

Directions: Follow the page guidance as you complete this guided reading.

1. Rubenstein p 320 – 321. Note differences between subsistence and commercial farming.

	Subsistence	Commercial		
Where important?	"DEVELOPING" COUNTRIES (LDCs)	DEVELOPED COUNTRIES (MDCs)		
Definition or Purpose	production of food primarily for consumption by the farmers family (village)	production of cash crops primarily for sale off the farm What is a cash crop? crop grown for sale rather than for the farmer's use		
Farmers as % of labor force	In developing countries (LDCs) - 35% of all workers are engaged in farming	In developed countries (MDCs) - only 3% directly farm (R p 332) What % of Americans are in agribusiness? 20% What is agribusiness? system of commercial farming in developed countries where farming is integrated into a large scale food production industry		
Technology	hand tools; animal power	reliant on machinery		
Types found in LDCs (details to follow)	<ol style="list-style-type: none"> <li>Intensive Wet Rice Dominant</li> <li>Intensive Wet Rice not Dominant</li> <li>Shifting Cultivation</li> <li>Pastoral Nomadism</li> <li>Plantation (exception!!! This is commercial agriculture)</li> </ol>	<table border="1"> <tr> <td>Types found in MDCs (and more developed LDCs)</td> <td> <ol style="list-style-type: none"> <li>Mixed Crop and Livestock</li> <li>Dairy Farming</li> <li>Grain Farming</li> <li>Livestock Ranching</li> <li>Mediterranean</li> <li>Commercial Gardening and Fruit</li> </ol> </td> </tr> </table>	Types found in MDCs (and more developed LDCs)	<ol style="list-style-type: none"> <li>Mixed Crop and Livestock</li> <li>Dairy Farming</li> <li>Grain Farming</li> <li>Livestock Ranching</li> <li>Mediterranean</li> <li>Commercial Gardening and Fruit</li> </ol>
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2. Now that we've learned about the main differentiation between categories of agriculture (subsistence vs. commercial), let's go back and learn about the history of the development of agriculture. Use both Rubenstein p 318 – 319, 342 - 343 & de Blij p 369 – 373. Read both completely and summarize below.

**Timeline on the Development of Agriculture**

<b>Neolithic Revolution or First Agricultural Revolution</b>	<p>What is agriculture? deliberate modification of the Earth's surface through cultivation of plants and rearing of animals to obtain sustenance or economic gain</p> <p>What is a crop? any plant cultivated by people</p> <p>Describe did humans live prior to the invention of agriculture. they gathered food through hunting, fishing or gathering. Lived in small groups &lt; 50 people bla a larger # would quickly exhaust available resources within walking distance. Traveled frequently, avoided "others" territory, engaged in gender division of labor.</p> <p>What was the agricultural revolution? When did it happen? plants and animals around 8,000 BCE (10,000 years ago)</p> <p>What is domestication (look it up?) the process of taming an animal or modifying a plant for human use.</p> <p>In how many places is this believed to have originated? What is this called (lecture)? List possible hearths. multiple hearths (independent innovation - not diffusion) SW Asia, East Asia, sub-Saharan Africa and Latin America</p> <p>(de Blij p 369 -370) Where does Carl Sauer believe that agriculture first began? What crops were first domesticated in his theory? SE or South Asia ("lands of plenty") - root crops "NOT REVOLUTIONARY"</p> <p>To what area and crop (provide examples) do we attribute the "First Agriculture Revolution"? SW Asia (Fertile Crescent) - seed crops (wheat, barley) 8,000 BCE</p> <p>What did the surplus which was generated from this type of agriculture result in? reliable food source allowed people to settle permanently. Pop. of settlements increased allowed job specialization → markets → institutions → stratification - CIV!</p>
	<p><b>Second Agricultural Revolution</b> (de Blij p 375 – 376)</p> <p>When did this happen?</p> <p>Where did it begin?</p> <p>What new crops were introduced and from where? corn &amp; potatoes (from New World to Old)</p> <p>What English law allowed farming innovations to take place? What did it allow? Explain. Enclosure Act encouraged the consolidation of fields into single large holdings. allowed experimentation in soil prep. fertilizer, crop care, harvesting</p> <p>What other technologies improved production as well and spread agriculture? seed drill used to avoid wasting seeds by planting in rows making it easier to distinguish plants from weeds. New fertilizers and artificial feed.</p> <p>How are the Industrial Rev. and the Second Agricultural Revolution connected (lecture)? Incr. food prod → deer. in need for farmers. Enclosure Act displaced tenant farmers. CDR ↓ leading to overpopulation. Rural residents flood cities (urbanization) and become cheap labor in factories. Urban factory workers are fed by surplus generated through Second Agricultural Revolution</p>

