GEOGRAPHY

By

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Human Geography

Part 10

LOCATIONAL ANALYSIS IN HUMAN GEOGRAPHY

The quantitative tradition established in human geography with the objective of generalising man-environment interrelation on absolute profit maximisation approach involves locational analysis as important dimension. This dimension is mainly contributed by :-

<1> Von Thunen : Agriculture Location Model (1826)

<2> Alfred Weber : Industrial Location Model (1909)

VON THUNEN'S MODEL

In 1826, german economist and practicising farmer Von Thunen propounded the first analysis of agriculture land use on quantitative lines. His work was published in the text entitled "Isolated State" where he presumed existence of a geographical location which has isolated economic characteristics, that is, no commercial input or output with self-sufficing existence.

He developed his model assuming :-

(i) Isolated state have isotropic plane with similar soil fertility throughout.

(ii) Farmers, rational economic creature – oriented towards profit-maximisation and capable of converting quality and quantity of yield as per the changing market demand.

(iii) Transportation cost increases with increase in the distance travelled and weight of the commodity displaced.

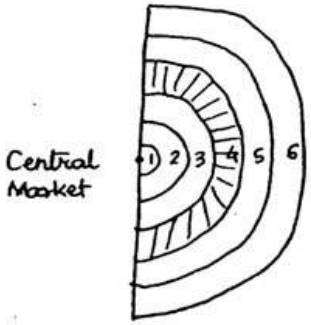
(iv) Water means of transport is the cheapest means of transport.

(v) Land value decreases with increase in distance from the centre of the isolated state.

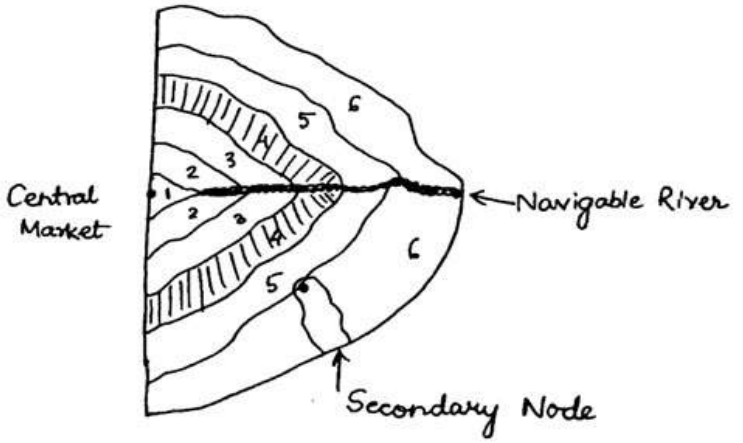
On the application of these assumptions, Von Thunen developed his model involving 2 inter-related parts : Land-Use Pattern and Economic Rent.

In land use pattern, originally he developed concentric land use zones developed around the central market area wherein applying the determining role of land value, he segregated INTENSIVE CULTURE in the inner margins of the isolated state & EXTENSIVE CULTURE towards the periphery. The demarcated land use in intensive category includes market gardening zones, wood production and intensive crop

culture where wood production (zone 2) additionally depicts role of transportation cost, as heavier commodity are sensitive to displacement. He adjusted dairy farming (zone 4) as transitional between intensive and extensive land use, emphasizing that dairy farming requires comparative larger land but produces perishable items, epresenting its development in transitional distance. In the extensive land use category, he incorporated 3-field system and extensive grazing land. Giving recognition to water means of transport as the cheapest means of transport, he attempted the introduction of navigable channel in his isolated state and thereby introduced change in the shape of land use pattern as parallel running belts along the navigable channel, however maintained the land use gradation.



