics to grow cash crops</p> <p>~ Mediterranean Agriculture: Centered around fruits and orchard crops</p> <p>~ Factory farms: tend to have animals packed into tight spaces</p> <p>~ Dairy farms: Large-scale milk</p>

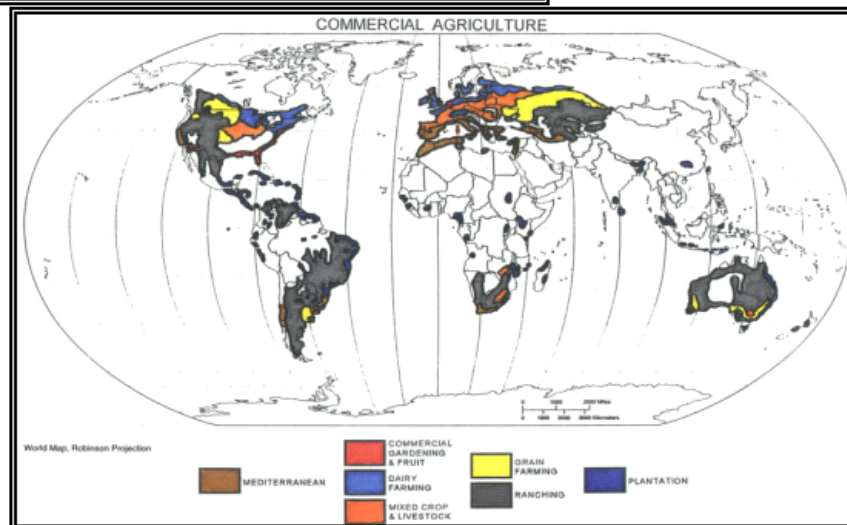


Subsistence Traits:

- ~ small farms
- ~ communal land
- ~ low purchased inputs
- ~ diverse agricultural activity

Commercial Traits:

- ~ large farms
- ~ corporate land
- ~ high purchased inputs
- ~ specialized agriculture



Types of Subsistence Farming

Agricultural production (plant & animal) for family/local consumption w/basic tools & native plants. Most LDC farmers are subsistence.

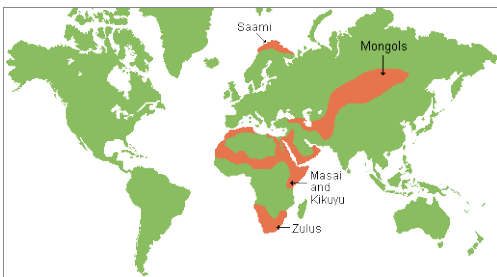
Extensive Subsistence: Large areas of land, minimal labor input, low yields per acre, & low population densities



1. Pastoral nomadism

- a. Migratory nomadic moving of livestock based on nature
- b. Mainly used in arid or rocky areas w/sparse precipitation
- c. Animals chosen for hardiness/mobility/durability (sheep, goats, camels, horses, yaks, reindeer)
- d. Transhumance: movement of livestock with seasonal patterns, (lowlands in winter, highland in summer usually)

Locations: Middle East, Central Asia, Sahara and Gobi desert regions



Areas of Pastoral Nomadism



2. Shifting cultivation

- a. Rotation of fields instead of crops (“nomadic farming”)
- b. Mainly in tropical regions w/high temps & abundant rain
- c. 1 of the oldest *most widely spread agricultural systems

“Slash and Burn” (swidden) agriculture:

a, vegetation cut & undergrowth burned => Rain washes ashes (N₂) into the soil to increase fertility=> cash crops planted until soil is depleted of nutrients => Farmers move and start over

Problems:

Leaching: Soil loses nutrients, can take decades to replenish

Deforestation: Every day, acres of tropical rainforest are destroyed, significantly degraded, & plant, animal and insect species are lost due to deforestation

Desertification: lands become increasingly arid & unproductive due to human overuse, overgrazing, or drought