Third Agricultural Revolution or the Green Revolution

Rubenstein p 343 – 345

What were the two main practices that led to increased agricultural production during the 1970s and 1980s? *introduction of new higher-yield seeds and expanded use of fertilizer.*

Who won the Nobel Peace Prize for his development of the "miracle wheat seed"? *Norman Borlaug*

How did miracle seeds affect productivity? Cite India as an example. *Production went up dramatically India's wheat production more than doubled (72x) in 5 years*

In order to take advantage of the new seeds, what are farmers required to use? *more fertilizer and machinery*

What three minerals are critical to increasing soil fertility? *nitrogen, phosphorus, potassium (potash)*

What must governments in LDCs do in order to keep up the momentum of the Green Revolution? *must allocate scarce resources to subsidize the cost of seeds, fertilizer and machinery, and build infrastructure to move cash crops to market w/out waste.*

What does "GM" (GMOs) stand for? *genetically-modified*

What are they specifically designed to do? *modified to survive the herbicides and insecticides sprayed on fields to kill weeds/insects. Survive drought & other harsh conditions*

By what "brand name" term are they known? *Roundup Ready* What corp. created them? *Monsanto*

How widespread is the use of GM worldwide and within the United States? Provide statistics as evidence. *worldwide 9% (US 9%) soybeans 77% (94%), cotton 80% (90%), maize 32% (89%) 12% of all farmland devoted to GM crops.*

Why would LDCs (like those in Africa) be resistant to the adoption of GM crops?

- health problems - GMs may reduce effectiveness of antibiotics, destroy ecological balances in local agriculture*
- export problems - Europe requires labelling: Africans fear losing Europe as a market by labelling due to opposition to GMs in the EU*
- Incr. dependence on U.S.-based transnational corps. manufacture most GM seeds. Africa fear terminator gene to require them to repurchase seed year and year.*

What is another controversial practice especially as applied to the raising of livestock? Why? *injecting/feeding anti-biotics may promote the development of a superbug.*

What do some countries/regions (identify) require? *GM labelling, mostly Europe, China, India*

Why are some opposed to this? *might scare customers, disrupt U.S. agriculture*

de Blij p 377 – 378 (this is the better discussion of this topic)

How far back and to where does the Green Rev. REALLY begin? *1930s in the American Midwest*

With what crop was the Green Rev. MOST effective in increasing yields in Asia? *rice (IR36)*

Since the Green Revolution has increased production, what has caused most famines? *political instability*

Because of its focus on rice, wheat and corn, where has the Green Revolution been less effective? Why? *Africa, because agriculture is based on different crops and where lower soil fertility makes agriculture less attractive to foreign investment*

Criticisms of the Green Revolution (de Blij p 378 – 381)

What is "monocropping" (Rubenstein p 332)? What does it make farms vulnerable to (de Blij)? *the practice of growing the same single crop every year after year making farms vulnerable to climate change and infestation of particular pests.*

What are two concerns about the increased use of chemicals associated with the Green Revolution? *reduced organic matter in soil and groundwater pollution*

Amongst what group has the Green Revolution done little to alleviate poverty? *small subsistence farmers*

In what area of the world have consumers expressed concerns over GMOs? *WESTERN EUROPE*

How has the Green Revolution, increase tensions within rural households in Sub-Saharan Africa? *it has converted lands women have traditionally used for family subsistence into commercialized family plots. Women have less time for other activities crucial for household maintenance.*

3. Major Global Agricultural Regions (Rubenstein p 324 – 336, read de Blij p 386 – 392 to supplement). These don't go in order, they skip around. As you fill this out you should also be working on your Agricultural Regions Map using the powerpoint as a visual guide and supplement for info.

Area	Type	Characteristics/Vocabulary	Future or Challenges
LDCs	Plantation (R p 329)	<p>What climate regions? Where? <i>tropics/subtropics Latin America, Africa + Asia</i></p> <p>Developing countries (LDCs)</p> <p>Owners? <i>North Americans/Europeans</i></p> <p>Crops sold where? <i>MDCs (developed countries)</i></p> <p>How is plantation agriculture different from the types practiced in LDCs? <i>It is a commercial type of farming rather than subsistence</i></p>	<p>Examples of crops specialized? <i>cotton, coffee, rubber, tobacco, sugar cane, cocoa, jute, bananas, tea, coconuts and palm oil</i></p> <p>Labor force/housing (powerpoint)? <i>Must import workers b/c they are located in sparsely inhabited areas. Plantation workers must live in temp. housing = Barracks</i></p>

