von Thunen Model of Agricultural Land Use

This is a model for analyzing agricultural location patterns. It is a pioneer work developed by a Prussian (German), Johann Heinrich von Thunen. He developed a crop theory and crop intensity theory in 1826. In the construction of his model, von Thunen used the data of his agricultural estate—Macklenburg, near Rostock in Germany. He operated and managed this estate for forty years until his death. Most of the data used in explaining his theory was obtained by him through practical experience, including detailed cost accounting of his estate. He attempted to construct a theoretical model of land use pattern, giving a particular arrangement of towns and villages in a situation, experienced in Mecklenburg. The main objective of von Thunen's analysis was to show how and why agricultural land use varies with the distance from a market. He had two basic postulates:

1. The intensity of production of a particular crop declines with the distance from the market. Intensity of production in a measure of the amount of inputs per unit area of land; for example, the greater the amount of money, labour and fertilizers, etc., that are used, the greater the intensity of agricultural production.

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

Assumptions

The model of von Thunen is applicable only if the following conditions exist:

1. An 'isolate estate' (no links with the rest of the world) with one city at the centre of an agricultural area.
2. The city is the sole market for the surplus production from agricultural area, and the agricultural area is the sole supplier of commodities to the city.
3. In the market of the city, all farmers receive the same price for a particular crop.
4. This agricultural area is an isotropic surface, having homogeneity in terrain, topography and climatic conditions.
5. The farmers are rational who behave as economic men and conduct agriculture to optimize their profit.
6. The farmers have a full knowledge of the needs of the market.
7. There is only one form of transport (in those days horse-carts and boats). The transport network in the region—both roads and navigable canal—was poor and the cost of transport increased at a constant rate.
8. The town existed in the centre of the agricultural land which had no counter magnets (market) in the vicinity.

von Thunen's model examines the location of several crops in relation to the market. The model is constructed around the concept of *rent*, and assumes that all farmers will produce on their land that commodity which yields the 'highest' rent, and so will maximize their profit. This net profit is termed as land rent (L), and its value is controlled by the production costs per unit of the commodity (a) its market price (p), the yield per unit of land (E), and the distance from the market to the production point (k). These are combined to give (Dunn, 1954):

$$L = E(p - a) - Ek.$$

In this context, land rent differs from economic rent in that it takes no account of opportunity costs and so ignores what might be earned from alternative uses of the land.

In the simplest applications of the model, which have attracted geographers for several decades, transport costs are taken as the only variable (i.e., prices, production costs and yields are held constant for each commodity): rates per unit of distance vary, being highest, for bulky and/or perishable items such as timber and dairy products. Thus, land rent can be shown to decline away from the market point according to the 'Distance Decay Model', but the rate of decline differs by commodity. The

Figure 3.18 *Two Crops Types Locational Rent and Distance from Market*

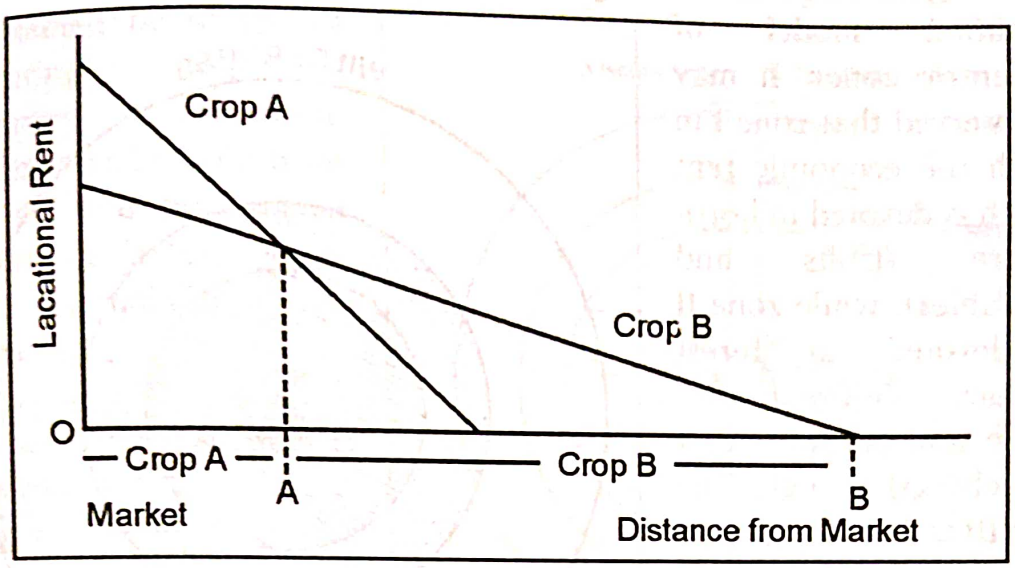
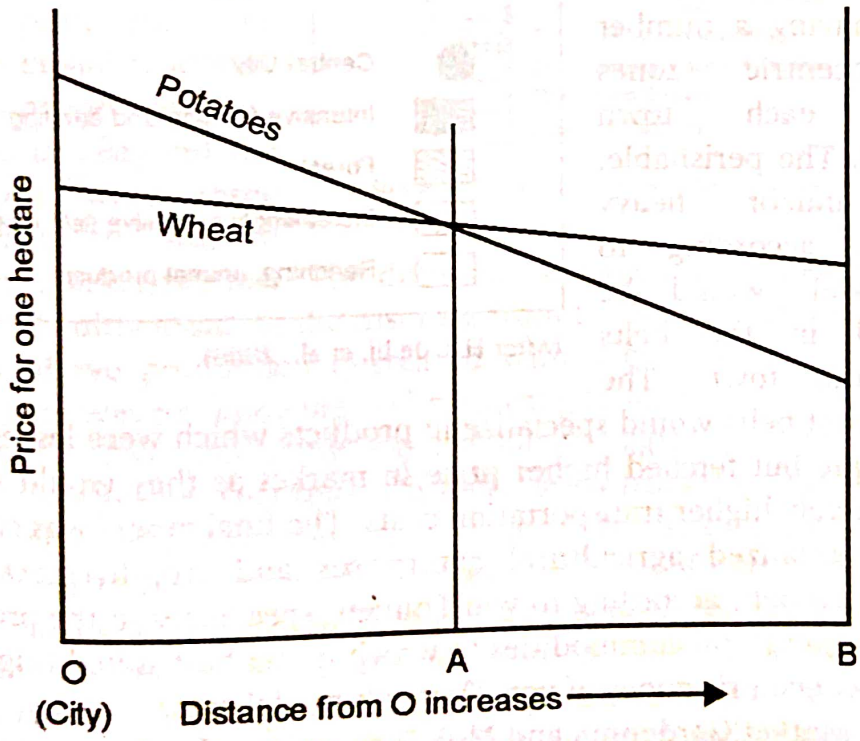


Figure 3.19 *Economic rent for two crops: wheat and potatoes. Taking into account transport costs, potatoes are most profitably grown between O and A, and wheat between A and B.*