Locations:

Tropical regions of Latin America, Central Africa, and SE Asia



Tropical Areas of Shifting Cultivation

Intensive Subsistence Farming: Small farms, large amounts of manual labor, high yields per acre, and high population densities



1. Rice is the primary intensive subsistence crop, but wheat and barley are also grown this way in LDCs

- a. Intertillage: Clearing of rows in the field of rocks & weeds
- b. Wet Rice: the practice of planting rice on dry land in a nursery then moving the seedling to a flooded field to promote growth – dominant type of agriculture in SE China, East India, and SE Asia
- c. Paddies/Sawahs: Flooded fields where wet rice grows

Can increase land, pesticides, fertilizers, crop rotations, etc to increase crop yields.

Locations:

Densely populated regions of Asia (mainly monsoon regions), Africa, and Latin America



Rice Production Areas



NYC

2. Urban farming: The use of small plots and rooftops in urban areas

[Great Ted Video Link](#)

Types of Commercial Agriculture

Large Scale for Sale, High use of Machines & Tech, Often MDCs w/specialty crops
Gov't Very Involved w/Prices and Regulations

Vertical Integration: agreements between farmers & corporate purchasers to give the farmers \$ guarantees & reliable markets

Agribusiness: mass production of agriculture w/corporations control all levels of food production for sale: Farming (primary), processing (secondary), & wholesale (tertiary)

Intensive Commercial Agriculture: Large amounts of capital and labor that produce crops with high yields and market value per unit of land

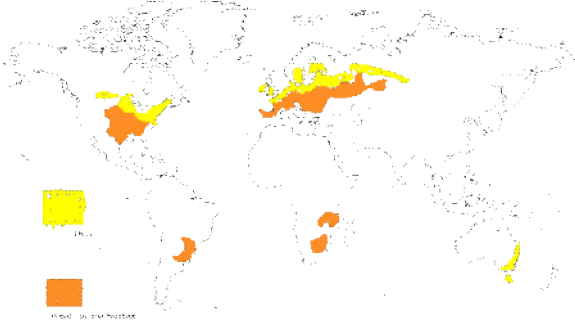


1. Truck Farming

- a. The production of fruits & vegetables for market, processing, or canning
- b. Large-scale operations mainly in MDCs; use machinery, technology, & low-wage migrant workers for efficiency
- c. Located close to markets & transportation hubs because of perishable crops
- d. Usually have contracts with agribusinesses such as Green Giant.



US SUN BELT



Traditional Dairy Belt



Figure 4.5

Areas of Mediterranean agriculture in the world



Figure 4.4

Major plantation areas of the world

- d. Usually have contracts with agribusinesses such as Green Stamps, Dole, Del Monte, etc.
- e. Includes specialized fruit production in orchards (citrus, peaches, apples, berries)

Locations:

US Sunbelt/Atlantic Coast, Europe, South America

2. Mixed Livestock and Crop Farming

- a. Grains are grown on a farm to feed its livestock,
- b. Most US mixed crop/livestock farms grow corn or soybeans, and raise cattle or pigs

Locations:

US Midwest, North European Plain, Pampas, Manchuria

3. Dairying

- a. closest to large urban areas b/c perishable => Further from urban centers, more processed dairy becomes (cheese, butter, canned)
- b. Milkshed: ring around a city which milk can be supplied w/o spoiling (300 miles in US)
- c. Most dairy farms are mechanized, regulated for safety, & have contracts with large companies

In US, Wisconsin is the historical “dairy state” but California now produces more milk (Wisconsin still produces the most cheese!). India is now the world’s largest milk producer, dropping US to #2

Locations:

US Dairy Belt/Pacific, NW Europe/UK, Australia/New Zealand

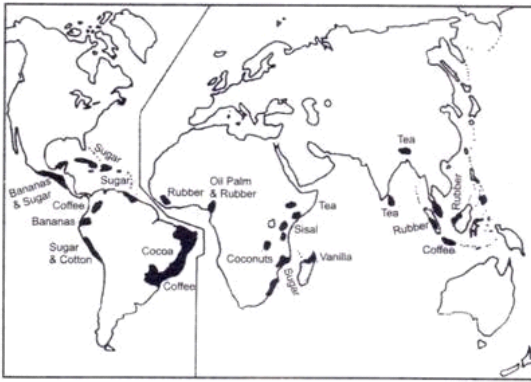
4. Mediterranean Agriculture

- a. Located in warm coastal regions w/dry summers & cool, moist winters
- b. grapes, olives, dates, & tree nuts are grown in these regions (66% of the world’s wine from countries bordering the Med Sea)

Locations:

Med Basin, California, Chile, South Africa, Australia

Figure 4.4
Major plantation areas of the world

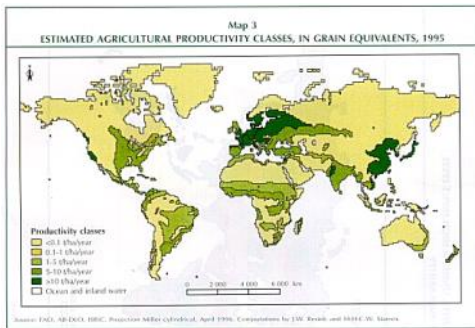


5. Plantation Agriculture

- a. large land, usually in LDC, worked by lots of low-wage labor, often run by a MNC (TNC) (Chiquita, Dole, etc.)
- b. Produce specialized “cash crops” for export
- c. developed by Europeans when still a colony *econ interaction between core & periphery countries

Locations:
South/SE Asia, Africa, Latin America

Extensive Commercial Agriculture: Large farms with small amounts of capital and labor per unit of land

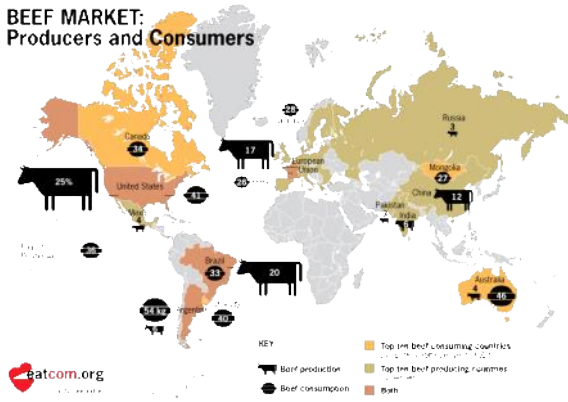


1. Large-scale Grain Farming

- a. farms are ≈ 1,000 acres
- b. Wheat is the world’s leading export crop
- c. US & Canada supply about 50% of all wheat exports and US is the largest commercial producer of grains

Locations:
Great Plains, Ukraine/Kazakhstan, Australia, Pampas

BEEF MARKET: Producers and Consumers



2. Livestock Ranching:

- a. commercial grazing of livestock on semiarid/arid land with low population densities in MDCs
- b. Began during 19th century growth of urban markets for beef and wool
- c. Cattle (Western hemisphere), sheep (Australia/New Zealand, South Africa), and goats (Central Asia) are the three animals most commonly found on ranches