	<p>Major regions? <i>East Asia, South Asia, Southeast Asia</i></p> <p>What is the agricultural density? <i>high!!</i></p> <p>How is the work done? <i>by hand or with animals rather than by machine</i></p> <p>Plot sizes/structure? <i>small, fragmented resulting from dividing land between children over the centuries</i></p> <p>Land usage? Give examples <i>No wasted land corners planted, paths/roads kept as narrow as possible little grazing/pasture</i></p> <p>These characteristics are representative of what descriptive term? <b>INTENSIVE</b></p>	<p>Wet rice <u>not</u> dominant. What climate conditions? Where? <i>rain levels are too low, winters too harsh! Interior of India, Northeastern China</i></p> <p>Two most common crops? <i>wheat, barley</i></p> <p>What practice is used to avoid exhausting the soil but still maximizing the amount of land planted? <i>crop rotation</i></p> <p>Wet rice dominant. Where dominant? <i>SE China, E. India and SE Asia</i></p> <p>environmental factor required (powerpoint): <i>rainfall/water</i></p> <p>sawah (paddy): <i>flooded field where rice is transplanted.</i></p> <p>How do wet rice farmers modify their land so it can be flooded (powerpoint)? <i>hillsides are terraced</i></p> <p>double cropping: <i>obtaining two harvests per year from the same field</i></p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>LDCs</b></p>	<p>Shifting cultivation (R p 326 - 327)</p> <p>What type of climate region/biome? Describe two chief characteristics. <i>tropical, high temperatures, abundant rainfall</i></p> <p>Describe the two distinctive features of shifting cultivation. <i>- farmer clear land for planting by slashing vegetation and burning debris. As known as "slash-and-burn" agriculture</i></p> <p><i>- farmers can only grow crops on a cleared field for a few years until nutrients are depleted. Then leave fallow to recover. requires frequent relocation</i></p> <p>How is the land owned? <i>controlled by the village swidden.</i></p> <p><i>the cleared area, the only fertilizer used is the burnt debris.</i></p> <p>Describe the cyclical nature of land use. <i>land only supports crops three years or less. villagers identify new site leave old site uncropped for 6-12 years. Population growth may require establishment of new village w/own cycle.</i></p> <p>What might population growth require? <i>↙</i></p> <p>What is the visual appearance of the fields, as opposed to fields in developed countries? <i>much more chaotic because of its mixture of crops unlike the monocultures in MDCs</i></p> <p>% of world's land? How does that compare to other types of agriculture? What % of the world's population is engaged in shifting cultivation? Why the difference between these two numbers? <i>1/4 of world's land area (highest 90 of any type of agriculture). Only 5% of population because shifting agriculture requires more land/person than other types of agriculture. EXTENSIVE</i></p>	<p>Trend in the amount of land dedicated to shifting cultivation? <i>declining</i></p> <p>What competing activities are replacing shifting cultivation? <i>logging, cattle ranching, cash crops</i></p> <p>Why do defenders of shifting agriculture say it is environmentally sound? <i>it does not use fertilizers/herbicides that might damage the soil, reuse severe erosion and upset balanced ecosystem</i></p> <p>What process contributes to climate change? <i>large scale destruction of the rain forest "deforestation"</i></p>
	<p>Pastoral Nomadism (R p 328)</p> <p>What is it? <i>herding of domesticated animals</i></p> <p>Best climate? Where? Examples of nomadic groups? <i>dry climates where planting crops is impossible. Bedouins in Saudi Arabia/N. Africa and Masa. in East Africa.</i></p> <p>How do pastoral nomads use their herds? <i>milk, skin, hair used for food/clothing/shelter. Herds are usually not slaughtered</i></p> <p>How do they view their herds? <i>size of herd is a sign of power/prestige</i></p> <p>How do the nomads feed themselves? <i>they eat mostly grain they get from trading animal products</i></p> <p>What are the four major types of animals? <i>cattle, camels, goats, sheep</i></p> <p>Describe their pattern of movement. <i>not random, strong sense of territoriality. only "invade" another area in an emergency or "war". Goal is to control an area large enough for forage for animals and water for survival.</i></p> <p>transhumance: <i>seasonal migration of livestock between mountain and lowland areas.</i></p> <p>pasture: <i>grass or other plants grown for feeding animals as well as land used for grazing.</i></p>	<p>How has modern tech. threatened the pastoral nomadism lifestyle? <i>they are no longer needed as a transporter of goods and into across sparsely inhabited areas. These areas can now be controlled w/ modern weapons</i></p> <p>What would govts prefer to use the pastoral nomads' land for? <i>sedentary agriculture mining, petroleum extraction</i></p>