Concentric Land Use

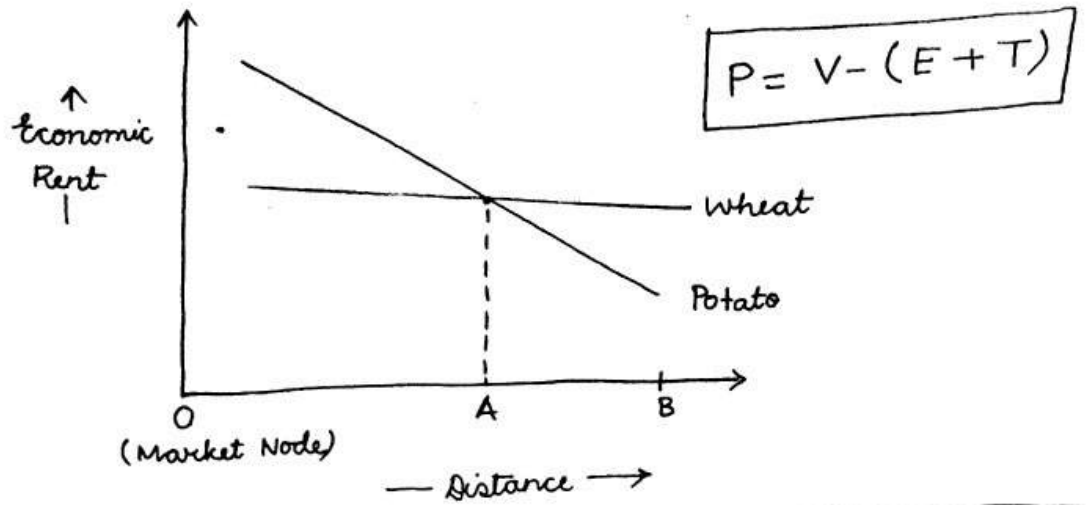


Modified Land Use

1 - Market Gardening Zone 2 - Wood Production Zone 3 - Intensive Crop Culture	4 - Dairy Farming Zone 5 - 3-field system (Crop, Wood, Dairy) 6 - Extensive Grazing Zone

In the modified land-use involving navigable channel, Von Thunen also projected possibility of development of secondary node. Applying the land use pattern, he attempted the analysis of ECONOMIC RENT. He defined economic rent to be the 'profit' farmers make in cultivating a particular type of crop. He identified economic rent to be the function of value of the product in the market (V), labour cost (E) and transportation cost (T). Among these, he presumed V, the value of the product & E, the labour cost, to remain constant in entire isolated state. He provided the priority to T, the transportation cost in determining the economic rent. Taking this into account, he emphasized that in nearer proximity to market node, rational economic creature will have many choices but will follow most profitable option whereas with increasing distance from the central node decreasing profitable option will generate compulsion for farmers to follow.

To generate economic rent, he justified that thro'out the isolated state economic rent-making possibility is regulated by TRANSPORTATION COST.



APPLICATIONS OF LOCATIONAL MODEL OF AGRICULTURE:

The generalised locational model presented by Von Thunen marks its importance not just in beginning of land-use analysis and quantitative tradition but in the fact that every aspect of the model marks its applicability in global perspective including :=

(1) Every market node have market gardening zone involving commercial production to cater the demand of the market.

(2) Land value do marks decrease with increasing distance from central node regulating globally

applicable transition of intensive land use towards inner part of the settlement and extensive in the periphery.

(3) Transportation cost regulated by distance travelled and weight of the commodity displaced, called variable cost, is applicable worldwide.

(4) The analysis of heavier commodity sensitive to displacement and thus, its production in proximity to the market along with water means of transport as cheapest means of transport adds to the validity of the concept.

M22 : Peaks of India 27.04.2014

Parasnath
Deogarh
Kanchenjunga
Tiger Hill
Kelingon
Saramati
Blue Mts.
Nokrek Peak (MAB Site)
Kylas (Gap b/w Garo & Khansi)
Cherrapunji
Bahmangarh
Amarkantak (Radial Drainage)
Dhupgarh (Highest of Satpura)

Meghasani (iron ore, Dharwar)
Malayagiri
Singaraju
Mahendra Giri
Nimgiri
Dewodi Munda (Highest of E^n Ghats)
Aroya Konda
- Baila Dila (Iron Ore Dharwar)

Lecture # 67

Date 28.04.2014

ALFRED WEBER: INDUSTRIAL LOCATION MODEL

German economist Alfred Weber following the locational analysis presented by Von Thunen developed industrial location model in 1909. He developed his concept on the similar treatment of isotropic plane where demand and thus, value of manufactured commodity is presumed to be static. Rational economic creature 'Entrepreneur' oriented towards profit maximisation being always in search of least cost location. Moreover, transportation cost keeps on varying in accordance to travelled distance and displaced weight of the commodity. Developing his model on the application of these assumptions, Weber interpreted

