

Von Thunen Agriculture Land Use Model

Written by J.H. Von Thunen in 1826, this model shows the **balance between land cost and transportation cost as you get closer to the city where the price of land increases**

Since this model was created before industrialization it has many assumptions:

- 1) Farmers wanted to maximize profits
- 2) Land is flat and no physical barriers
- 3) State is surrounded by wilderness
- 4) City is within a "Isolated State" so it has no external influences
- 5) Farmers transport their own goods to market. There are NO roads
- 6) Constant soil quality and climate within State

Von Thunen's model shows that the State is divided into 4 rings around the city

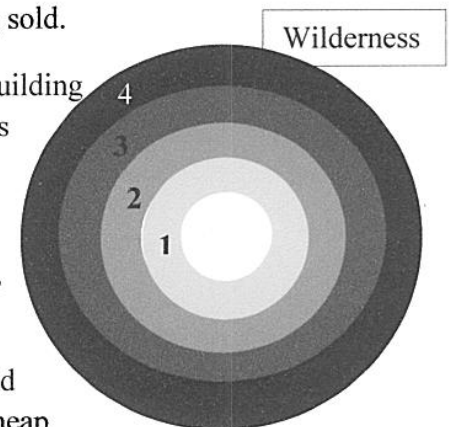
1st Ring - Dairying and Intensive Farming - closest to city. Since there were no refrigerators all of the items like dairy products, fruit, vegetables, etc would have to be located closest to city/market so they wouldn't go bad before being sold.

2nd Ring - Timber and Firewood (Forests) - made for fuel and building materials. Since it was very heavy and expensive to transport it was located close to the city.

3rd Ring - Extensive Field Crops - like grains. Since these lasted longer and were light, transportation was cheaper and easier, allowing the location to be farther from the city.

4th Ring - Ranching - Animals were raised here because they could transport/walk themselves to the city making transportation very cheap.

Beyond - Wilderness - On the outside of those 4 rings was unoccupied wilderness. Since it was too far from the city there wasn't a form of agriculture that was able to locate there.



- City/Market
- 1. Dairying & Farming
- 2. Forests
- 3. Extensive Field Crops
- 4. Ranching
- Wilderness

Von Thunen used the term **Locational Rent** - *land value*. *Corresponds with maximum amount a farmer could pay for land without making losses.*

For a farmer to maximize their profits they have to take market price minus transportation and production costs. Where they were located depended on what item was produced.

Items that were cheaper to transport and produce were found further from the market.

Bid Rent Theory - land closer to the city is used for more extensive purposes due to land cost

Early Agricultural Hearths and Crops

- Main Person of Influence: **Carl Sauer** – an intrigued geographer with many interests in plant domestication.
 - Made the first suggestions of the development of many agricultural hearths in South America and Southwest Asia, such as the Bay of Bengals.
 - Many of his ideas and propositions were and are still used by many people, regarding early agricultural hearths.
- Examples of Hearths: **ANIMAL, VEGETABLE, SEED**
- Vegetative Planting – removing part of a plant and putting it into the ground to grow a new plant. Example: **Hostas**
- Seed Agriculture – taking seeds from existing plants and planting them to produce new plants. Example: **a large majority of the farmers use this method today**

Three main areas of agriculture around the world:

- **Central America/Northwestern South America**

Agricultural Products: arrow root, manioc, and sweet potatoes

Animals: alpacas, turkeys, and llamas

Seeds: cotton, beans, and squash

- **Western Africa**

Agricultural Products: yams and palm oil

Animals: sheep, cattle, and goats

Seeds: coffee

- **Southeast Asia**

Agricultural Products: root crops and bananas

Animals: dogs, pigs, and chickens

Seeds: millet and rice

Neolithic Revolution and the Second Agricultural Revolution

➤ Neolithic Revolution (First Agricultural Revolution):