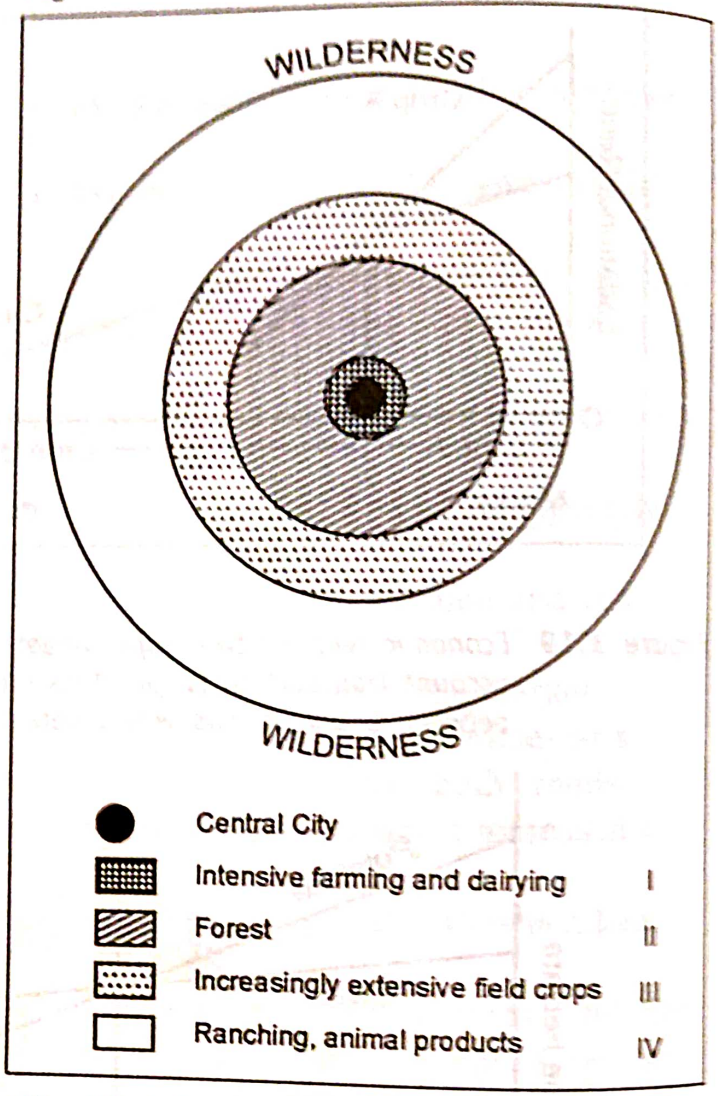
(After R. Knowles, et al., 2002: 141)

market price for each commodity determines the maximum rent, at the market point, and the result is differing land rent slopes, as shown for three commodities in the Figure 3.18 and 3.19. If those distance decay curves are translated from one- to two-dimensional space, they suggest a zonal pattern of land use organization around the market point.

The economic rent considering three crops (horticulture, forest products, and intensive arable cereals) has been plotted in Figure 3.20.

This figure shows a simplified model of concentric zones. It may be observed that zone I in which the economic rent is high is devoted to horticulture (fruits and vegetables), while zone II is devoted to forest products (fuelwood, etc.) as the transportation cost of fuelwood is high. The zone III is that of intensive arable land devoted to cereal crops.

Figure 3.20 *Concentric Land Use Zones*



(After H.J. de lij, et al., 2000)

On the basis of these assumptions, von Thunen constructed a land use model, having a number of concentric zones around each town (market). The perishable, bulky and/or heavy products, according to this model, would be produced in the belts nearer the town. The more distant belts would specialize in products which were less in weight and volume but fetched higher price in market as they would afford to bear relatively higher transportation costs. The final model was conceived having specialized agricultural enterprises and crop-livestock combination. Each belt, according to von Thunen, specializes in the production of those agricultural commodities to which it was best suited (Fig. 3.21).

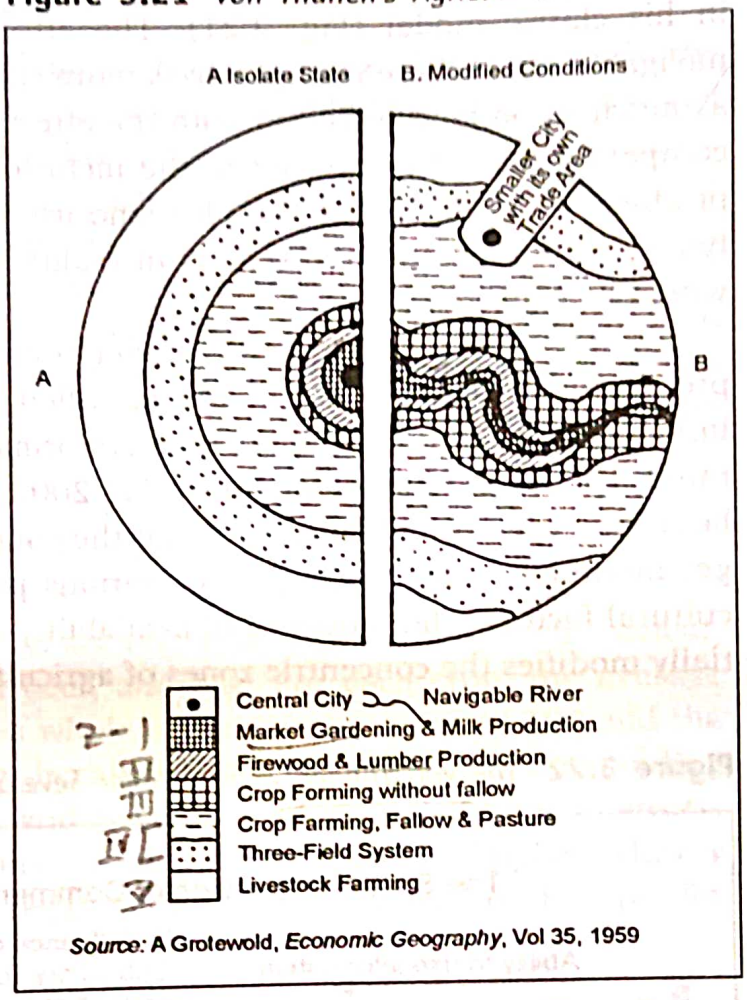
The concentric zones of von Thunen's model are:

Zone I Market Gardening and Milk Production
Zone II Firewood and Lumber Production
Zone III Crop Farming without Fallow
Zone IV Crop Farming, Fallow and Pastures
Zone V Three Field System
Zone VI Livestock Farming

Zone I: The land use model, propounded by von Thunen, suggests that the production of fresh milk (in the context of Europe), vegetables, fruits and flowers was concentrated in the zone I, nearest to the city (market) because of the perishable nature of these products. In this zone

the fertility of land was maintained by means of manuring and, if necessary, additional manure was brought from the city and transported to the fields located at short distances from the market (Fig. 3.21).

Figure 3.21 *von Thunen's Agricultural Zones*



Source: A Grotewold, *Economic Geography*, Vol 35, 1959

Zone II: This zone was used for production of wood, a bulky product in great demand in the city as a fuel in the early part of the 19th century. He showed, on the basis of his empirical data, that forestry yielded a higher location rent, since its bulkiness meant relatively higher transport cost.

Zone III: Beyond the forest belt were three zones where rye was an important market product. The difference between the zones was in the intensity of cultivation. As the distance from the market increased, so the intensity of rye production decreased with a consequent reduction in yields. There was no fallowing and manuring to maintain soil fertility.

Zone IV: The land being less productive, agriculture in the fourth zone is less intensive. This zone is situated away from the market. Farmers in this zone used a seven-year crop rotation. In the crop rotation, there was one year of rye, one year of barley, one year of oats, three years of pastures, and one year fallow. The products sent to the market from this zone were rye, butter, cheese, and occasionally, live animals to be slaughtered in the city. These products do not perish so quickly as fresh milk, fruits and vegetables, and could, therefore, be produced at a considerably greater distance from the market.