(a) Locational Triangles

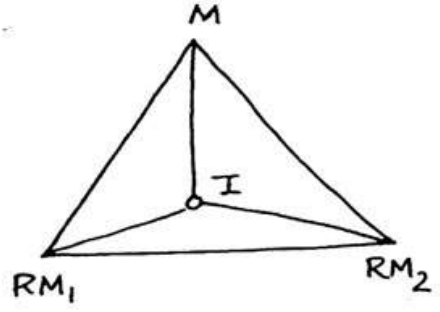
(b) Isodapanes

(c) Agglomerations

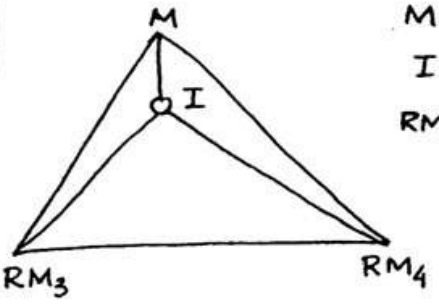
(A) LOCATIONAL △S

In developing the least cost approach of industrial location, Alfred Weber first attempted to integrate role of raw material,

market, and transportation cost with the support of locational triangles. He presumed the base of the triangle to be representing raw material sources and the apex – 'the market'. In this combination, he outlined the distinction between raw material-oriented industries and market-oriented industries. Those industries that utilises heavier raw material and produces lighter manufactured goods, that is, <u>weight-losing</u> type represent least cost location to be near raw-material as most of the <u>metallurgical industries</u>. In comparision, those industries that incorporate lighter inputs and produces heavy ready products i.e. <u>weight-gaining</u> type represent least cost location to be near market as most of the <u>assembl age industries</u>



→ Raw Material Oriented
→ Weight-Losing



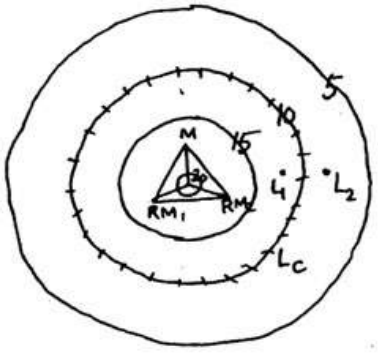
M = Market
I = Industry
RM = Raw Material

→ Market-oriented
→ Weight-gaining

(B) ISODAPANES

In incorporating labour cost as significant determiner of least cost location, Weber developed the concept of isodapanes that are imaginary rings joining the places having same labour cost. He emphasized that with increasing distance from locational triangle, decreasing demand for labour decreases the labour cost facilitating labour cost savings. In accordance, the least cost location can be outside the locational triangle, where labour cost savings is more than additional transportation cost to transport raw materials from the triangle and ready products to the triangle. In this analysis, he also outlined critical isodapane where labour cost savings is in balance to additional transportation cost and thus beyond it, least cost location do not exist.

LCL = Least Cost Location



++++ Critical Isodapane

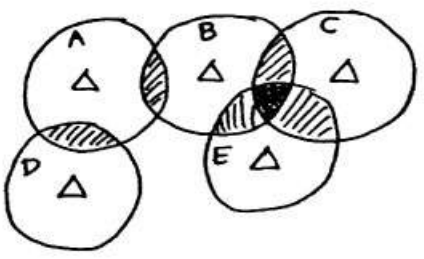
L_1 : LCL where LCS > ATC

L_2 : Not LCL bcoz LCS < ATC

L_c : LCS = ATC

(C) AGGLOMERATIONS

With the recognition of critical isodapane (L_c) around every locational triangle, Weber also identified the spatial possibilities of agglomerations. He defined agglomerations to be spatial overlaps of critical isodapanes providing additional benefits of subsequent industrial growth. He, therefore, emphasized on AGGLOMERATION ECONOMIES i.e. benefits of agglomerations which is best identified in the clustering tendencies of manufacturing industries worldwide. He also distinguished between primary & secondary agglomerations wherein primary involving overlap of three critical isodapanes projecting 3-fold benefits compared to secondary agglomerations with overlap of 2 critical isodapanes.

