

VON THUNEN'S AGRICULTURAL LOCATION THEORY

B.A. 4th Semester (Honours)
Course C8- Economic Geography

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Introduction:

- ▣ The agricultural location theory was first presented by Johann Heinrich von Thünen, a Prussian landowner, in 1826 in a book called *Der Isolierte Stat* (Isolated State).
- ▣ Thunen's location theory on agriculture is based on the study of an agriculture field in Germany.
- ▣ This theory is based on the concept of Economic Rent which is prevalent in farm market distance relationships.
- ▣ In this model, Von Thunen explains the crop productivity and land use pattern changes when we go away from the market.

Aim of the theory

- ▣ The main aim of von Thune's Model of Agriculture was to explain why and how agricultural land use pattern varies when we go away from the market.
- ▣ It also explains the hierarchy of agricultural crops based on profit-making capacity.

Basic models or principles of the theory:

Model I-

The intensity of the production of particular crop declines with the distance from the Market. Here the intensity of production means the amount of inputs per unit area of the land.

Model II-

The type of land use will vary with distance from the Market.

Basic Assumptions:

1. The isolated state comprises of one market area and an agricultural hinterland.
2. The market receives goods only from the hinterland and the hinterland sells goods only to the market.
3. The hinterland ships its surpluses to no other market except the city.
4. There is a homogeneous physical environment, including a uniform Plain around the City.

Basic Assumptions:

5. The hinterland is inhabited by farmers who wish to maximize their profits, and who adjust automatically to the market's demands
6. There is only one mode of transport that is horse wagon is used.
7. Transportation cost is directly proportional to distance. The higher the distance higher the transport cost.

Concept of Economic Rent

This is the basic principle of Thunen's analysis, where he argued that different types of land use produce different net returns per unit area.

Economic rent is the measure of the advantage of one piece of land over another. Since all farmers receive the same price at the market and production costs are also assumed to be the same, the only advantage one piece of land has over another is its location from the market.

It is also known as Locational Rent

Economic Rent:

$$LR = Y(m - c) - Ytd,$$

Where,

LR= locational rent per unit of land,

Y= yield per unit of land,

m= market price per unit of land,

c= production cost per unit of product,

t= transport rate per unit of distance,

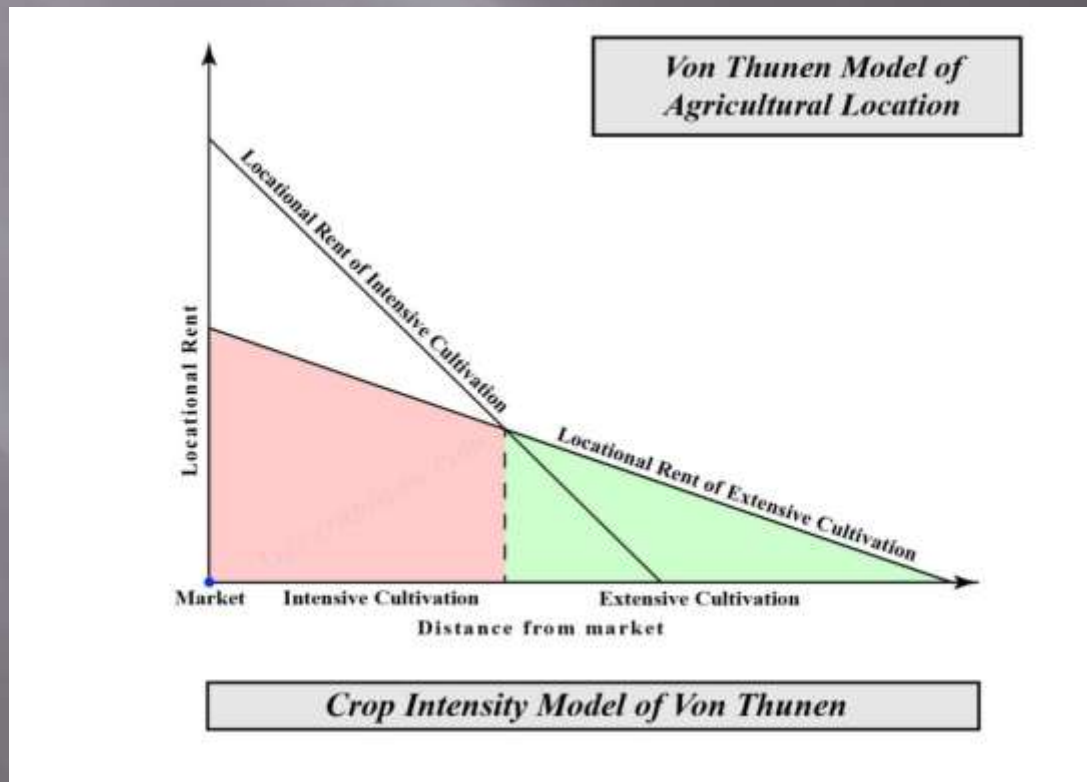
d= distance from the market.