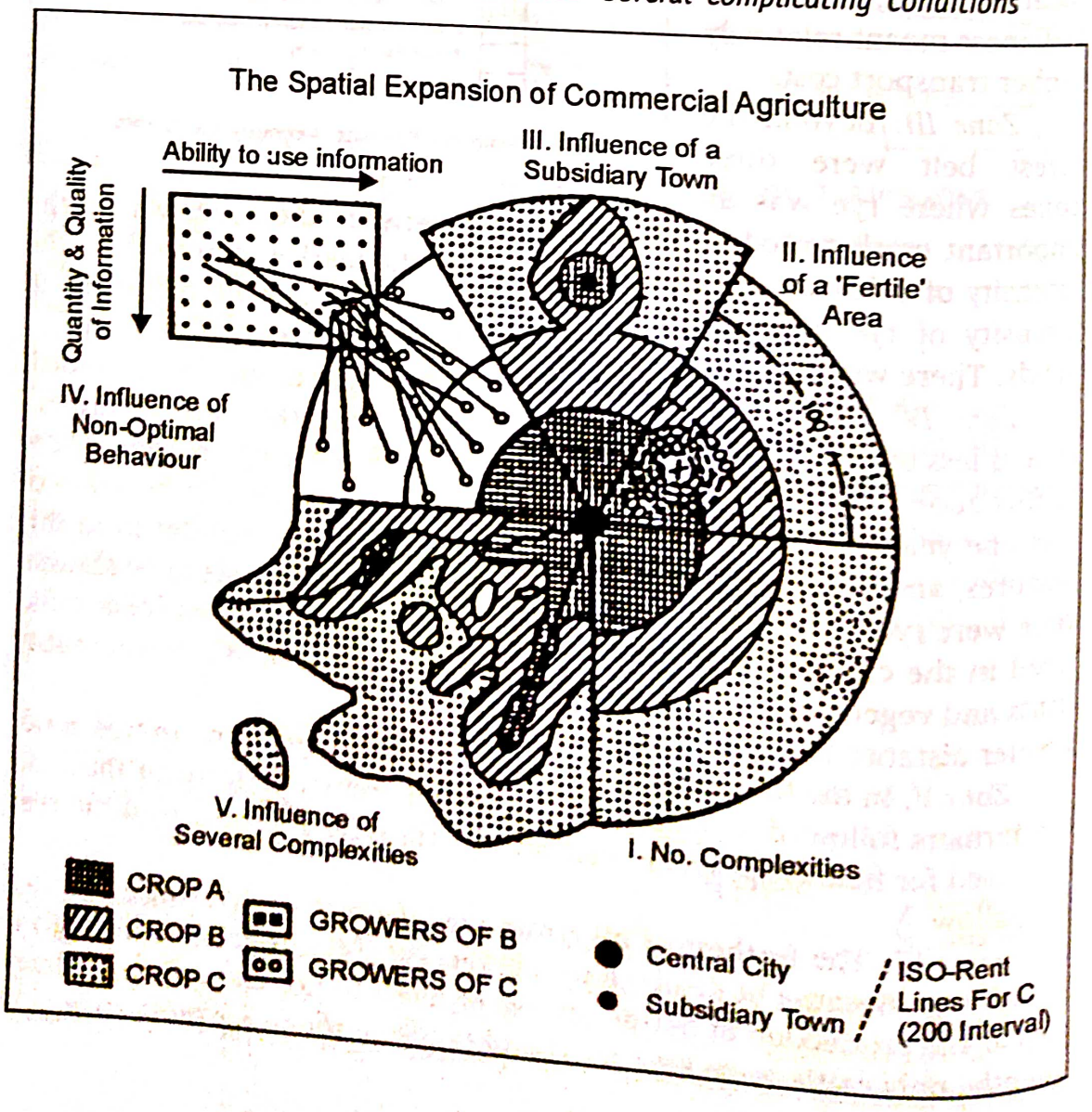
Zone V: In the fifth zone, rye is an important cereal crop. In this zone, the farmers followed a three-field system, whereby one-third of the land was used for field crops (rye), another one-third for pastures, and the rest left fallow.

Zone VI: The farthest of all zones was devoted to livestock farming (ranching). Because of distance to market, rye did not produce so high a rent as the production of butter, cheese or live animals (ranching). Consequently, only cattle were kept for slaughtering in the outer most zone.

Finally, von Thunen incorporated two examples of modifying factors in his classic model (Fig. 3.21). The effect can clearly be seen of a navigable river where transport was more speedy and cost only one-tenth as much as on land, together with the effect of a smaller city acting as a competing market centre. Even, the inclusion of only two modifications produces as a much more complex land use pattern. When all the simplifying assumptions are relaxed, as in reality, a complex land use pattern would be expected.

A more complicated picture under commercial agriculture has been presented in Figure 3.22. In the modified model of von Thunen, the influence of fertility, subsidiary town, information, etc., has been incorporated. The isorent lines at an interval of 200 have also been plotted. It will be further seen from Figure 3.22 that the concentric zones of von Thunen get modified under the impact of various physical, socio-economic and cultural factors. The influence of availability of information also substantially modifies the concentric zones of agricultural land use.

Figure 3.22 *The von Thunen Zones: Under Several Complicating Conditions*



producing Corn Belt as well as supporting an indigenous sheep-raising industry. The 'supercity' anchoring this macro-Thunian system was the north-eastern Megalopolis, well on its way towards coalesce and already the dominant food market and transport focus of the entire country (Fig. 3.24).

Although the circular rings of the model are not apparent in Figure 3.24, many spatial regularities can be observed (remember that von Thunen, too, applied his model to reality and thereby distorted the theoretically ideal pattern). Most significant is the sequence of farming regions as distance from the national market increased, especially westward from Megalopolis towards central California, which was the main directional thrust of the historic inland penetration of the United States. The Atlantic Fruit and Vegetable Belt, Dairy Belt, Corn Belt, Wheat Belts, and Grazing Regions are indeed consistent with the model's logical structure, each zone successively farther inland astride the main trans-continental route-way.

Relevance of the Thunen Model to Indian Conditions

In many of the underdeveloped and developing countries of the world, in the villages, cropping belts are found. For example, in the villages of the Great Plains of India, concentric patterns of land use can be observed around the rural settlements. The highly fertile and heavily manured lands around the village settlements are devoted to the perishable commodities like vegetables, potatoes and orchards, while the land lying in the middle belt is given to cereal crops like rice, wheat, barley, maize, pulses and sugarcane. The land lying in the fringe zone is generally devoted to inferior cereals like bajra, guar and millets.

Prof. M. Shafi tested the model in the Koil tehsil of the Aligarh district (U.P.). In his opinion, the land use intensity decreases away from the intensively tubewell irrigated areas. Prof. Jhujar Singh and Prof. Dhayan Kaur also tested the von Thunen model in the different parts of Punjab and they concluded that the model cannot be applied in its original form as the extension of irrigation facilities and dense network of means of transportation and communications have affected the cropping patterns and land use intensity significantly.

After the introduction of tubewell irrigation in the Great Plains of India, this concentric pattern of crop land use has, however, been largely modified as the farmers with better economic status are able to produce perishable crops even in the distant fields from the market and settlement. The consolidation of holdings in India has also modified the crop intensity rings as each of the farmers is interested in growing the commodities for his family consumption as well as some marketable crops for earning cash to clear his arrears of land revenue and irrigation charges. Despite these changes and modifications, the land use intensity decreases with the

increase in distance from the settlements, provided the physical environment and living standard of the farmers are the same. The diffusion of high yielding varieties (HYVs) has made the application of this model almost irrelevant both at the micro and meso levels. The fast development of means of communications and transportation has made it possible to transport perishable commodities at long distances. The model, thus, no longer is operative in India in its original form.