Locations:
The Americas, Australia/New Zealand, Central Asia, South Africa

From <<http://newellta.weebly.com/types-of-farming.html>>

3 Revolutions

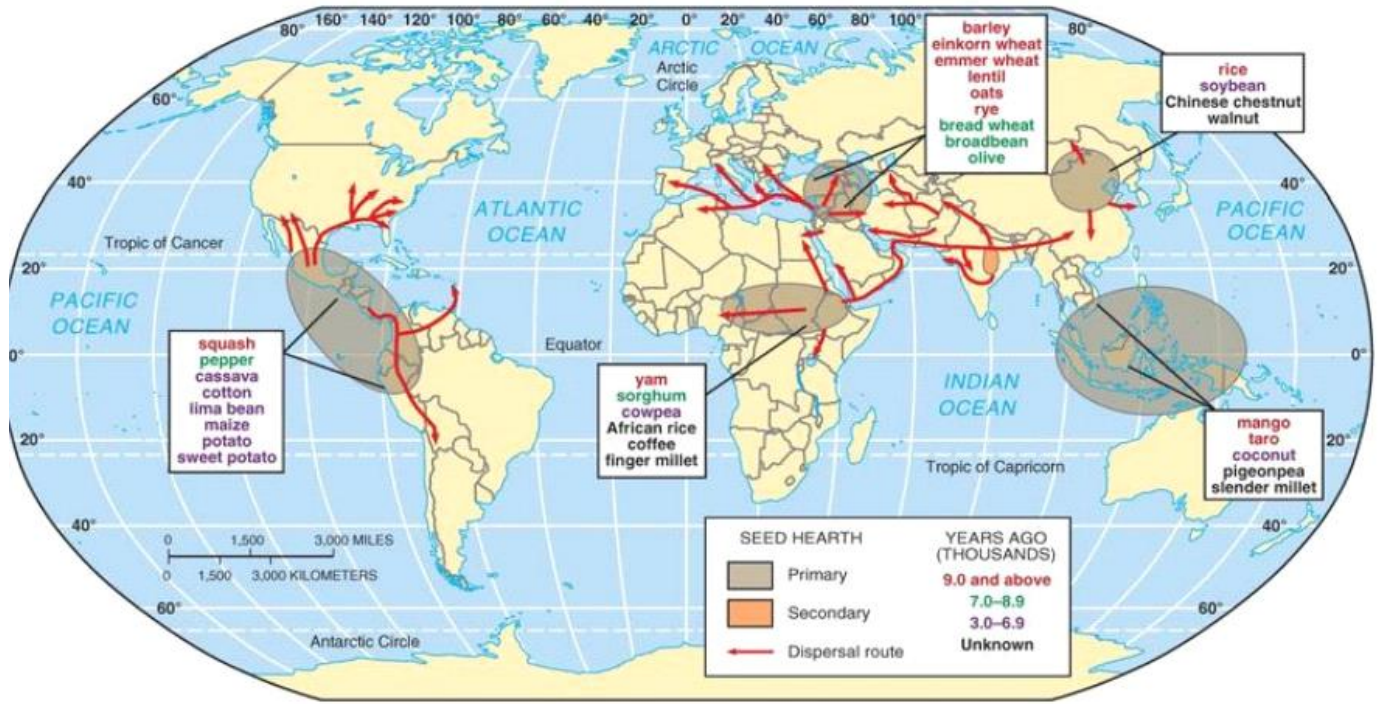
Thursday, May 4, 2017 2:47 PM

Neolithic Revolution

~ **Neolithic Revolution:** Sometimes referred to as the first agricultural revolution, it marks the slow transition from hunting and gathering societies into sedentary societies who lived in cities and stored crops. It occurred in different times in different places and the full revolution took thousands of years.



Here's a map to give you an idea of where this was all taking place:



The Second & Third Agricultural Revolutions

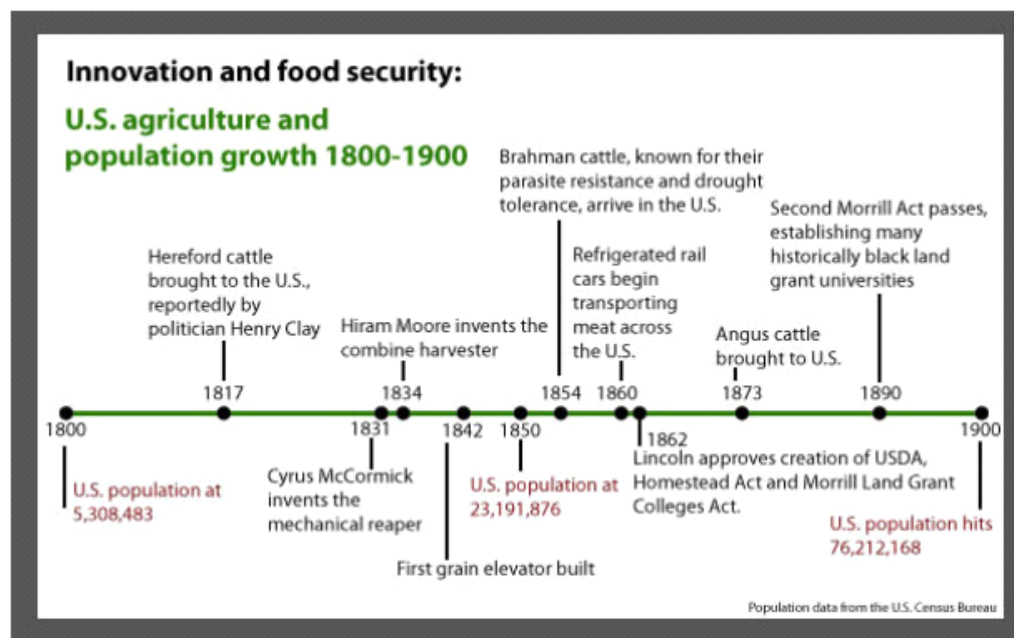
Key Terms:

Second Agricultural Revolution: an increase in crop production caused by an influx of new methods and simple innovations, it began in the Middle Ages

Industrial Revolution: major changes in technology and the ways of production; changed small-scale craft into mass production, it began in the late 1800s-1900s

The Second Agricultural Revolution with its **curved metal plow**, **horse collar**, and **four course crop rotation** produced more food with fewer workers. The rural workers who lost their jobs moved to the city, getting jobs then. This helped lead to the industrial revolution, which in turn made even better farm equipment like the **seed drill** and **cotton gin**. Which freed up more workers.

Here's a look at this process in the United States:



Third Agricultural Revolution: Occurred in the late 20th century with extensive mechanization, agro-biotech and reliance on irrigation and chemicals.

Green Revolution	Gene Revolution
<ul style="list-style-type: none"> ~ Large increase in crop production in developing countries by using pesticides, fertilizers and high-yield crops ~ Meant to alleviate world hunger ~ Focused on LDCs ~ Innovations shared with governments and agencies 	<ul style="list-style-type: none"> ~ Genetically Modified Organisms (GMO) <ul style="list-style-type: none"> - corn, soybeans, rice, cotton, canola ~ Genetically engineered plants and animals ~ Focused on MDCs, especially United States ~ Monsanto: corporation that sells GMOs ~ Genetically engineered crops protected by patents
<p>Effects: Doubled irrigated land at great increase in debt to farmers, soil fertility declined, pesticide and fertilizer residue built up, but it staved off famine in Asia</p>	<p>Effects: Mixing genes from different organisms proved pretty controversial. Europe has condemned GMOs, while they are available in 80% of stores in the United States</p>

Consequences of Agriculture



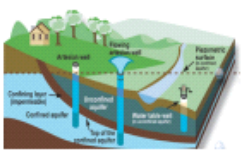

Agriculture began around 10,000 years ago in the Fertile Crescent, here's a look at the positives and negatives of agriculture.

Pros of Agriculture	Cons of Agriculture
<ul style="list-style-type: none"> ~ Less variance in food supply ~ More food, less harvesters of it ~ Rapid population growth ~ Creating of cities ~ Helps economy (variance of jobs) ~ More choice and variety of food 	<ul style="list-style-type: none"> ~ Can be harmful to environment ~ Many people don't know how to get food for themselves ~ Mass production of livestock can cause mistreatment of animals ~ More chemicals ~ Rapid population growth in areas that can't support it

One of the biggest concerns with modern agriculture is the negative effects it can have on the environment.