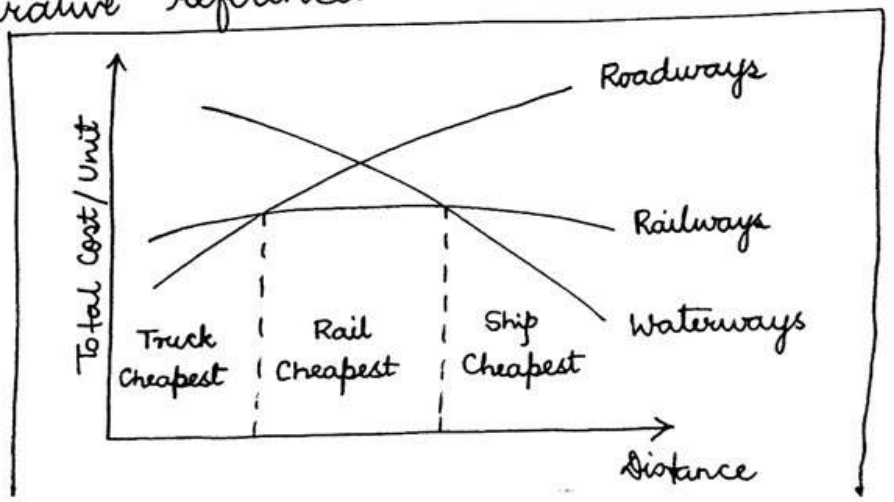


Primary Agglomerations
Secondary Agglomerations

Fig. – Agglomerations

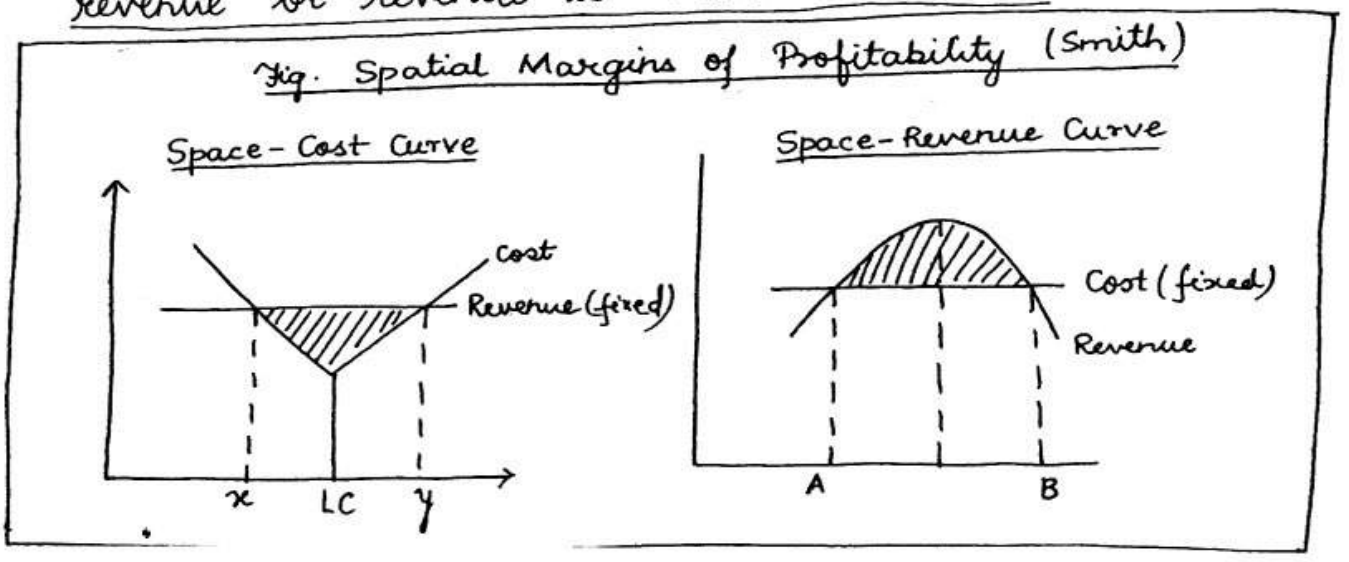
APPRAISAL OF WEBER'S LC MODEL :

The least cost school established by Alfred weber have been most convincing, thus, most followed school in the analysis of industrial locations. Following this school, Hoover attempted the classification of transportation cost not just in accordance to the travelled distance, displaced weight of the commodity but also by the level of processing, called variable cost. He also outlined fixed cost as the determiner of least cost location; Recognising it as terminal cost. Criticizing Weber's near raw-material & near market location, he advocated the requirement of minimising the terminals in the production process. In combining fixed and variable cost, he also provided the analysis of cheapest means of transport in comparative reference.



In the same school, Isard in his concept of substitution, emphasized upon agglomeration dis-economies i.e. negative returns that are yielded in due course of agglomerating tendencies in a given location. He attempted the addition of practical orientation to least cost school. Based on this recognition, he emphasized that substituting the raw material is the only practical way of continuing with profit mobilisation as it facilitates decentralised growth. The least cost school was added with market-oriented variations by Smith in his approach of spatial margins of profitability. Treating both least cost and maximum revenue in his space-cost curve and space-revenue curve, he identified that profitable locations are within that distance where "cost is less than revenue or revenue is more than cost."

Fig. Spatial Margins of Profitability (Smith)



The classical approaches presented by Weber and the practical amendment outlined by Smith largely proves to be insufficient in explaining modern industrialisation, which involves global interdependance, bigger and complicated interlinks, environmental concerns, labour-union related challenges and government policies which are not incorporated in any of the classical approaches.