Model I: Intensity Theory

The intensity of cultivation decreases away from the city. For the same crop having a similar market price, the farm located close to the city will have an intensive cultivation than the one located away from it. This is because the locational rent on the crops of the farm near the city will be higher than the farm away.

Intensity Theory

- Due to the rise in transportation cost, intensive cultivation is most suitable near the city centre. Therefore, the intensity of production of a particular crop declines with distance from the market.

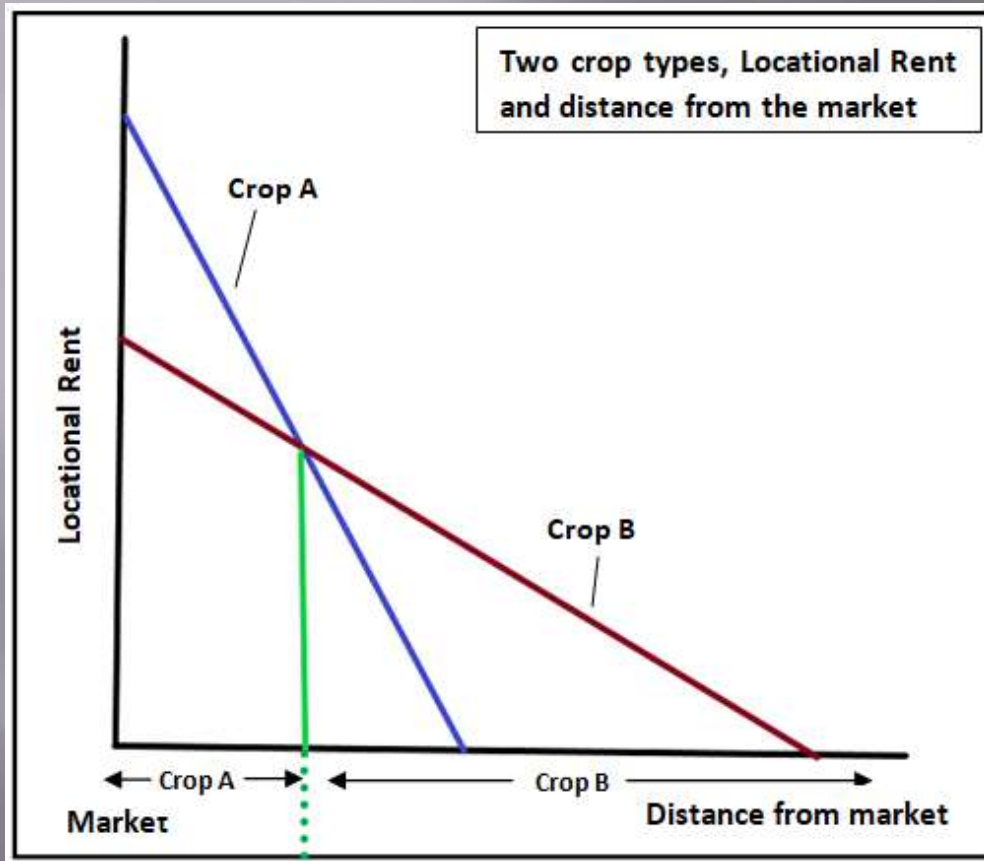


Model II: Agricultural land use

Von Thunen's model examines the location of several crops in relation to the market. The location of crops, according to him, is determined by the following factors-