Criticism

The main criticism of the von Thunen's model is that it is based on unrealistic assumptions. Some of the important criticisms are as under:

1. The existence of isolated estate and only one market centre for the disposal of agricultural commodities do not apply in the present time. The modern transport system deviates from the principle of constant tonne-mile (km.) cost. In the modern system of transport, for example, larger the distance, lower is the transportation cost per tonne/kilometre.
2. The demand factor was not incorporated by von Thunen in his model. In fact, the demand of an agricultural commodity has a significant impact on the cropping pattern and crop land use intensity.
3. At present, no estate (agricultural holding) has an isolated entity in the fast changing world in which distances have been reduced appreciably by the swift means of transportation and communications. Consequently, the world markets are shrinking at a faster pace. The farmers have international markets to dispose of their commodities. The transport agencies in many regions of specialized agriculture transport the produce at a cheaper rate to the distant markets, which modifies the locational rent and the crop land use patterns.
4. Man is not a rational or economic person always as assumed by von Thunen. In many of the East European countries, Russia and China, the cooperative and collective farming has been developed in which the decision-making process lies with the political authority.
5. The concentration on spatial factors has led to less recognition of the role of environmental factors as determinants of land use patterns.
6. As with many economic models, von Thunen's simplifies the 'real world' in order to understand it, in ways that some find unacceptable. The process of decision-making by farmers is considerably oversimplified. For example, the element of risk and uncertainty are ignored (Game Theory and Wolpert, 1964).
7. At present, the cargo ships are fitted with refrigeration facilities and milk, butter, cheese, and meat are sent to markets in Britain from New Zealand and Australia, a distance of over 17000 km and now it is not necessary that perishable commodities be produced near the market.

8. The advantages of physical factors should not be ignored. The fertility of the soil, slope of the land, climate, drainage, and other infrastructural facilities will continue to play their part and cannot be taken for granted.
9. The spatial component of von Thunen model is thus no more than an ideal type. Its analytical framework, however, has much wider applicability.

Despite all these limitations, the validity of this model has been evaluated with considerable success at a range of spatial scales from the global (Peet, 1969) to the individual village and farm holding (Blaike, 1971; Chisholm, 1979). The model also stimulated the modelling of zonal patterns of intra-urban land use in the same way (Alonso Model).

While criticizing the model, it should be kept in mind that it was developed in 1826 when the means of transportation and communication were not so well developed and isolated estates were found in greater parts of the world.

However, the work of von Thunen is useful in two ways. First, it focuses attention on economic factors, particularly transport costs, and distance to market, contrary to the work of earlier geographers, who were subordinated by the factors of physical environment when attempting to land use patterns. Secondly, it attempted the concept of locational rent theory. This concept has great significance in both the rural and urban land use studies. Moreover, the assumptions of von Thunen led to more researches in the field of locational rent theories, crop intensity and cropping patterns. It, therefore, can be concluded that von Thunen's work with all its limitations, still provides a useful framework for organizing agricultural activities at the micro, meso and macro levels.

Weber's Theory of Industrial Location

Alfred Weber, a German regional economist propounded the theory of industrial location in 1909. The theory of industrial location, also known as the 'Least Cost Location Theory', was published in his classic work entitled as *Uber den Standort der Industrien*, and issued in its English translation 20 years later in 1929. It has probably had more influence on industrial location theory than any other single contribution. This model is a device for analyzing the location of industry, originated by Weber and elaborated as the *Locational Triangle.* The Weber's model provided the foundation for variable cost analysis, which dominated the study of industrial location for many decades.

Objectives

The main objectives of Weber's theory were as under:

1. To ascertain the minimum cost location of an industry.

2. To establish that transport cost plays a vital role in the selection of industrial location.
3. To prove that irrespective of socio-economic and political conditions, the location of industries depends on transport cost. Transportation cost in the location of industries is universal.

Assumptions

Weber's theory of industrial location is applicable only when certain optimal conditions are available:

(i) The area/region under consideration has a self-supporting economy.
(ii) There is an isotropic surface. In other words, there is uniformity in landform, weather, climate, distribution of population, labour, and human resource.
(iii) There is perfect competition in the market.
(iv) The labour is static and the wages are uniform in the region.
(v) There is uniformity and stability in the socio-economic and political environment in the region.
(vi) The industrialists and the labourers are rational and economic persons who try to optimize their profits and wages respectively.
(vii) Transportation cost increases uniformally and proportionately according to weight in all directions.
(viii) There is a uniform demand for a product at all stations, resulting in a uniform price, and therefore the plant (factory) located at the point of least costs would get the highest profits.

Weber, on the basis of quality and purity, divided the raw materials into two categories:

(i) ubiquitous raw materials (found everywhere, e.g., water, air, sunshine, land, soil); and
(ii) fixed raw materials confined to particular places (iron, copper, manganese ores, etc.).

The raw materials have also been classified as (i) pure raw materials, and (ii) impure raw materials. If the weight of a raw material remains the same even after processing and manufacturing, it is called a pure raw material. Contrary to this, if after manufacturing, the raw material is reduced in weight, it is called an impure or weight-losing raw material.

Postulations

The factors that control the location of industries are as under:

(a) Influence of transport (general factor).
(b) Influence of labour cost (general factor).
(c) Influence of industrial agglomeration (local or special factor).

Possible Locations of Industries

1. *Linear location*: when industry is located between the source of one raw material and the market.
2. *Non-linear location*: when industry is located between the market and the source more than one raw material.

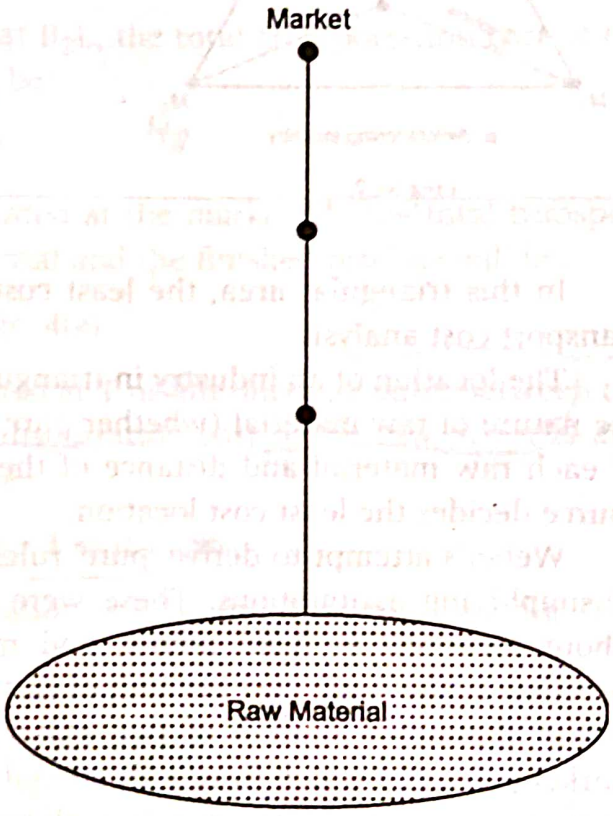
Linear Location of Industry

In the case linear location, the following are the possible locations (Fig. 3.25):

(i) at the market,
(ii) at the source of raw material, and
(iii) at any intermediate location.

The selection of location of industry, in this case, entirely depends on the nature of raw material and the degree of weight-loss during manufacturing. The cotton textile and leather goods industry generally have a linear location.

Figure 3.25 *Linear Location of Industry*



Non-Linear Location

When two raw materials are used, 'the influence area' for the location should be a triangle. The possible locations of the industry would be (Figs. 3.26 & 3.27):

(a) at the market,
(b) at the source of raw material M_1,
(c) at the source of raw material M_2, and
(d) at any intermediate point between the above three.