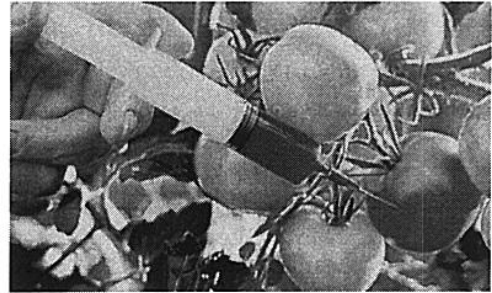
- This is the transition of many human beings from lives of hunting and gathering to agriculture.
- Plant Domestication:
 - Plant domestication is when the genetic makeup of a plant is altered so that its survival depends on the intervention of human beings.
 - Carl Sauer thought that plant domestication likely took place in *Southeast and South Asia* around 14,000 years ago.
 - It is suggested that the cultivation of root crops (crops that are reproduced by cultivating the roots or cuttings from the plants) was the first form of plant domestication.
 - Most people believe that the domestication of seed crops (crops that are grown by cultivating seeds) in the area of *Southwest Asia* known as the Fertile Crescent (which covers much of the land from the Persian Gulf to the Mediterranean Sea along the top part of the Arabian Peninsula).
- The domestication of plants coincides with many changes to the genetic makeup of the plants themselves:
 - As people chose the seeds of the heartiest and largest plants to cultivate, the plants began to grow larger than the counterparts of these found in nature.
- Many places around the world have come up with their own innovations of agriculture. Different parts of the world discovered how to cultivate different types of crops.
- Animal Domestication:
 - This is the genetic modification of animals so that it is rendered capable of being handled by humans.
 - Some scholars believe this happened many years before the domestication of plants, but some believe that it occurred as recently as 8,000 years ago.
 - This happened when people became more sedentary and lived in the same place for longer periods of time.
 - It is possible that animals attached themselves to human societies to pick up the scraps of food that were thrown out.
 - Animals that were docile were easily penned up and some people took in the orphaned animals as pets.

➤ Second Agricultural Revolution:

- The Second Agricultural Revolution is what made the Industrial Revolution possible. This is the movement from subsistence agriculture (self-sufficient agriculture that is small scale with very low technology that emphasizes growing food for local consumption and not for trade) to surpluses that allowed many people to work in factories.
- The Second Agricultural Revolution was composed of a series of innovations:
 - Many different crops were imported to Europe during the 17th and 18th centuries. These crops found favorable climates in Europe.
 - Methods of soil preparation, fertilization, crop care, and harvesting improved.
 - Seed Drill: this allowed farmers to avoid wasting seeds and to easily plant crops in neat rows.
 - Advances in breeding livestock enabled farmers to develop new breeds. These breeds were either very strong milk-producers or good for eating.
 - Artificial feeds were used to feed livestock and fertilizer was used to feed plants.
 - The combustible engine allowed for the production of tractors and other farming equipment.
- All of the things listed above enabled greater agricultural output, which, in turn, enabled the growth of the secondary sector (industrial) of the economy.

3rd Agricultural Revolution- beginnings, impact on LDCs

- Started in the 1960s
- Also called the Green Revolution
- Corresponded to the result of the 2nd Agricultural Revolution, the exponential population growth around the world



Biotechnology or genetic engineering

- Plants grow in extreme conditions, normally where it's not suited for them to grow
- Increased use of chemical fertilizers to enhance productivity
- Rise in industrial farming- mass production of agricultural products
- Genetic engineers started modifying wheat and corn to change characteristics
 - Example: Wheat needed to be grown in a dry climate, too much moisture made it spoil in the fields. Now wheat can resist spoilage in the field.
 - Other products that got similar modifications- corn, soybeans and cotton
 - Rice was first modified in the Philippines and spread throughout Asia. It is heartier and grows quickly, feeds more people in the poorest regions of Asia.
 - Double-cropping and triple-cropping can be practiced in some parts of Asia, feeding more people also.