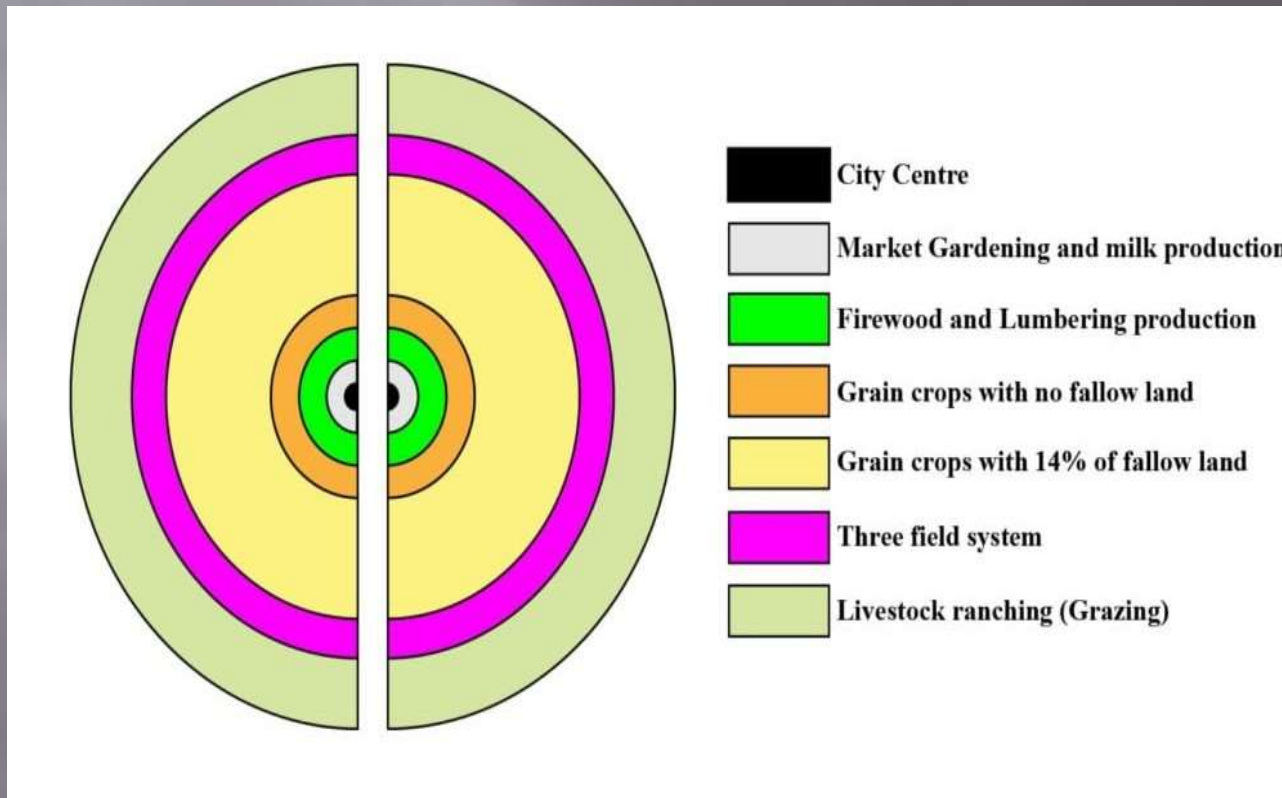
1. The market prices
2. Transport costs
3. The yield per hectare

The crop with the highest locational rent for the unit of land will always be grown, since, it gives the greatest returns and all farmers attempt to maximize their profit. Two crops may have the same production costs and yields but having different transport costs and market prices influence the decision making of the farmers. If commodity A is costlier to transport and has a higher market price, A will be grown closer to the market than B.



Concentric zonal rings of agricultural production:

Von Thunen recognized following six concentric zonal rings of agricultural production



Concentric zonal rings of agricultural production

Zone-1: Market Gardening and milk production: Zone-1 would be dedicated to cash cropping. Due to deficiency of food preservation facilities, primitive modes of transportation, and the highly perish nature of products, market gardening, and milk production were most suitable in this zone.

Zone-2: Firewood and Lumbering production: The second zone was marked by the production of firewood. Due to heavy bulkiness and primitive transportation modes, wood was comparatively costly to be shipped. It was also used as a fuel and building material. However, the outer limit of this zone was marked by wood which was highly in demand in the market.