Figure 3.26 *Non-Linear Location*

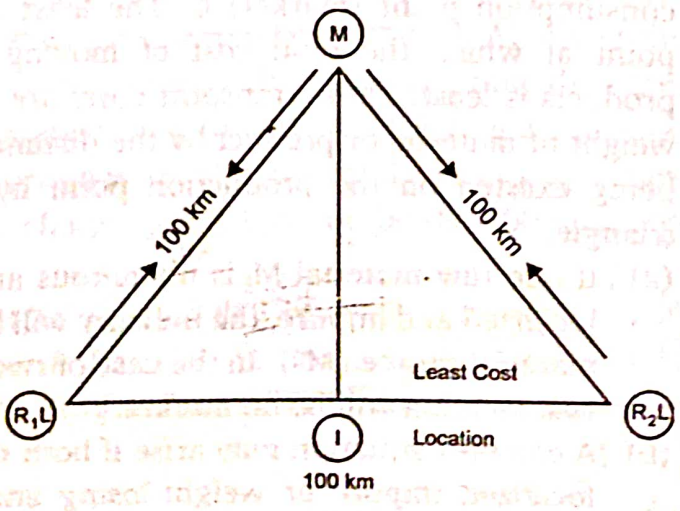
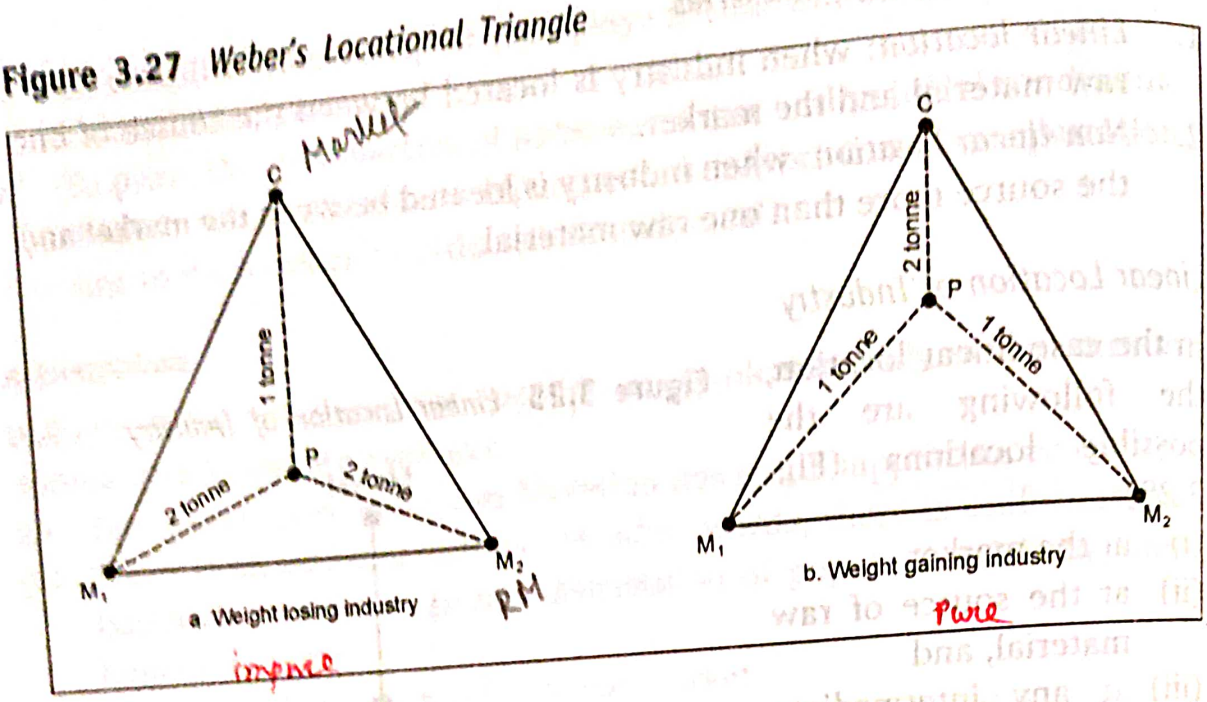


Figure 3.27 *Weber's Locational Triangle*



In this triangular area, the least cost location may emerge through transport cost analysis.

The location of an industry in triangular area is closely influenced by the nature of raw material (whether pure or impure). The material index of each raw material and distance of the market from the raw material source decides the least cost location.

Weber's attempt to derive 'pure' rules of location involved a number of simplifying assumptions. These were materials, markets, and cheap labour locations at fixed points, and movement was possible in any direction at the same cost per unit of distance. From this idealized world Weber abstracted sources of two materials (M_1 and M_2) and a single market point (C) which form a locational triangle. In this triangle area, a least cost location may emerge through transport cost analysis. To find the point of least cost, Weber first sought the least transport cost location, which he considered the most important influence, using a 'locational triangle' (Fig. 3.27).

Reality is simplified to two raw materials, M_1 and M_2, and one consumption point (market) C. The least transport cost point P, is the point at which the total cost of moving raw materials and finished products is least. These transport costs are calculated by multiplying the weight of material or product by the distance carried, resulting in a 'pull' being exerted on the production point by each of the corners of the triangle.

(a) If one raw material M_1 is ubiquitous and the other raw material M_2 localized and impure, the industry will be located at the localized raw material source (M_2). In the case of two pure raw materials, the least cost location will be on market.

(b) A complex situation may arise if both the required raw materials are localized impure or weight-losing and the raw materials and the

market are at an equilateral triangle (suppose 100 km in each direction). Suppose, to produce one tonne of finished product, the raw material required from each source is two tonnes, and the rate of transportation of the raw material is Re. 1 per tonne per kilometre, the cost structure of the four possible places will be as under:

If the industry is to be located at R_1L (Fig. 3.26), the total transportation cost will be:

(2 tonnes × 100 km × Re 1.00) +100=Rs. 300

If the industry be located at R_2L, the total transportation cost of the product to the market will be:

(2 × 100) +100 = Rs. 300

If the industry is to be located at the market M_1, the total transportation cost of the raw material and the finished product will be:

(2 × 100) + (2 × 100) = Rs. 400

If the industry is to be located at 'I' or intermediate point between the two raw materials, the transportation cost of the raw material and the finished product will be:

(2 × 50) = (2 × 50) +86.6 × 1 = Rs. 286

So, 'I' or intermediate location will be the least cost location (Fig. 3.26).

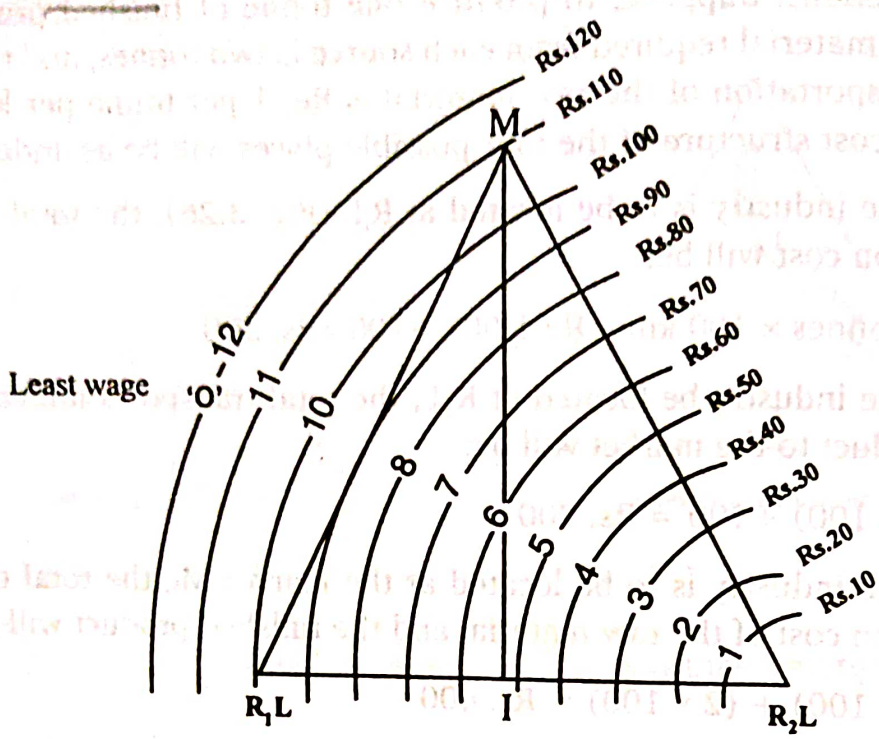
Influence of Labour Cost

Weber next examined the effects of labour costs on location since he considered that industries would be located away from the point of least transport costs to the point of least labour costs if savings in labour costs were greater than any additional transport costs involved in such a move.