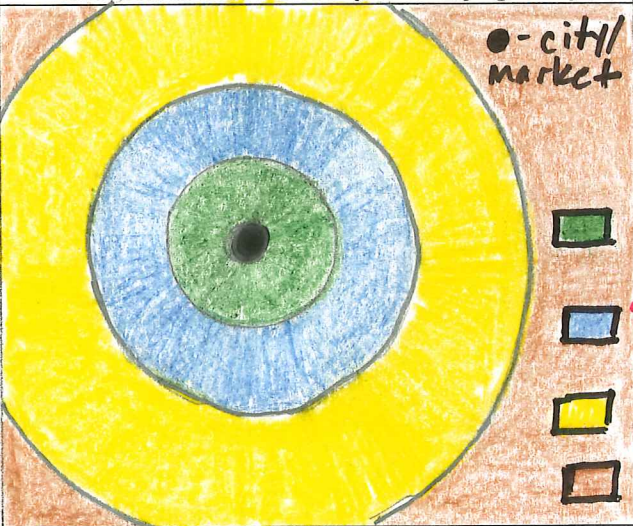
"Marginal"

Area	Type	Characteristics/Vocabulary
<b>MDCs</b>	Livestock Ranching (R p 334)	<p>How is ranching land usage described? <i>extensive</i> In what areas is it best adapted for? <i>semiarid or arid land in (MDCs) developed countries where vegetation is (too sparse/soil too poor for crops)</i></p> <p>What areas/countries are leading producers of meat? <i>China, U.S., Brazil, Pampas of Argentina, Southern Brazil, Uruguay</i></p> <p>What group of countries has seen the largest growth in ranching? What is their relative share of meat production today? <i>developing countries: rapid growth. Now 2/3rds. of meat production</i></p> <p>Where are cattle fattened today? <i>local feedlots along major DRs and highway routes</i></p> <p>What is a CAFO? What shift does this represent in the description of land use involved in ranching? (powerpoint) <i>Concentrated Animal Feeding Operation → represents INTENSIFICATION</i></p>
	Mixed Crop and Livestock (Rp336)	<p>Where is this most common? <i>most of Europe from France to Russia and in the U.S. from the Appalachian Mtns. west to 98°W, beyond which would req. irrigation</i></p> <p>How are animals and crops integrated? Include land usage and income breakdown. <i>Most crops are fed to animals rather than consumed by humans. In turn, livestock provide manure to improve soil fertility. Almost all land devoted to growing crops. 3/4th of income from animal products (beef, milk, eggs, chicken)</i></p> <p>Advantages: <i>workload can be distributed evenly throughout the year reduces seasonal variations in income</i></p> <p>What are the two most important crops? <i>corn, soybeans</i></p> <p>(see powerpoint) What practice has traditionally been followed? Why? <i>crop rotation is used to replenish soil nutrients, no fields left fallow</i></p> <p>How is this changing (powerpoint)? <i>more monocultures, increase use of chemical fertilizers, leads to soil degradation, represents INTENSIFICATION</i></p>
	Dairy Farming (R p 335)	<p>Located near what? Why? <i>markets, because dairy products are highly perishable</i></p> <p>What is this area called? <i>MILKSHED</i></p> <p>Traditionally where has production and consumption of dairy products been concentrated? <i>developed countries (MDCs)</i></p> <p>How and why has this changed? <i>now developing countries (LDCs) incr. production/consumption. Rising incomes allow urban residents to buy dairy</i></p> <p>How is the location of the dairy farm with relation to the market/milkshed related to the product produced? <i>is outside the milkshed there is more emphasis on "processed" dairy ex: Wisconsin more cheese than milk</i></p> <p>What two features of dairy farming have caused economic difficulties? <i>1) labor intensive - cows must be milked 2x daily. Even if done by machine, process must be monitored</i> <i>2) expensive wintered feed in areas unable to grow grass during winter. Must purchase hay/grain.</i></p>
	Grain Farming (R p 332)	<p>What are examples of grains? <i>wheat, corn, oats, barley, rice, millet</i></p> <p>Who is the main consumer of grains? <i>primarily humans rather than livestock, manufacturers of food</i></p> <p>How are grains farmed in developed countries? <i>heavily mechanized large farms</i></p> <p>What previously defined term refers to the variety found in grain farming? <i>monocropping</i></p> <p>What countries are the world's largest grain producers? <i>China, India, Russia, U.S.</i></p> <p>What climate are grains grown in? <i>too dry for mixed crop</i></p> <p>Why is wheat significant economically? <i>world's leading export crop US/Can. = 1/4 of all exports → econ/pol. power</i></p> <p>Where are the two largest concentrations of grain production in North America? Describe. <i>Winter wheat belt (KS, CO, OK) planted in autumn and harvested in early summer.</i> <i>Spring wheat belt (SD, ND, MT, Saskatchewan) planted in spring harvest in late summer</i></p>
	Mediterranean (R p 333)	<p>Where does this activity primarily exist? <i>Southern Europe, N. Africa and N. Asia, California, Central Chile, SW tip of S. Africa &amp; SW Australia</i></p> <p>How is the physical environment similar in these areas? <i>west coasts bordering a sea w/ prevailing sea winds provide moisture and moderate winter temps. Summers are hot/dry. Sea breezes provide relief. Land is hilly</i></p> <p>What are the two most important crops in the Mediterranean region? <i>OLIVES and GRAPES</i></p> <p>What is horticulture? <i>growing fruits, vegetables, flowers and tree crops</i></p> <p>What state has a large portion of its farmland dedicated to horticulture (we will color code these areas as Commercial Gardening and Fruit Farming)?</p>
Comm. Gardening & Fruit (R p 333)	<p>In what areas of the U.S. does this activity predominate? Why? <i>SE USA, it has a long growing season humid climate, accessible to large # of consumers in the NE US. (Meat &amp; pols)</i></p> <p>What is another name for this activity? Why? <i>Truck Farming. from Middle English meaning "truce": to barter or exchange commodities</i></p> <p>What are some popular items with consumers grown on "truck farms"? <i>apples, asparagus, cherries, lettuce, mushrooms and tomatoes.</i></p> <p>How are these products sold? <i>Sold fresh to consumers (produce section at grocery store/farmer's markets) or to large processors for canning/freezing</i></p>	