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BLOCK 2 of ECONOMIC GEOGRAPHY : Manufacturing-Industries

(i) Industrial Regions of the world

(ii) Locational Aspects :

(a) Agro-based : Textile → CT, ST, JT, WT; Leather Works; Sugar; Paper

(b) MSMEs :

(c) Chemical Industries : Fertiliser, Pharma, Cement

(d) Metallurgical Industries : Iron & Steel, Aluminium

(iii) Industrial Regions of India

INDUSTRIAL REGIONS OF THE WORLD

Manufacturing industries primarily incorporate agglomerating tendencies in terms of the benefits of the availability of locational determiners as raw material, market, capital labour transportation links. In the global perspective agglomerations are prominently identified as :

① Anglo-American Cluster
② Wn European Cluster
③ En European Cluster
④ East Asian Cluster

Among these clusters, barring the exception of China, representing East Asian Cluster, all the constituents depicts of the effect of classical phase of industrialisation.

(A) The Anglo-American Cluster with international expanse in both USA & Canada primarily fringes along Great Lake Region. Apart from including the benefit of north-Atlantic trade route and world's most prominent in-land waterways, it includes the benefit of Appalachian resource, European technology transfer and early beginning. Within this cluster, 6 complexes :=

(ii) New England Complex

(iii) Pittsburg - Erie Complex

(iiii) Mid - Atlantic Complex

(iv) Detroit Complex

(v) Michigan Complex

(vi) Lake Peninsula Complex, are included.

The New England Complex confined in NE^{n} USA is centred around Boston. This oldest industrial complex, though originally was known for textile industries, presently involves copper smelting and copper-based industries as the dominating characteristics. In the close proximity, the Pittsburg-Erie Complex centred around Pittsburg- the iron-steel capital of USA involves the resource benefit of Appalachians i.e. richest coal ~~coze~~ seams "anthracite" variety of the world. This heavy metallurgical industrial complex includes Cleveland, as the country's largest wearing apparel manufacturing sector. More towards the Atlantic shoreline is the Mid-Atlantic Cluster which represents world's largest chain of megalopolis with Washington DC, New York, Annapolis,

Philadelphia as the centres representing market oriented assemblage industries clusters. within this complex Baltimore and Dover involves the iron-steel plants and petrochemical industries based on imported assets from Canada and Venezuela. Among the other 2 complexes of USA — Detroit and Michigan, the benefit of Great Lake route and chain of megalopolis justifies automobile complex (Detroit) and mixed-farming largest rail-junction related benefits making Chicago prominently representing food processing, meal packaging, agricultural implements production as nature of developed industries. in Lake Michigan complex. The Only Complex in Canada is Lake Peninsula Complex confined within Huron, Erie and Ontario Lakes. Accounting for more than 90% of Canadian manufacturing capacity, it includes diversified industries in the centres like Montreal, Quebec, Ottawa, Toronto along with Sudbury and London.

B. WESTERN EUROPEAN INDUSTRIAL COMPLEX

It incorporates the island archepelago and the mainland interconnected by English Channel Tunnel. Collectively representing earliest beginning of modern industrial growth, this complex is either exhausted or is at the verge of exhaustion of its industrial raw material base. The region marks the benefit of north Atlantic trade route, Suez Canal Trade route and world's most developed riverine inland waterways. This complex is primarily comprised of :=