The influence of labour cost may be explained with the help of Figure 3.28 showing the 'isotimes' (the lines joining the points of additional equal transport costs of raw material to the cheap labour centre). All along the lines or isotimes the transportation cost is the same per unit distance. Suppose, if the least transportation cost Rs. 400 is at R_2L and the total labour cost per tonne of production is Rs. 500, the total cost of production (transportation cost + labour charges) at R_2L would be Rs. 400+Rs. 500 = Rs. 900.

In case the labour cost at 'O' situated at 12th isotime is only Rs. 250 and the wages of the workers is Rs. 250. In this case the total cost of production will be Rs. 400+Rs. 250 + Rs. 120 (additional transportation cost) = Rs. 770.

Figure 3.28 *Isotimes: The lines joining the points of equal transport costs*



In case of cheap labour, the factory will be located at 'O' as the cost of production per tonne will be cheaper, being only Rs. 770 as against Rs. 900 least transport cost location of raw material (R_2L).

Weber also used the concept of 'isodapane' (cost contours) is his model. An isodapane is a line joining the points of equal additional transportation cost of the two materials and delivering the product to the market (Figs. 3.29 and 3.30).

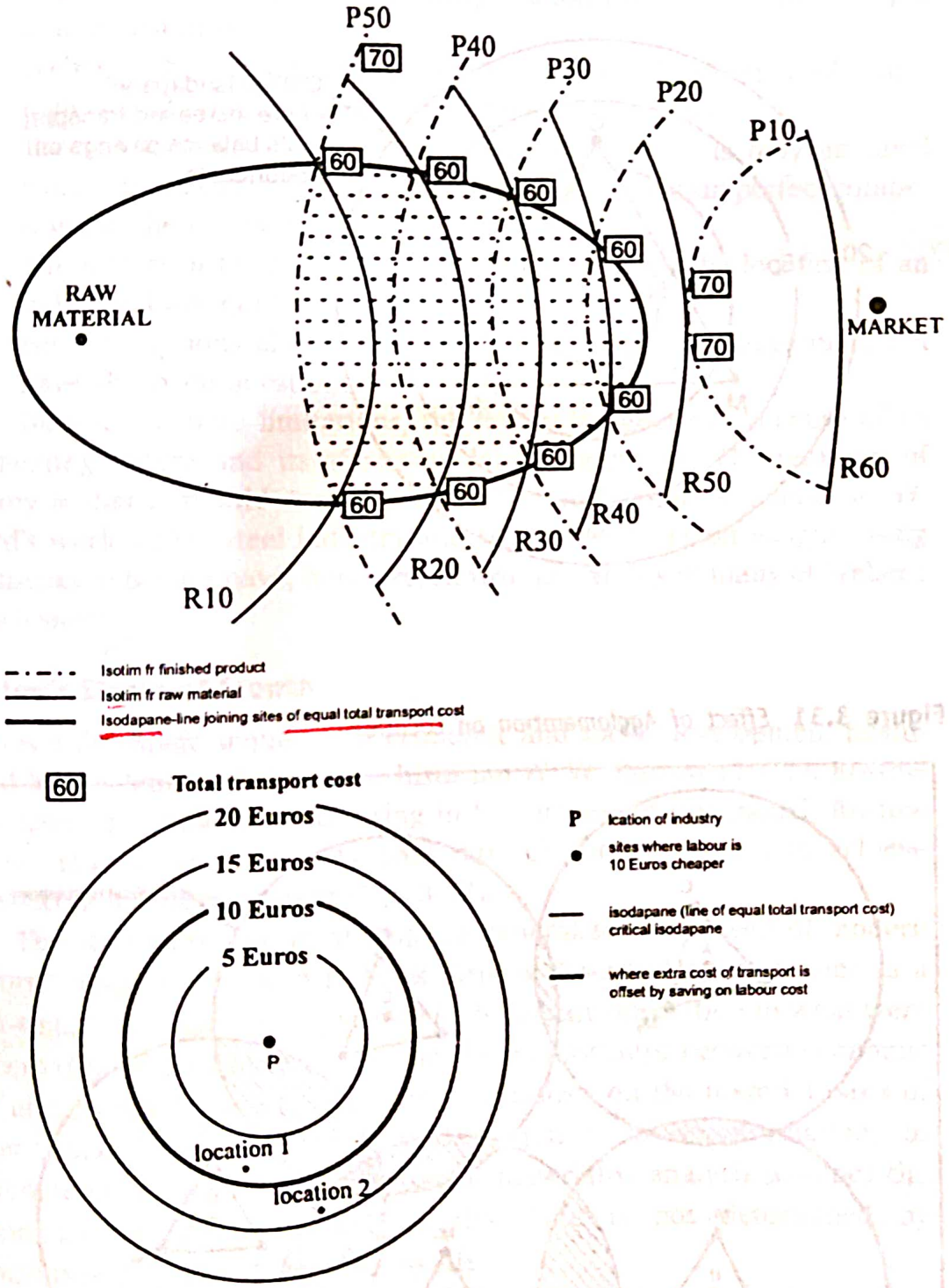
Weber, with the help of isodapane, identifies the areas in which the cost of production and supply of the finished product would be the same. In the given Figure 3.29 the dotted area shows the sites of equal total transport costs.

Having combined the effects of transport and labour costs, Weber thirdly examined the effect of industry's tendency to agglomerate. In Figure 3.31 A, B, C, D and E are least cost locations, but the firms located there could cut their production costs by Re. 1 per unit of production if at least three of them operated in the same location. However, they must not incur increased transport costs of over Re. 1 per unit of production. In Figure 3.31, the critical isodapane of Re. 1 has been drawn round each producer and it is clear that firms C, D and E could reduce their total costs by locating in the shaded area.

Criticism

Weber's attempt to find the least transport cost location and then to examine how this would be modified by other considerations has obvious

Figure 3.29 *Isodapane: The total transportation cost*



limitations, and has been criticized for being too abstract. Some of the criticisms of Weber's model are as under:

(1) He gave more emphasis to supply, while the role of demand in the location of an industry has almost been completely ignored. Weber overemphasized the role of transport in the establishment of an industry.