4. (Rubenstein p 330 - 331) Fishing

- a. In what two ways is water-based food acquired?
- fishing - the capture of wild fish and other seafood living in the water
  - aquaculture or aquafarming is the cultivation of seafood under controlled conditions
- b. How much did human consumption of fish and seafood increase between 1960 and 2016? 27 → 141 million metric tons
- i. What percent of calories consumed by humans is from fish and seafood? 19%
- c. How has global fish production increased over the past half-century? 36 → 202 metric tons
- i. To what acquisition method (above) is this almost entirely attributable? expansion of aquaculture
- ii. Why has the population of some fish species declined? Define. "overfishing" which is the capturing of fish at a rate faster than they can reproduce.
- iii. What is the status of fish stocks according to UN? 1/4 overfished, 1/2 fully exploited, 1/4 underfished

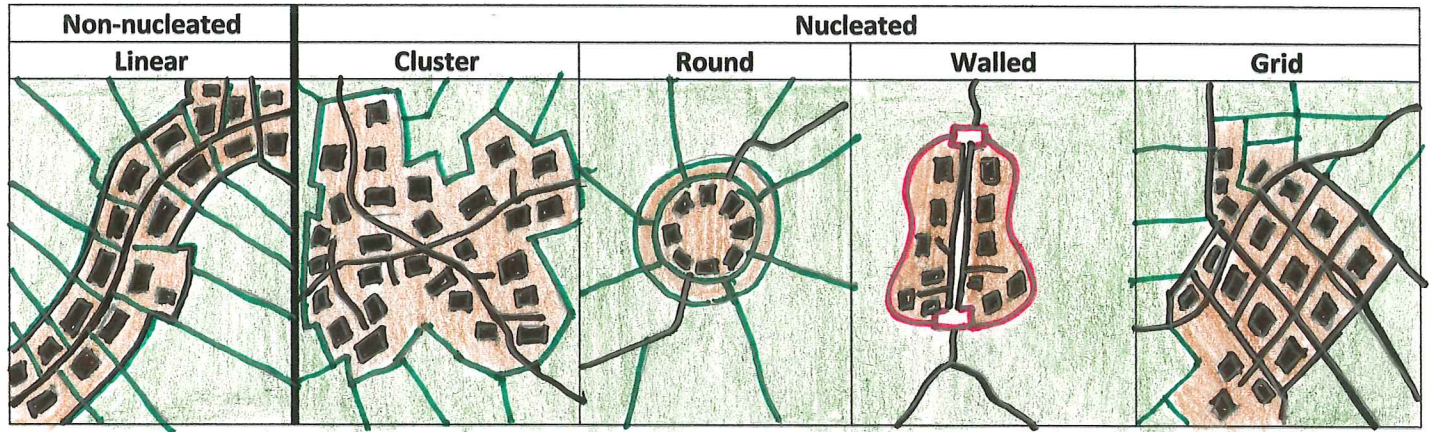
5. Read "Importance of Access to Markets" (exemplified by von Thünen's model) (Rubenstein pg 337, de Blij p 376 - 377 "Understanding...")