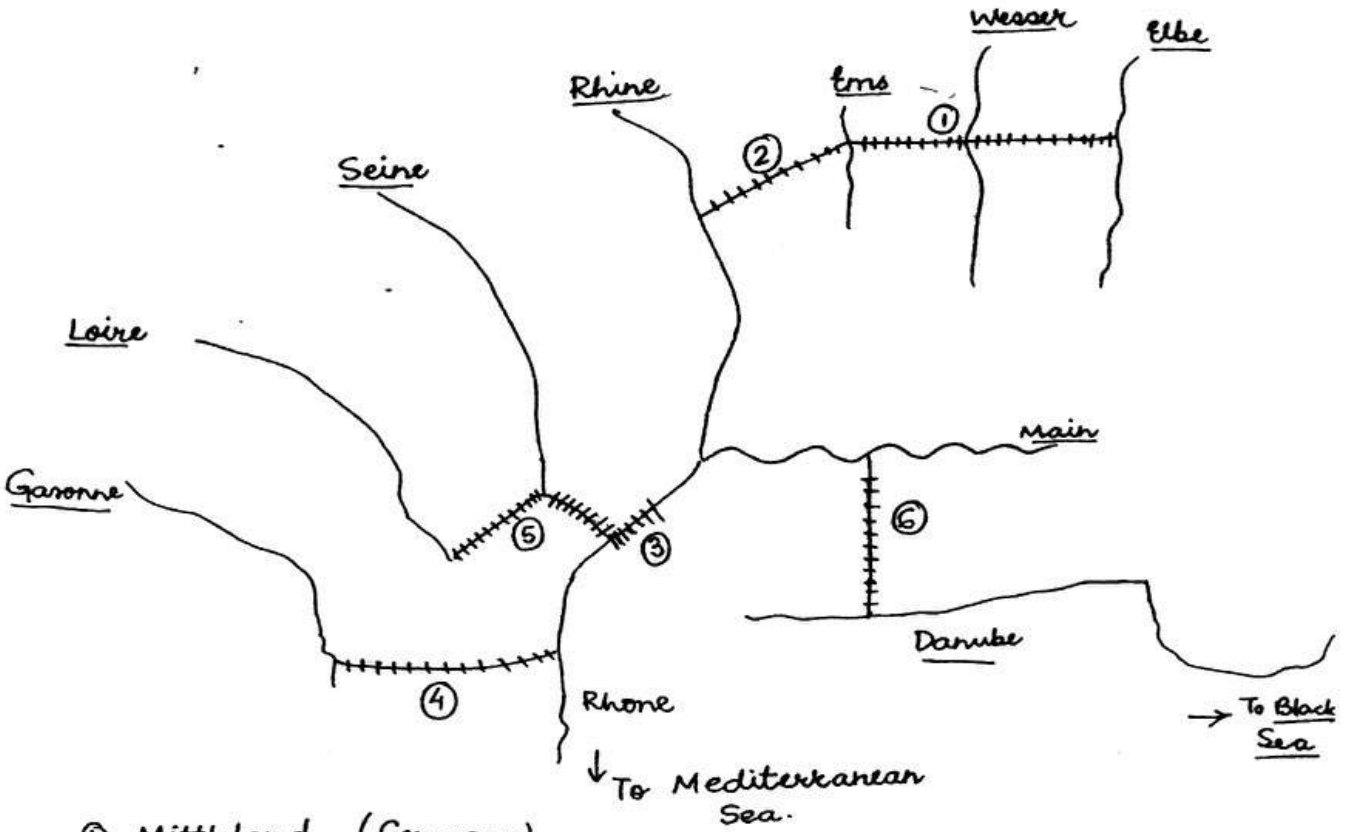
(i) Great Britain cluster

(ii) Ruhr cluster

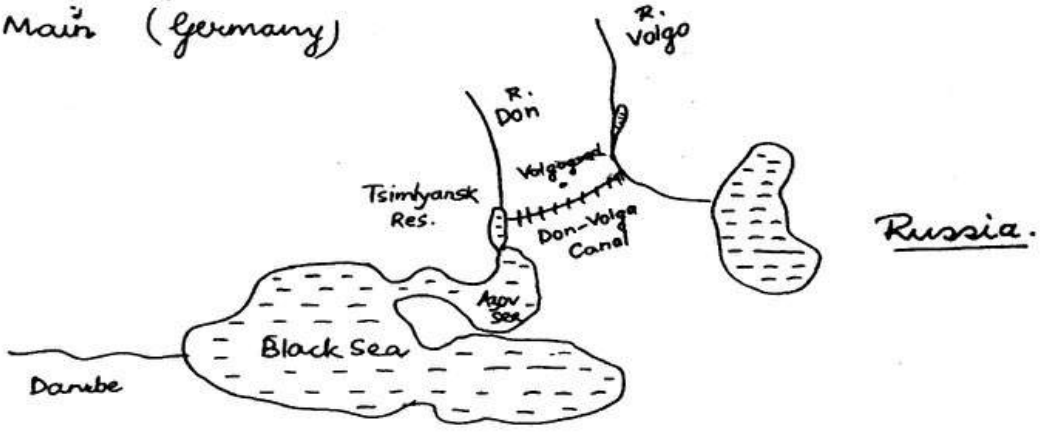
(iii) Lower Saxony cluster

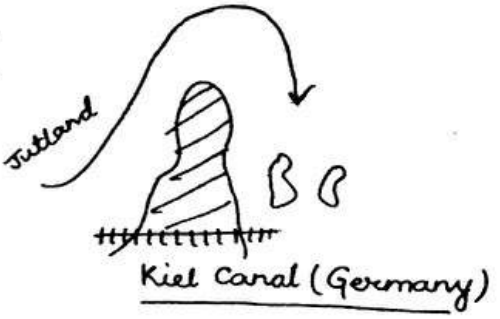
(Duluth)
Superior – Huron : Soo Canal
Huron – Erie : Detroit Canal
Erie – Ontario : Welland (8 Locks)
Ontario – Montreal : St. Lawrence river

↳ Great Lakes Route from Duluth to Montreal.