Figure 3.30 *Critical isodapane: The effect of labour and transport costs on location*

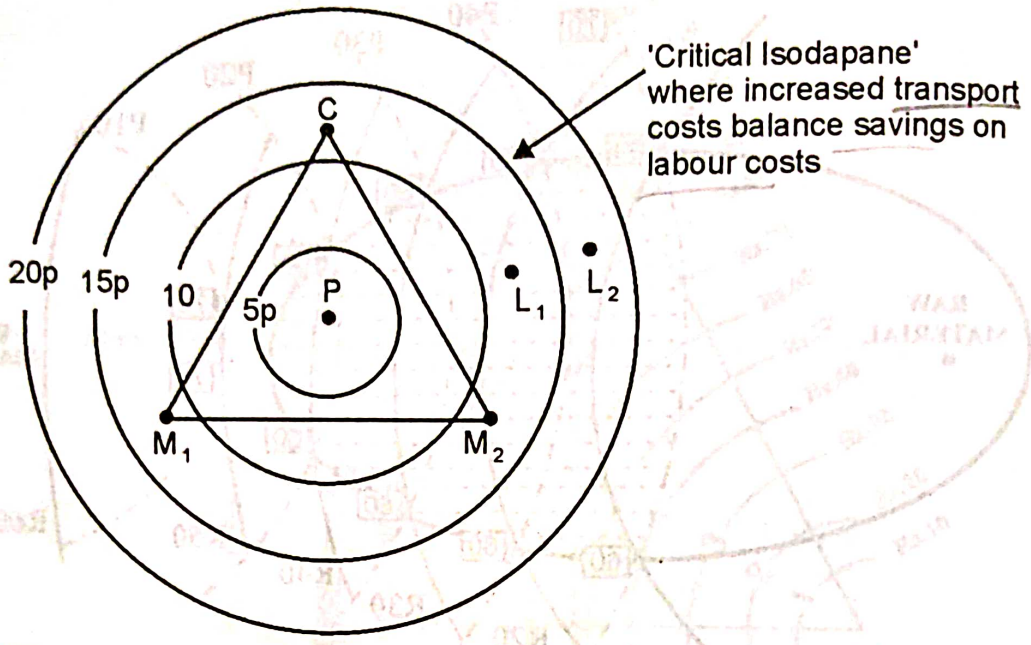
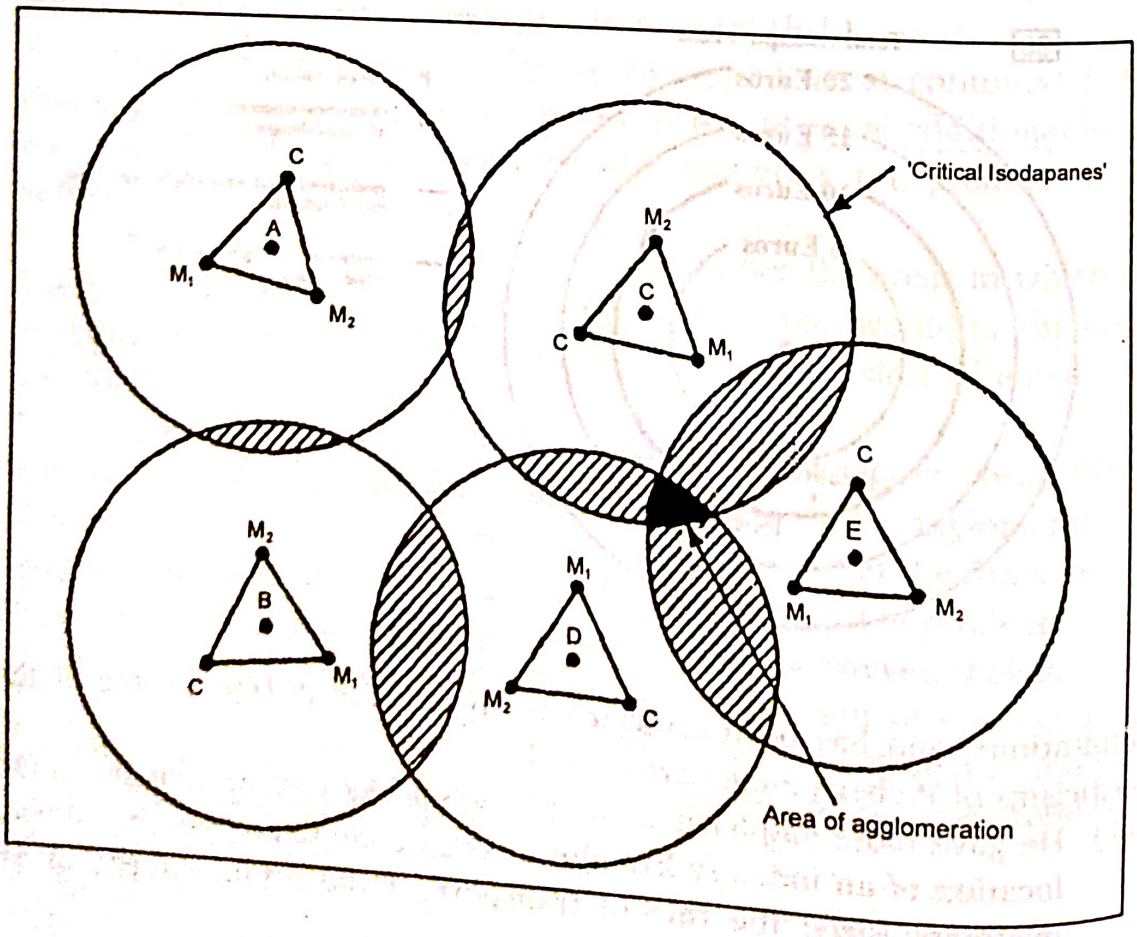


Figure 3.31 *Effect of Agglomeration on Location*



(2) Transportation costs of raw materials are cheaper than that of finished product. Moreover, transportation rate is generally cheaper at long distances.
(3) Weber, in his agglomeration concept, ignored the problem of space, high cost of land and high rent in the industrial areas.
(4) The assumption of perfect competition of Weber is only an ideal condition. In the long run, it is very difficult to sustain perfect competition in the real world.
(5) The historical factors, which are so important in the location of an industry, have not been considered.
(6) His assumptions about transport cost and effects of agglomeration have also been questioned.

Despite all these limitations, the theory is important because of its pioneering nature and its effects on later researchers. The real test of theory is that it should accord with reality, and empirical studies as W. Isard's work on US steel industry and W. Smith's work on weight-losing industries in Britain have, however, shown the validity of many of Weber's conclusions.