Draw von Thünen's model (use de Blij Fig. 9-51)	Describe von Thünen's model.
	<p>When was von Thünen's model first proposed? <u>1826</u></p> <p>What is considered first by commercial farmers when deciding which crops and animals to cultivate? <u>market location</u></p> <p>What two costs does the farmer compare when making this consideration? <u>cost of land &amp; cost of transport to market</u></p> <p>EXPLAIN the pattern in von Thünen's model (link rings to economic motivation)?</p> <p><u>1st. ring - market-oriented gardens and milk expensive to transport must reach market quickly b/c they are perishable</u></p> <p><u>2nd. ring - wood/lumber need in 1800s for fuel &amp; construction, located close b/c heavy (↑ transport)</u></p> <p><u>3rd. ring - various crops and pasture (lighter, easier to transport, less perishable, possibly grains, etc.)</u></p> <p><u>4th ring - animal grazing is farthest because it requires a lot of (inexpensive) space</u></p>
<p>(de Blij p 377) von Thünen's model is described as the first effort to do what? <u>analyze the spatial character of an economic activity</u></p>	<p>What assumptions did the model make? <u>all land had similar site characteristics and of uniform quality</u></p> <p>According to von Thünen, what could alter the basic shape of the model? <u>topography, distinctive</u></p> <p>What did the model fail to take into account? <u>social customs &amp; gov't. policies</u></p>

What imprint does agriculture make on the cultural landscape? (de Blij p 381 - 386)

6. What is a cadastral system? land survey system through which land ownership and property lines are defined
- a. What is the prevalent survey system in the United States (west of the Appalachian Mountains)? rectangular survey system
- This is based on what cadastral system? township-and-range system
  - What law helped to establish this cadastral system as dominant (lecture, not the Homestead Act)? Land Ordinance of 1785
  - What was the purpose of this law? to facilitate movement of non-Indians evenly across the farmlands of the American interior and raise \$ for the gov't.
  - What is the visual effect on the landscape of this cadastral system (lecture)? produced a rigid rectangular checkerboard pattern across the landscape
- b. What cadastral system predominates on the eastern seaboard? metes-and-bounds survey
- What is used to demarcate parcels of land under this system? natural features
  - Consequently, the shape of parcels of land under this system can be described as what? irregular
- c. Where was the Long-Lot Survey common? This shows the influence of what culture? reflects French influence in the Canadian Maritimes, Quebec, Louisiana and Texas
- Describe the shape of the lots? narrow parcels stretching back from rivers, roads or canals
  - Why do you think is a fair way of surveying land (lecture)? It provides the land owner access to important transportation and/or water resources
- d. What is primogeniture division of land? all land passes intact to the eldest son.
- What is the impact on the landscape of using this inheritance system? parcels tend to be larger and farmers work a single plot of land

- ii. Where are the principal areas where this is used? Northern Europe and its colonized areas in the Americas, South Africa, Australia and New Zealand.
  - iii. What is the effect on the landscape if primogeniture is NOT used? considerable fragmentation, farmers tend to (work on) a variety of scattered small plots of land
  - iv. Where is this system the norm? Asia, Africa and Southern Europe and Native American reservations
- e. Rural Settlement Patterns
- i. Traditionally where did most farmers live in relation to their farmland? villages
  - ii. What kind of settlement is the most common rural residential pattern GLOBALLY in agricultural regions? Describe. nucleated settlement where houses are grouped together in tiny clusters called "villages". Farmers leave the village daily to work surrounding land
  - iii. How is the settlement pattern in the American Midwest different? Why? What is this called? dispersed settlement pattern. Individual farmhouses lie far apart. In between is land that is cultivated by machine rather than by hand.
  - iv. What buildings might a prosperous American homestead include (lecture)? house, barn, silo, stable
- f. Briefly sketch the five village forms (Fig. 11.13).



- g. What percentage of the world's population still lives in villages and rural areas (de Blij p 384)? 50%
- i. Is the total # of rural dwellers increasing or decreasing? increasing as global population grows
  - ii. Is the proportion of rural dwellers compared to global population as whole increasing or decreasing? Why? decreasing due to urbanization (rural → urban = biggest global migration flow! TODAY!