~ **Desertification**: the development of desert-like conditions from over working of the land

Environmental concerns

Issue	Visual	Causes	Effects
Soil Degradation		Deforestation, overgrazing and excessive use of pesticides	Desertification, loss of farmable land, polluted water supplies and erosion
Overgrazing		Continuous grazing cycles, too many animals, poor management of animal grazing	Desertification, soil erosion and soil degradation
River and Aquifer Depletion		Excessive pumping and draining of water supplies	Loss of water supply, deteriorating water quality and land subsidence (collapsing)
Animal Wastes		Large concentration of animals in factory farms, improper waste storage	Polluted water supply, air pollution, and release of harmful greenhouse gasses

<p>Animal Wastes</p>		<p>animals in factory farms, improper waste storage and management</p>	<p>pollution, and release of harmful greenhouse gasses (methane)</p>
<p>Extensive Fertilizer and Pesticide Use</p>		<p>Monoculture, GMOs, and farms that place priority on maximizing profits</p>	<p>Chemical run-off into water supplies, pollution, destruction of ecosystems, soil degradation</p>

Organic Agriculture, Fair Trade, Eat Local Movement

Because of the backlash against modern agriculture, there has been a movement toward more organic agriculture. **Organic agriculture** is a movement toward all natural foods that are not created using GMOs, chemicals, fertilizers or pesticides, that are grown naturally.

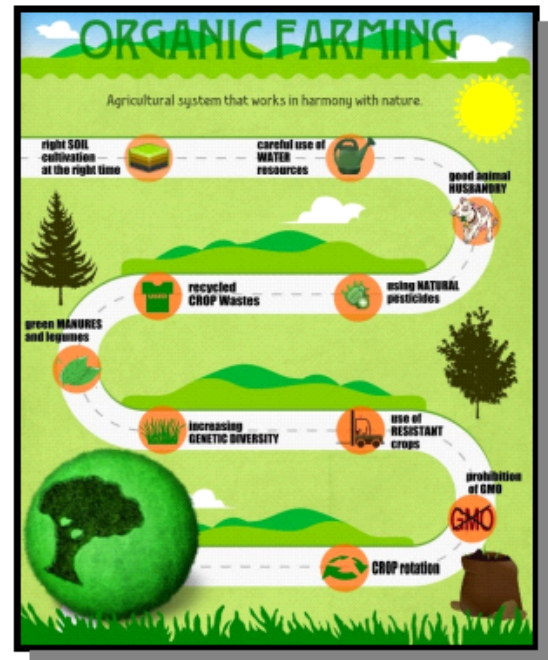
Organic Methods of Agriculture

PROS

- ~ tastes better; healthier for human beings
- ~ environmentally friendly
- ~ saves more of naturally occurring nutrients
- ~ supports local farms which support the economy

CONS

- ~ Costlier
- ~ Food expires quicker
- ~ Research is not proven to be 100% accurate
- ~ can not be transported over long distances



Fair Trade

Fair trade is a movement to move more of the money paid for products in great demand that are often grown in LDCS (like coffee, bananas, sugar and cocoa) to the places where they are produced. Prior to the fair trade movement, very little of the money went to the producers.



PROS

- ~ Workers get higher share
- ~ equalizes rights of LDCS

CONS

- ~ more expensive

Local Food Movement

The **Local Food Movement** is an attempt to get more people to buy from local producers to slow down the rate of globalization of the food market.