Agriculture gone global

- Farmers in western North Dakota ship wheat to Seattle via train, where its put onto ships and shipped to Asia.
- The Upper Midwest sends products down the Mississippi River to New Orleans, and then they are sent to South America
- Farmers in the Great Plains have a profit from their wheat and corn in Asia
- Food is highly industrialized

Animal rights activists are concerned with the quality of an animal's life when they live this way

- Chicken living on top of each other and getting antibiotics to make their breast size larger for the large amount of people that want white meat in their diet and reduce the spread of disease
- Chicken is a staple food in the Western diet

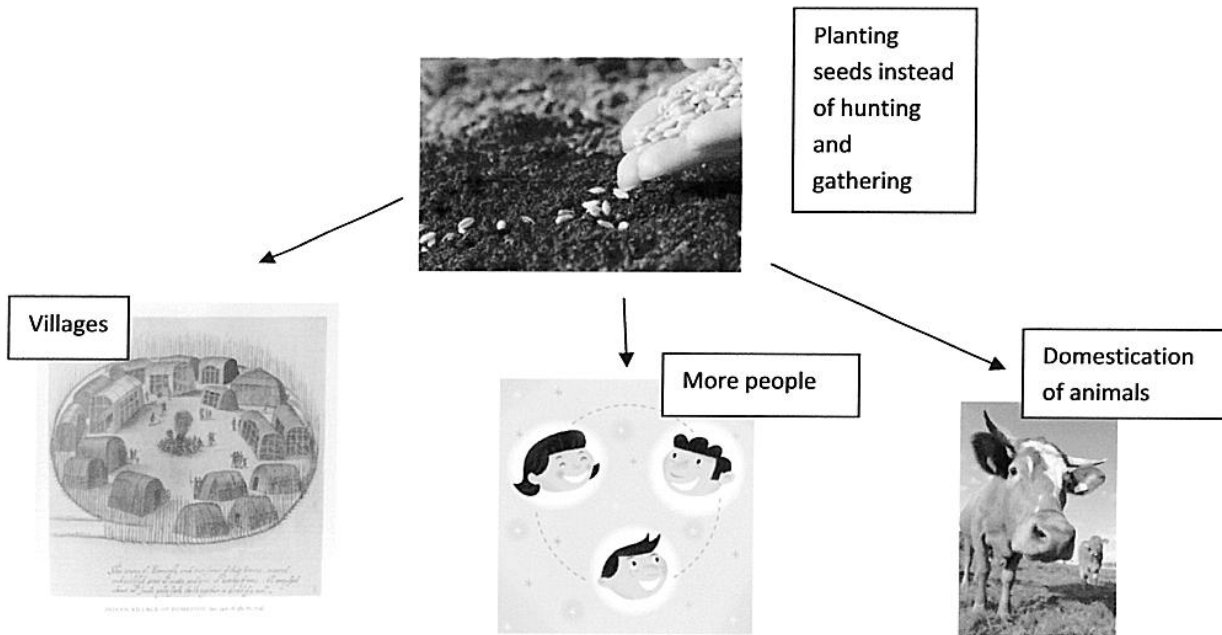
People are still starving in the world, but not for the lack of food, for the inadequate distribution of food around the world.

Causes and Effects of the Transition Away from Hunters and Gatherers

- The **First Agricultural Revolution** is what moved humanity away from **Hunting and Gathering** society to an **Agricultural** society.
- Two main practices came out of this revolution:
 - **Plant Domestication**
 - **Animal Domestication**
- With the planting and domestication of crops humans now had a surplus of food to rely on, making time for other things like art and innovation.
- Population grew due to the transition from Hunting and Gathering, more food=more people.
- However, more crops also meant more labor was needed to grow and maintain crops. In today's society though (two agricultural revolutions later) this is not incredibly relevant because the entrance of **Capital** into the workforce.
- Some believe that agriculture was a bad move by the human race, such as Jared Diamond in his article *The Worst Mistake in the History of the Human Race*. In this article he says that agriculture and the move from Hunting and Gathering society caused things such as social and sexual inequality among people.
- But overall the move away from Hunting and Gathering society has been a good one, agriculture has created more jobs for the people and more assets for the economy.
- The move to Agricultural society has also caused problems for humanity in the fact that we rely too heavily on crops. Examples:
 - Irish Potato Famine
 - Sudan Famines
- Overall, the move to an Agricultural society has benefited humanity in ways because of the innovation it allows, the nourishment it gives, and the expansion for human population it allows.