7. Economic challenges faced by Subsistence and Commercial farmers (Rubenstein p 320 – 321, 339, 340, 342; de Blij p 373 – 374)

	Subsistence Farming	Commercial Farming
Farming Efficiency and Production	<p>(Rubenstein p 342) According to Ester Boserup, in what two ways can subsistence farmers increase supply of food?            1) <u>adopt new farming methods</u>            2) <u>leave land fallow for shorter times</u></p> <p>(Rubenstein p 339) What do subsistence farmers need in order to increase production? <u>high-yield seeds, fertilizers, pesticides and MACHINERY</u>            Why is it difficult for them to secure these supplies? <u>lack the money to buy them from MNCs (Transnat'l corps.)</u>            What do they do in order to raise the funds?  <u>must sell cash (export) crops</u>            What specific term is used to identify this type of cash crops?            Examples. <u>export crops, out-of-season fruits and vegetables for consumer, coffee/tea = tropical crops</u>            What is the dilemma that is faced by focusing on export crops?  <u>the more land used for cash crops, the less available for domestic consumption</u>            What illegal export crops have some in developing countries turned to?  <u>DRUGS - opiates (heroin, opium, morphine), Cocaine, Marijuana</u></p>	<p>(Rubenstein p 320-321) What has happened to the # of farms/farmers in the US in the 20<sup>th</sup> century? <u>declined rapidly, 1940 (6 million) → 1960 (4 million) → 1980 (2 million)</u>            List examples of machines that have replaced manual labor.  <u>tractors, combines, cornpickers, planters</u>            Besides machinery, what other advancements have aided comm. farmers? Include a couple details to help understand.            1. <u>experiments by univ. labs + industry + research orgs generate new fertilizers, herbicides, hybrid plants, animal breeds + farming practices lead to higher-yield crops</u>            2. <u>electronics (GPS) determine precise coordinates for planting seeds and spreading diff. types/amounts of fertilizer</u>  <u>Ranchers use to track cattle.</u>            What is the relationship between mechanization and farm size?  <u>farms are large when machines are used b/c machine more efficient on a large scale</u>            Term (lecture)? <u>economies of scale</u>            What type of financial cost/financing does this necessitate?  <u>expensive, often requires borrowing from banks</u></p>

- structure
- road
- ~ field boundary
- garden/yard
- farmland

	Subsistence Farming	Commercial Farming
Land Use and Ownership	<p>(de Blij p 373 – 374 for this box) How is the land often held when a community engages in subsistence agriculture? <u>in common</u></p> <p>What concepts are often limited and/or restricted when a community engages in subsistence agriculture? <u>accumulation of personal wealth and individual advancement at the cost of the group.</u></p> <p>During the 1900s what has been the trend in the practice of subsistence agriculture? Why? <u>declined w/ the diffusion of industrialized agriculture and the goal to increase production to feed growing populations and to sell agricultural products for profit.</u></p> <p>What role did the US and other MDCs play in this process? <u>sought to move farmers beyond subsistence farming as part of development programs.</u></p> <p>Why have some farmers returned to subsistence agriculture? <u>They don't feel that they have benefitted financially or culturally</u></p>	<p>(Rubenstein p 320 – 321 continued)</p> <p>What type of farm dominates commercial agriculture in the US? Provide statistic. <u>large farms make up 3% of the # of farms but produce 42% of the output.</u></p> <p>(lecture) This type of farming is referred to as? <u>Industrial Agriculture. Large-scale corp.-owned farms</u></p> <p>What was the trend in land used by farming in the US during the 20th century? How was this achieved? <u>the amount of land increased 13% due to irrigation and reclamation</u></p> <p>Why has the acreage of farmable land declined in the 21st century? <u>The expansion of urban areas with the growth of suburbs.</u></p> <p>Term (lecture)? <u>Urban sprawl</u></p> <p>The loss of what particular type of land is the most serious problem (p 340)? <u>prime agricultural land</u></p>