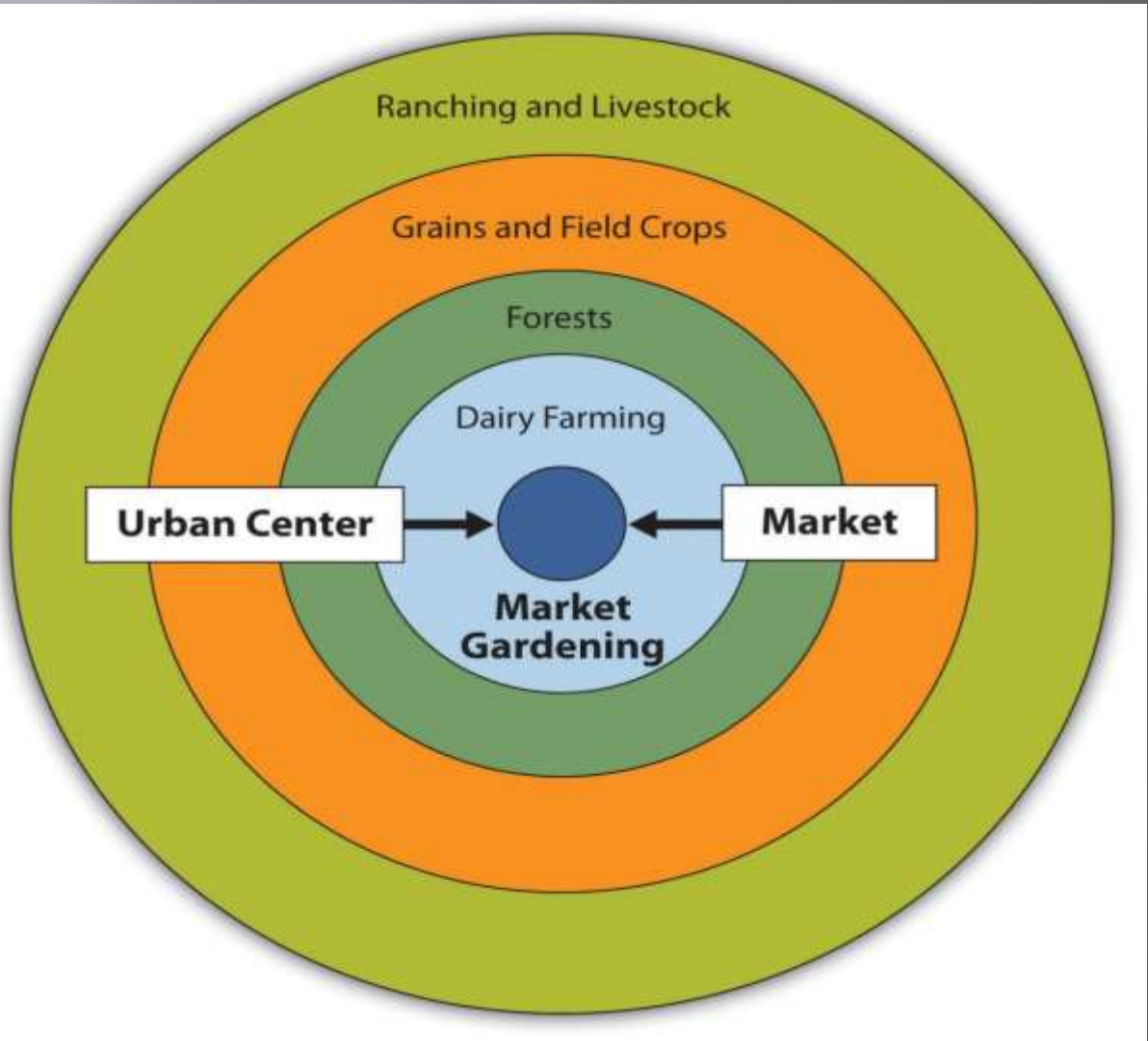
Zone-3: Grain crops with no fallow land: Unlike zone-2, the zone-3 was marked by food grains. Rye was the most important market product of this zone, having no fallow land. The cropping intensity of this zone was highest as compared to zone-4 and zone-5. Most importantly, grains could be stored, easy to transport and last longer than milk products. Also, the agricultural land would be cheaper farther away from the market.

Concentric zonal rings of agricultural production

Zone-4: Grain crops with 14% of fallow land: This zone was marked by 14% of fallow land, having less crop intensity as compared to zone-3. The farmers of this zone usually practised seven years crop rotation with one year each rotation of rye, barley and oats, three-year rotation of pastures and one year as fallow land.

Zone-5: Three field system: Like zone-2, this zone was marked by extensive cultivation having 33% of land as fallow. The farmers of this zone practised three-field system, having 1/3rd of land as crop field, 1/3rd as pastures and rest left for fallow land.

Zone-6: Livestock ranching (Grazing): The market products of this zone would be of two types namely, livestock and by-products of milk like cheese, butter, etc. which would not highly perishable. Also, the reduction in the volume of these by-products made them cost-effective in terms of transportation.