PROS

- ~ said to be better for you
- ~ fresher, without toxins
- ~ pays money to local area

CONS

- ~ more expensive
- ~ expires quicker
- ~ ignores export needs of others

Columbian Exchange

Thursday, May 4, 2017 2:51 PM



The exchange of crops and ideas between the New World (Americas/Western Hemisphere) and the Old World (Asia, Europe, Africa or Eastern Hemisphere)

Types of Economic Activity



Primary

Definition: Taking things directly from the ground

Examples: farming, mining, fishing

Predominant in: LDCs (Periphery)

Secondary

Definition: Refinement of the products taken from the primary sector

Examples: manufacturing, cooking

Predominant in: LDCs (Semi-periphery)

Tertiary

Definition: Services related to products

Examples: sales, bankers, doctors

Predominant in: MDCs (Core)

Sometimes the tertiary sector is split into three sections, thus creating two higher levels.

Quaternary

Definition: Processing of info and finances

Examples: legal services, insurance

Quinary

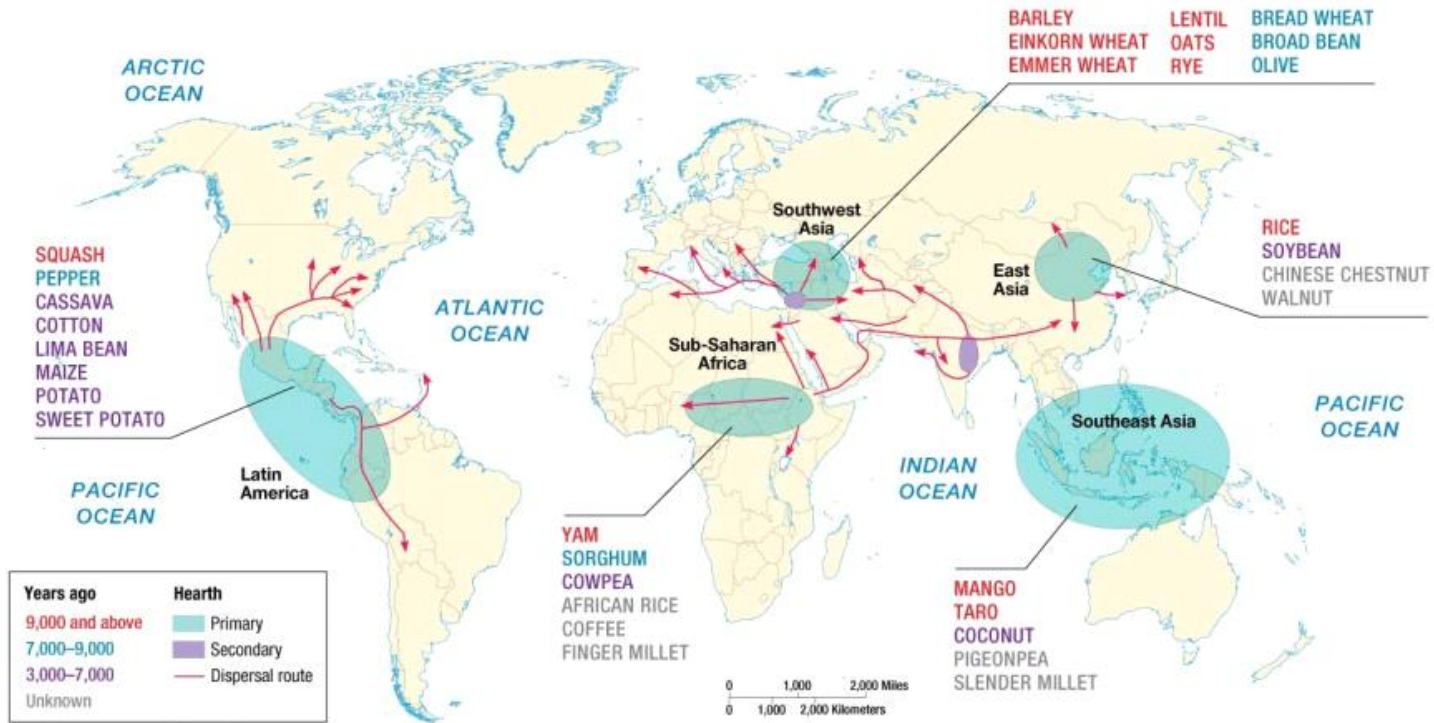
Definition: Specialized or technical knowledge