8. **Agricultural Environmental Sustainability** (detail the issues related to sustainability faced by both subsistence and commercial farmers?)  
(Rubenstein p 341, 346 – 349)
- What is desertification? human actions that cause land to deteriorate to desertlike condition
    - By what more precise term can this process be called? semi-arid land degradation
    - What subsistence agricultural activity is this associated with? pastoral nomadism
      - What three activities are most responsible for desertification? excessive crop planting, animal grazing and tree cutting. All of which exhaust soil nutrients
    - How much land is removed from agricultural production each year due to desertification (use the equivalency it is easier to understand)? an area the size of Colorado
  - How does conventional farming increase soil erosion in the American Midwest (Rubenstein p 347)? it clears away crop residue, soil is tilled loosening particles that are susceptible to being blown or washed away (erosion)
    - Briefly describe three soil cultivation methods that reduce soil erosion and runoff.
      - previous harvest is left on fields through winter conservation
      - No tillage - leaves soil undisturbed with residue from prev. year
      - Ridge tillage - plant on top of ridge tops (rows)
  - (Rubenstein p 346) What type of farming has grown the most rapidly in developed countries? organic farming
    - Define farming that depends on the use of natural substances or limits the use of synthetics like herbicides, pesticides & growth hormones
      - What sustainable practice involving complementary activities is stressed in organic farming? mixed crop & livestock
      - What methods prevalent on other commercial farms does organic farming not use? List. 1) No application of herbicides/pesticides to control weeds 2) GMOs are not used! 3) animals consume crops grown on the farm and are not confined to small pens 4) limited use of antibiotics.  
\*CAN BE GROWN LOCALLY BUT NOT ALWAYS\*
  - (Rubenstein p 348) What region of the US has grown rapidly despite limited supplies of water? U.S. Southwest
    - What does California contribute to US agricultural production? 1/3 vegetables, 2/3rds fruit/nuts
    - (Inset) What has California experienced recently which called US food production into doubt? extended drought
      - What percentage of California's water usage is through agriculture? 80%
      - What is one way that homeowners and municipalities are conserving water in California? replacing grass/lawns and annual flowers w/ native landscape of rocks and desert plants
9. **Food Security** (Rubenstein p 312 – 313, 314 – 315, 349) Food Supply and Distribution Issues
- What is the common name for the unit of measurement of dietary energy? calorie
    - What is the min. amt. of calories that an avg. individual needs in order to maintain a moderate level of activity? 1,844 Kcal
    - What is the average worldwide consumption? 2902 Kcal
      - What is the average daily consumption in developing countries? 2,800 Kcal In sub-Saharan Africa? 2,400 Kcal
        - What does this indicate? a lot of Africans are not getting enough to eat
      - What is the avg. American consuming? 3,800 kcal What health problem in America has this resulted in? obesity
        - (Inset) What other problem exists with the American food supply? pesticide residue

- What particular fruits and vegetables have been found to be pesticide-ridden? apples, peaches, nectarines, strawberries, leafy greens (spinach, kale and collards)
- b. (Rubenstein p 314 – 315) What is the UN definition of “food security”? physical, social and economic access at all time to safe/nutritious food sufficient to meet dietary needs and food preferences for an active and healthy life
- i. What percentage of the world’s population does not meet the above standard? 10%
  - ii. What is undernourishment? dietary energy consumption that is continuously below the need for a healthy life and for carrying out light physical activity
    - 1. In what two world regions is undernourishment most prevalent (provide %)? South Asia (15), sub-Saharan Africa (14)
    - 2. What is the worldwide trend in the total number of undernourished people (provide %)? 15% (2000) → 11% (2017)
  - iii. What is the greatest challenge to food security in the 21<sup>st</sup> century? food prices rather than supply
    - 1. What percent of income is spent on food in developed countries? 20%
      - What keeps food prices down in developed countries? supermarket competition
    - 2. What percent of income is spent on food in sub-Saharan African countries? 46%
      - To what four factors does the UN attribute record high food prices in developing countries?
        - poor weather especially in crop-growing regions
        - higher demand in China/India
        - lower productivity growth (no “new” miracle seeds)
        - use of crops as biofuels not food, esp. in Latin America
- c. (Rubenstein p 349) How do government policies affect food supply, cost and distribution?
- i. What do some governments do in order to meet the demands of their rapidly urbanizing populations? What effect does this have on farmers/agricultural production? to keep prices low they institute price controls which limit farmers’ ability to make a profit. Therefore, farmers have little incentive to increase production.
  - ii. Detail the three US government policies designed to improve the financial position of farmers.
    - 1. farmers are encouraged to avoid crops that are in excess supply. policies encourage the planting of clover to return nutrients to soil, keep soil in place and feed animals
    - 2. pays farmers when certain commodity prices are low. Govt. sets target price and pays farmers difference between market and target prices
      - (lecture) By what other term are these payments called? subsidies Avg. cost to taxpayers/year? \$20 billion
    - 3. govt. buys surplus production and sells or donates to foreign governments, or UN aid missions, NGOs.
      - What other government program can be considered support for farmers as well? Why? Food stamps for low-income Americans stimulate purchase of additional food.
  - iii. What is the fundamental irony in how governmental policy affects food production? In MDCs, farmers are encourage to grow less food while in LDCs they struggle to increase food production to match population growth.