Modifications in Von Thunen model of agricultural location

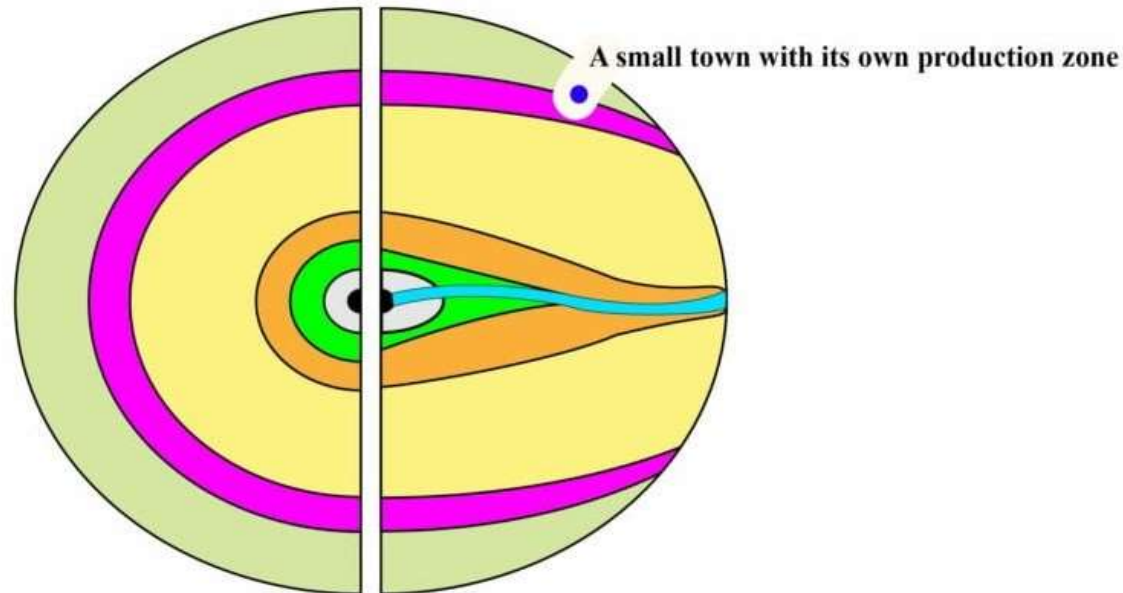
- ▣ Introduction of a navigable river into his Isolated State.
- ▣ Elongation of production zones along the river.
- ▣ Extension of Zone-2 in a narrow band.
- ▣ Consideration of more than one market center or minor market centers.
- ▣ Possibility of numerous small towns of equal importance.
- ▣ Intermixing of production zones due to numerous towns.




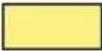





Modifications in Von Thunen model of agricultural location

The following are the modification introduced in the classical model of Von Thunen:

1. Introduction of a navigable river into his Isolated State.
2. Elongation of production zones along the river.
3. Extension of Zone-2 in a narrow band.
4. Consideration of more than one market center or minor market centers.
5. Possibility of numerous small towns of equal importance.
6. Intermixing of production zones due to numerous towns.

Modifications in Von Thunen model of agricultural location



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|---|---|---|--|
|  | City Centre |  | Zone:3 Grain crops with no fallow land |
|  | A Small Town |  | Zone:4 Grain crops with 14% of fallow land |
|  | Navigable River |  | Zone:5 Three field system |
|  | Zone:1 Market Gardening and milk production |  | Zone:6 Livestock ranching (Grazing) |
|  | Zone:2 Firewood and Lumbering production | | |

Critical Analysis:

1. The conditions described in this model, i.e., in an isolated state, are hardly available in any region of the world. There are internal variations in climatic and soil conditions. von Thunen's assumptions that there are no spatial variations in soil types and climate are rare.
2. It is not necessary that all types of farming systems as described by von Thunen in his theory exist in all the regions. In many European countries location of types of farming in relation to the market are no longer in existence.

Critical Analysis:

3. Thunen's measures of economic rent and intensity are difficult to test because of their complexity. The measurement of the number of man-days worked in a year, the cost of labour per hectare, or the cost of total inputs per hectare is not uniform in intensive and extensive types of farming. Similar is the case with the measures of intensity.
4. von Thunen himself has admitted that with the change in location of transportation or market center the pattern of land use will also change.

Critical Analysis:

5. During the past 190 years, there have been sizeable changes in agricultural land use and the economy with which it interacts. The most important of the changes have been improvements in transportation technology; these improvements now permit a space-time convergence of distant places, thereby expanding the scale of possible economic organization.
6. The von Thunen model is also static and deterministic. Today, we know that economic growth and changes in demand will alter the spatial patterns of agricultural systems and land use, which in turn influence the rate of change. It might be possible to postulate a dynamic von Thunen model that could be applied to the changing conditions.

THANK YOU