Causes and Effects of the Transition away from Hunter-Gatherers

| Cause | Effect |
|--|---|
| People would use the <u>seeds</u> from the tastiest or best food and replant it in hopes of growing another plant just as good for later on. | The earliest forms of <u>subsistence agriculture</u> began. |
| People have a more dependable source of <u>food</u> since they started planting and replanting grains, fruits, and vegetables. | There is a <u>surplus</u> of food. |
| There is a lot more food than before. | More people stay <u>alive</u> . |
| More people stay alive with the food they have. | Simplistic <u>villages</u> form. *And* <u>Animals</u> are domesticated for further advancements in society. |



Modern Day Hunter-Gatherers

- Many less developed countries have nomadic peoples that still participate in hunting and gathering.
- One example of these people is the Aboriginals in Africa, who are very underdeveloped and still rely on the cyclic movements of the animals and their surroundings for food.
- Hunting and gathering is pretty much completely gone in areas of high industrialization and development, however, many people living in Africa, some parts of Asia, and the Middle East are hunter-gatherers.

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Environmental Determinism and Possibilism

- **Environmental Determinism**
 - Suggests that human behavior is strongly affected by or even DETERMINED by the **Physical Environment**.
 - Suggests that **climate** is the critical factor in how humans behave.

- **Possibilism**
 - Was actually derived from Environmental Determinism; made up from its counterarguments.
 - Argued that the natural environment merely serves to limit the range of choices available to a specific culture.
 - Says that the choices made by a society depends on the requirements of the members and technology.

Summing It Up

- ❖ Possibilism became increasingly ACCEPTED
 - ❖ Determinism became increasingly DISCREDITED
- ↓
- » Basically, in much easier words, Possibilism says that everything is **POSSIBLE**, in that a community can work through any type of climate or environment and get through it.
 - » Determinism is quite different because it suggests that the conditions of the environment ultimately **DETERMINE** what we are capable of doing.
- ↑
- ❖ **However**, Possibilism, as popular as it is has its own limitations because it inquires the physical environment and asks what it allows:
 - Humans have pushed things that were said to be possible by their own will and smarts.
 - Because of technological advances, it is possible to do many things that are at odds with the environment

DETERMINISM VS POSSIBILISM

Agribusiness and Commercial Farming

The Reason for Commercial Farming

- When the population grows, new approaches for accommodating the profusion of people and the techniques needed to feed them are required
- Major examples of this might be the Agricultural and Industrial Revolution(s)
- The predecessor of farming was hunting and gathering, which as time progressed and the population grew, became an incapable method of providing food for the population
- Later another means of procuring food was developed to support the population: commercial farming
- Commercial farming bypassed subsistence farming because it is a more cost-efficient way of providing food

Agribusinesses' Role in Society

- Agribusinesses are the businesses involved in the production of food; any of the following maybe considered an agribusiness:
 - Farming/Contract farming
 - Agricultural supply
 - Capital production used for agricultural purposes
 - Distribution of food
 - Processing
 - Marketing/Sales
- As farming has been innovated and commercial farming has begun, instead of small businesses, large corporations have grown
- Agribusinesses use commercial farming instead of subsistence because it provides more cost-efficient ways of providing for the population