Examples: scientific research, CEOs

Hearths

Friday, May 5, 2017 8:48 AM

Crop Hearths

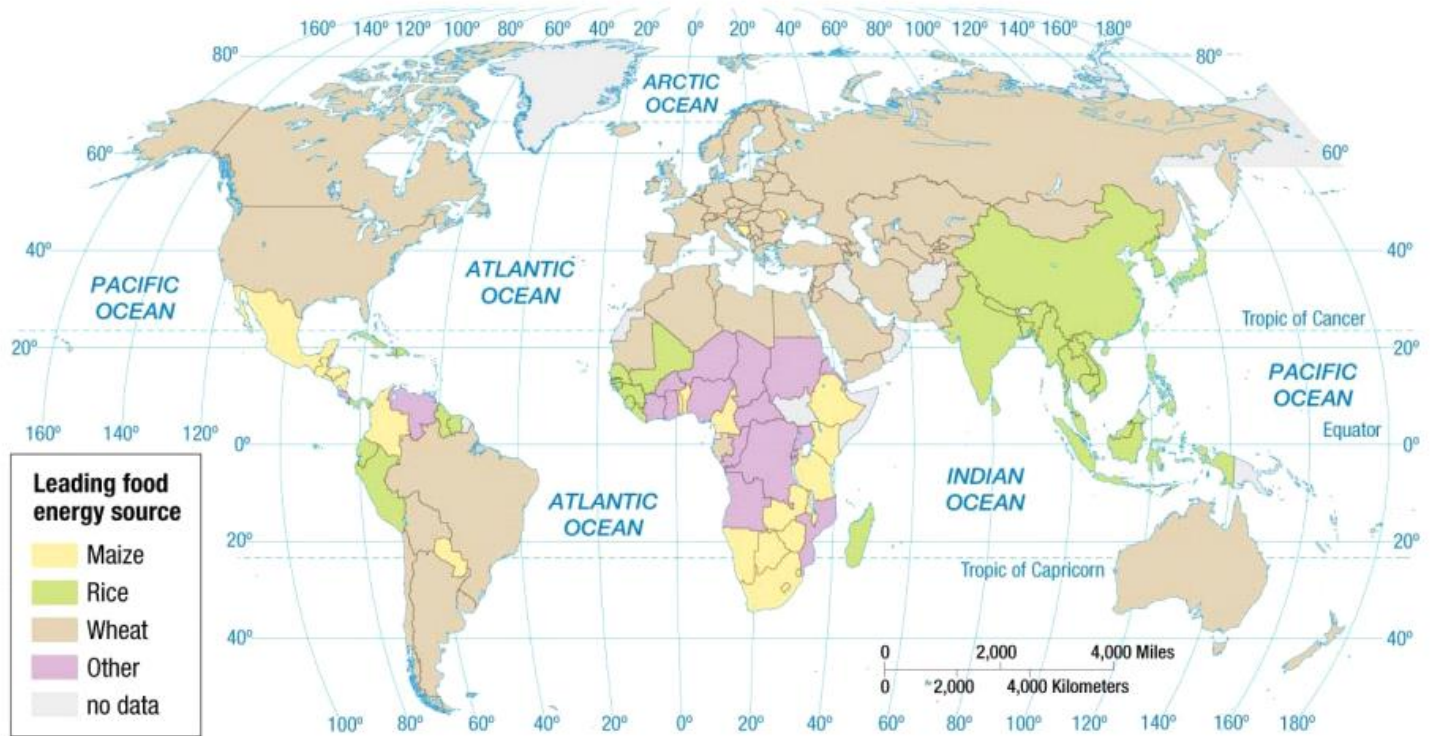


Animal Hearths





Dietary Energy by Source



Distribution of Under Nourishment