① Mittleland (Germany)
② Dortmund (Germany)
③ Rhine-Rhone (France & Germany)
④ Du Midi (France)
⑤ Burgundy (France)
⑥ Main (Germany)





M 23 Peaks of India 28/04/2014

Wn Ghat Peaks :

Salher
Kalsubai
Mahabaleshwar
} Peaks of Sahyadris in MH

Kudremukh [(Iron Ore, Dharwar), Baba Budan Hills]

Doda Betta
Anai Mudi
Vembadisha
Kottaimalai
Devarmali
Agastya Malai
} Southern Hills

Highest peak of A&N Islands in North Andaman

Date
29.04.2014

Lecture 68 Geography

Western European Industrial Complex (Contd.)

(i) The Great Britain Cluster :

This complex incorporate diversified industrial development i.e. mainly confined in England. Apart from benefitting from North Atlantic Trade route rich metallic mineral resource base adds to the development of industry. London the tidal port forms the most diversified industrial city. Birmingham & Manchester represent the classical development of iron-steel and textile industry. Among the other major industrial city belonging to this complex: Sheffield ; Liverpool and Leeds represent dominating textile industry linked to the mainland by English Channel Tunnel across Dover Strait.

(ii) The Lower Saxony Cluster :

The England complex paves way to lower Saxony Complex in the coastal belt of Germany & Netherlands. This complex includes diversified

port-oriented industry in Hamburg, Bremen in Germany, and Amsterdam, Rotterdam in Netherland. Agrarian hinterland makes Berlin (Germany) prominent centre of food processing industry whereas Leipzig and Dresden form the prominent node of optical industries making in the world. It is the benefit of Kiel Canal that is justified to be the cause of expansion of lower saxony complex upto Copenhagen (Denmark) involving dairy processing as an added diversity.

(iii) <u>The Ruhr Cluster</u> :=

This cluster representing Rhine - Ruhr Valley forms the metallurgical hub of Western Europe involving the benefit of rich anthracite coal deposit & metallic mineral resource. Important industrial cities representing this complex includes Nancy and Strasbourg in France ; Essen, Cologne and Dortmund in Germany.

C. EASTERN EUROPEAN CLUSTER :=

European continent involves 3rd major industrial cluster of the world as well, which primarily represent legacy of former USSR, referred as Eastern European Cluster. It also includes benefits of both North Atlantic Trade Route with Suez Canal route combined with rich mineral resource and agrarian hinterland. This industrial cluster is comprised of :

(i) Moscow – St. Petersburg Complex
(ii) Volga Complex
(iii) Ural Complex.

(i) MOSCOW – ST. PETERSBURG COMPLEX: This industrial complex predominantly involves the benefit of port city St. Petersburg and Moscow. In addition, they involve the excellent resource link with Trans-Siberian Rail Route. Rich mineral resource hinterland relating to central Russian upland combined with rich agriculture belt

involving production of fibre crops - has regulated the characteristics of the complex, which is known for world's largest turbine making centre - St. Petersburg ; heavy metallurgical node - Nizhny Novgorod & Kursk ; world's largest linen-textile centre - Tver, as important cities.

(ii) VOLGA COMPLEX :

The navigable lengthiest river of Russia R. Volga marks the continuation of industrial complex till the Caspian Sea, called Volga Complex. Volgograd forms the nodal industrial city with food processing and oil processing (Caspian Oil) as important industry. Among the other major industry identified with the complex includes market-oriented assemblage industry with Saratov, Kazan, Samara as important industrial cities.

(iii) THE URAL COMPLEX :

The Ural Complex marks its distinction as it extends also in asiatic Russia. Moreover,

it is largely devoid of heavy demographic load as it correlates to other two industrial complexes. Rich metallic mineral resource and crude oil reserve marks ural complex primarily known for heavy metallurgical industry with MAGNITOGORSK having world's largest iron-steel plant with other major city ORSK, CHELYABINSK, YEKATERINBURG. This involves big chemical petroleum hubs as PERM, UFA adding to the diversity of developed industry.

D. EAST ASIAN CLUSTER :

This industrial cluster reveals the combination of both classical phase of industrial development identified in Japan & Modern Phase of industrial development identified in China. Collectively, both the countries are benefitting from Trans-Pacific Oceanic trade route with excellent complimentary interactive relation with Anglo-America.