Rostow's Stages of Growth

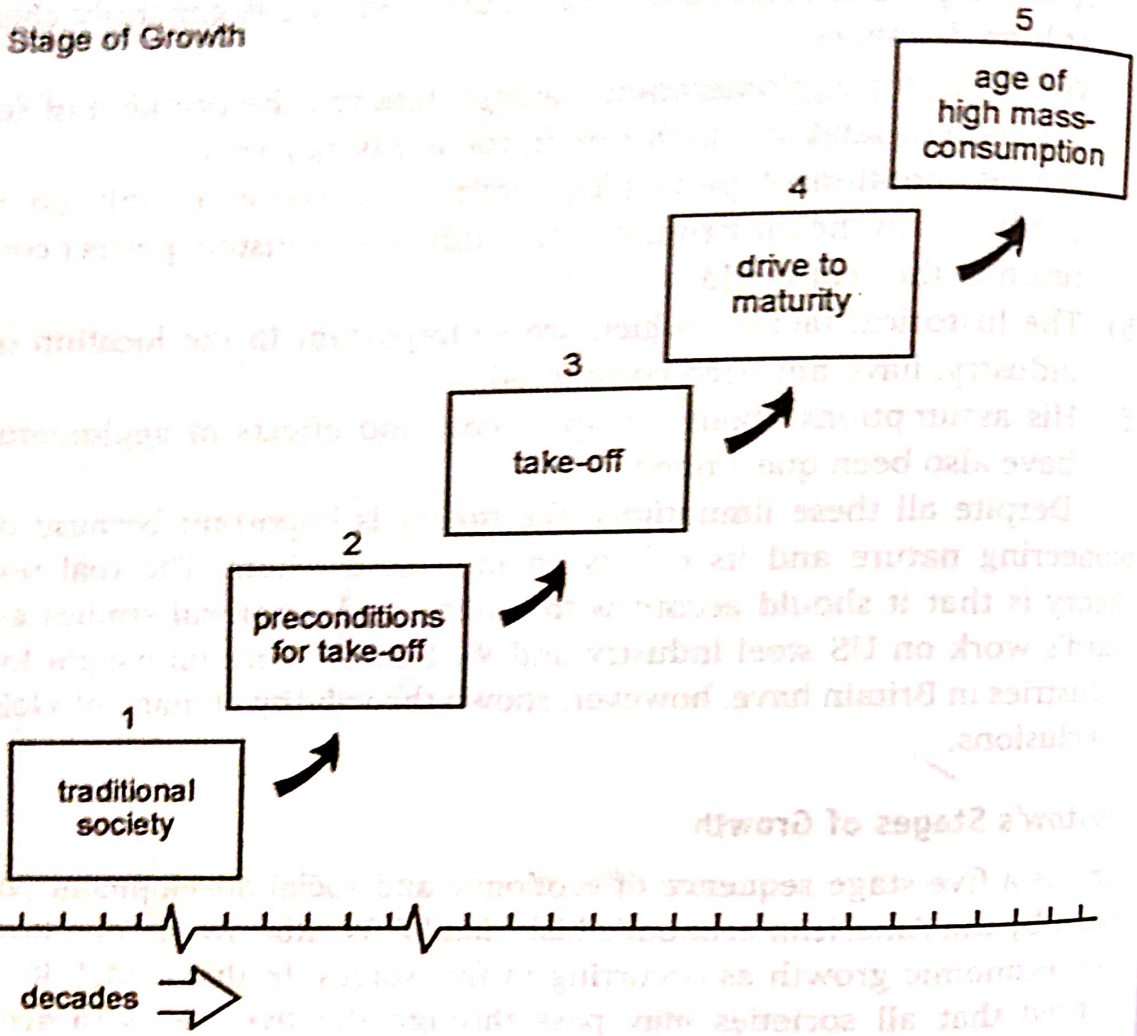
This is a five-stage sequence of economic and social development postulated by the American economic historian W. W. Rostow (1971). Rostow saw economic growth as occurring in five stages. In this model, Rostow argued that all societies may pass through the five stages to achieve socio-economic development (Fig. 3.32).

The stages present an attempt to generalize "the sweep of modern history". Their elaboration in book form is described by its author as a 'non-communist manifesto', written in deliberate opposition to what were perceived to be Karl Marx's views on the relationships between economic and non-economic behaviour. Marx emphasizes on the material basis of society, and looks the historical development of social relations to comprehend societal change. Historical materialist analysis assumes the importance of ideas and argues that "life is not determined by consciousness, but consciousness by life".

As social beings, men and women develop "their material production and their material intercourse", thereby alter "their history and products of their thinking" (Marx and Engles, 1970: 47). In geographical research, historical materialism rose to prominence in the 1970s; it attempts to explain patterns and processes of spatial and environmental change as the result of the specific social relations of capitalism or other modes of production.

The model of economic development, derived from the stages in both the teleological (a theory that events can only be accounted for as stages in

Figure 3.32 *Stages of growth: Rostow's stages theory of economic development*



(After Keeble, 1967: 250)

the movement towards a pre-ordained end: the end may be determined by those involved in the event, as with various forms of planning, or it may be extremely defined, as in many religions) and mechanical in the sense that the end result (stage 5) is known at the outset (stage 1), and mechanical is that, despite the claim that the stages have an inner logic "rooted in a dynamic theory of production", the underlying motor of change is not explained. As a result, the stages become little more than a satisfactory system. The model itself is based on data for 15 countries only, plus outline data for others.

The stages of growth of Rostow for socio-economic development of a primitive society to the modern developed society are as under:

1. Traditional society
2. Precondition for take off
3. Take off
4. Drive to maturity
5. Age of high mass consumption

Stage I: Traditional Society

The first of the five stages—the traditional society—is characterized by 'primitive' technology, hierarchical social structures (the precise nature of which are not specified) and behaviour conditioned more by custom and accepted practice than by what Rostow takes to the 'rational' criteria. Initially, the technology is primitive and social structures are rigid and tradition-bound. Acceptance of new ideas and innovations are minimum. Production per capita is low and change and transformation are rare. The raw materials are exported and the finished goods are imported. People remain busy in the fulfilment of basic needs (food, clothing and shelter) and there is minimum use of the comfortable and luxury goods. This is the traditional society. These characteristics combine to place a ceiling on production possibilities (Fig. 3.32).

Stage II: Preconditions for Take Off

The second stage is a transitional stage, i.e., the 'preconditions for take off'. Here, possibly because of outside stimuli, investments rise, the infrastructure begins to be developed, and there is growth in the agricultural and industrial sectors. It is upon these bases that the next stage 'take off' occurs. Outside stimuli to change (including, for example, colonialism and the expansion of capitalism) are admitted in the transitional second stage (the preconditions for take off). Colonialism is the establishment and maintenance of rule, for an extended period of time, by a sovereign power over a subordinate and alien people that is separate from the ruling power, e.g., the ancient Greek colonies, or British settlers in India. Characteristic features of the colonial situation include political and legal domination over an alien society, relations of economic and political dependence and exploitation between imperial power and colony, and racial and cultural inequality.

The second stage emphasizes a rise in the rate of productive investment, a start on the provision of social and economic infrastructure, the emergence of a new, economically based elite and an effective centralized national state. Again, no specification of social relations is given. However, the opportunities for profitable investment presented by the preconditions for take off are likely to be ignored by capital and they pave the way for the third stage.

Stage III: Take Off into Sustained Growth

The stage of take off is a short period of time during which the economy and society are transformed. Investments and savings rise, and new industries grow in the primary and manufacturing sectors. This is described by Rostow as "the great watershed in the life of modern societies". It is a period of around 10-30 years, during which growth dominates society, the

economy and the political agenda (although the social relations which facilitate this dominance are not described) and investment rises, especially in the leading sectors of manufacturing industry. This leads to urbanization and industrialization. The literacy rate, longevity and per capita income also rise.

Stage IV: Drive to Maturity

The self-sustaining growth results in the 'drive to maturity' (stage IV). This stage is characterized by diversification as most sectors grow, imports fall and productive investment ranges between 10 and 20 per cent of national income. Industrial development in this stage diversifies, imports fall, and investment is still high. The increasing importance of consumer goods and services and the establishment of the welfare state indicate that the final stage of the 'age of high mass consumption' has reached.

Stage V: Age of High Mass Consumption

This is the stage in which every citizen of the country has access to all the available goods of comforts and luxury. The sources of recreation are enormous, the leisure time is, however, reduced as people have to work extra time to obtain the latest goods and services for consumption. The literacy rate is almost 100 per cent, the longevity is high and the per capita income is also high. In the religious terms, this is the stage of paradise in which one gets everything that he desires.

The Rostow's model assumes that capitalism is the underlying structure of the society. It does not seek to explain the sequence of changes. In addition, the terminology is somewhat vague.

The insistence within the model upon placing growth in a wider historical and social context and upon a disaggregated approach, which reflects the uneven nature of development, marks a substantial advance upon abstracted and formal theories of economic growth. But, at the same time, these characteristics expose its socially universal and ahistoric features.

The stages of growth are unrealistic, as they could apply to anywhere at any time—to China as well as Brazil, to the former USSR as well as to the USA. However, the strategic implications are clear: following Rostow's logic, capitalism is a necessary consequence of development. All societies that are not currently capitalist in form will become so: "there is no alternative". Socialist societies are simply in an arrested stage preceding the breakthrough to capitalism. Such underlying implications are not made explicit. By concealing the specific social relations of production of the stages—and most especially of the first and second stages—capitalist societies may be reduced and extended by apparently universal processes of growth. This is the true meaning of Rostow's concept of stages of

growth. If it were to read 'a capitalist manifesto', its ideological objective would be revealed and their achievement limited or subverted.