Commercial Farming Today

- Commercial farming is the cultivation of a few specific crops on a large scale proportion
- Because it is large task, it has adapted into different places so as to fit the economy
- In less developed and impoverished areas in the world it can be hard to afford the capital necessary for agricultural purposes, and therefore the work (or the majority of the work) is instead done by hand; this combined with small amounts of arable land results in intensive farming
- An example of intensive commercial farming today is West Bengal in India; it has a huge population to supply, is in an indigent part of the world, and has diminutive amount of land accordingly intensive farming appeals to it
- There is also extensive farming, which involves small inputs of labor to relatively large expanses of land

Agribusiness & Commercial Farming

1. Agribusiness – the system of the production of food that involves everything (agricultural) from the development of seeds to the marketing & sale of food products at the market
 - a. In other words it's everything that is in the agriculture business
 - b. It's the modern farming concept & links small farms to large production & exchange
 - c. Food production industry: farms, processing plants, packages, fertilizer laboratories, distributors, advertisement agencies
 - d. Chickens produced by huge agribusiness companies → provide chicks & feed to farmers to take care of
 - e. The agribusiness farms have made family farms fall out
2. Commercial Farming – the type of farming in which the crops/livestock are grown/raised for \$\$money\$\$ in the marketplace; large-scale farming & ranching on lots of land, many machines, labor as in a factory, & technology
 - a. In a region, the climate, soil, material availability, & the main culture differ the apportionment of commercial agriculture
 - b. There are five different types:
 - i. Mixed crop & livestock farming (farm with crops and livestock)
 1. Here, the majority of the money comes from the livestock sales and the crops normally go towards feeding the animals
 2. The farmers use crop rotation → the cycle of crops to rejuvenate nutrients in the soil
 3. Found in Europe & Eastern North America
 - ii. Ranching – commercial grazing/commercial livestock
 1. In areas of dryness & unable for crop growth
 2. Transhumance – move flocks to different regions each season
 - a. Western US, Argentina, Southern Brazil, & Uruguay
 3. Extensive farming because the animals need lots of grazing land
 - iii. Dairying – Milk-based products for the market
 1. The farms that create dairy products are small in size and capital intensive → use a lot of machines instead of people
 2. Located close to the market because the products are easily spoiled → milkshed – zone around the center where dairy products are produced
 3. Found in Northeastern US, Southeastern Canada, and Northwestern Europe
 - iv. Large-scale grain production – lots of grains are grown to be shipped off/exported to another place for eating
 1. Most common is wheat
 2. Canada, US, Argentina, Australia, France, England, & Ukraine
 3. Grew during the Industrial Revolution
 - v. Plantation farming – grow 1 or 2 high-demanded crops that are to be exported and use large-scale farming techniques
 1. Shows the structures of global power
 2. Truck farming → intensive (small space, lots of work)
 3. Normally found in Less Developed Countries

Biotechnology

- **Any techniques used to modify living organisms in such a way that they improve plant and animal species, and thus plant and animal production**
- Large component of the Green Revolution
- Basically creates genetically-modified organisms (GMOs, or organisms that have had their genes altered in a laboratory)
- Genetic modification techniques:
 - Embryo transfer
 - Cell fusion
 - Recombinant DNA techniques
 - Tissue culture (cloning)

Positives:

- Allows farmers to produce much more in a shorter period of time** (gives farmers greater yields)
- Creates new crop varieties that grow in conditions under which the natural crop wouldn't
- Often creates new plants with pest or weed resistance

Negatives:

- We do not know the potential repercussions that these modified organisms will have on the environment
- Modified plants are expensive to procure, leaving peripheral countries bereft when they are often the ones who need these innovations the most

Examples:

Rice: in the 1960s, Filipino researchers created a new variety of rice, **IR8**, from an Indonesian species and a Chinese dwarf species. IR8 had a bigger head of grain as well as a stronger stem than other varieties. Then, in 1982, the researchers produced **IR36**, a rice strain bred from 13 parents to create the perfect mix of productivity and pest resistance. This new rice variety is resistant to 15 pests and has a growing cycle of only 110 days, allowing farmers to harvest 3 crops per year. Today, IR36 is the most widespread crop on earth.