(a) Japanese Classical Industrial Complex :
Japanese industrial complex depicts unique development in the fast cascading sequence inspite of complete absence of industrial raw material in the country. Maximum industrial capacity of the country is confined in the largest island HONSHU ISLANDS which involves Kwanto Complex, Nobi Complex & Kinki Complex.

(i) The Kwanto Complex is centred around Tokyo and is thus known for diversified market oriented processing assemblage and high precision industry. The complex also includes Yokohoma and Kawashaki as specialised ship-building and petrochemical ~~corx~~ centre respectively. Additionally, CHIBA forms the iron-steel industrial sector based on scrap iron imported from USA.

(ii) The Nobi Complex centred around Nagoya is designated to be transport equipment, automobile, locomotive and air-craft making industrial complex.

In accordance Nagoya is designated to be the Detroit of Japan. The other important industrial city includes GIFU.

(iii) The Kinki Complex involves country's conurbation of Osaka, Kobe, and Kyoto. Diversified industrial complex has Osaka – the Manchester of Japan having specific characteristic. *outside Honshu island heavy metallurgical industrial complex relates to KYUSHU islands involving Kita Kyushu and Nagasaki. This industrial complex with dominating iron-steel industries is based on imports of raw material from neighbouring Asian countries.

(b). The Chinese Industrial Cluster :=

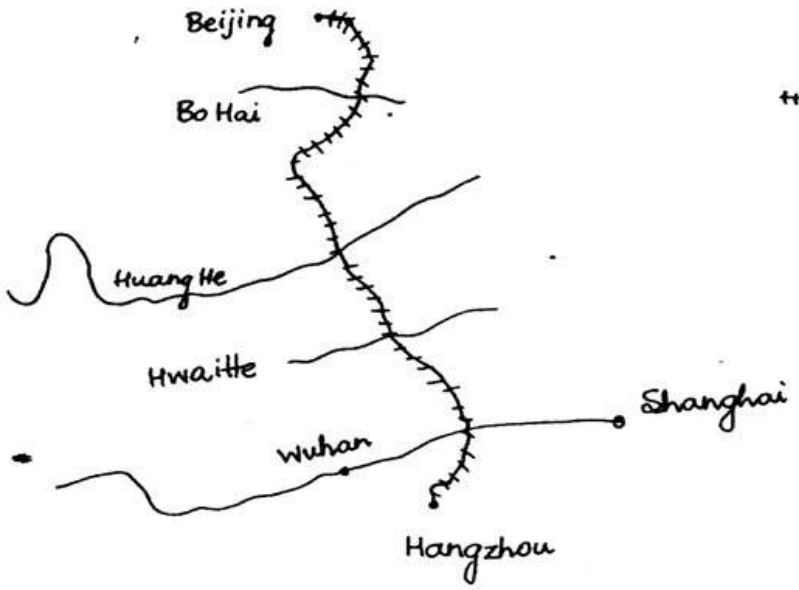
Confined along the eastern belt of the country, it represent the combination of benefit of rich energy and mineral resource combined with mobilised demographic dividend. The Chinese industrial cluster includes Manchurian Complex; Beijing – Tianjin Complex, Gansu Corridor

and Chang - Jiang Complex.

The Manchurian Complex involving the benefit of rich mineral resource hinterland includes SHENYANG - iron-steel capital of China, ANSHAN and FUSHUN as heavy metallurgical and cement producing cities.

The Gansu Corridor that is mid-course of R. Huang Ho involving the benefit of world's richest 'Anthracite Coal' reserves involves metallurgical industry with LANZHOU and LUOYANG as important industrial cities.

The other two complexes, Beijing - Tianjin & Chang - Jiang, incorporate diversified market and port oriented industries with additional benefit of rich agrarian hinterland and world's lengthiest artificial waterway Yunho Canal (Grand Canal of China). Among the important industrial cities Shanghai and Wuhan along Beijing, Chang - Jiang.



INDIAN INDUSTRIES LOCATIONAL CHARACTERISTICS

Manufacturing industries in the country have been a consistent contributor of convincing growth registered in the country since independence, more specifically since globalisation. In geographic perspective, analysis of locational characteristics of the industry involves the categorisation as Agro-based, chemical-based, and metal-based category.

Agro-Based Industries:

These industries not just reveal decentralised characteristics but it also involves broadest industrial base with highest employment making

it mainly contribute to the inclusive development. In terms of output, this category is sub-divided as textile and sugar as major whereas paper, leather works, food-processing as minor industries.

TEXTILE INDUSTRY:

It represents major agro-based industry comprising cotton, silk, jute and woolen textiles, in decreasing order of significance.

The cotton-textile recognised as KING FIBRE marks its formal genesis on the modern lines in 1850s with the establishment of modern mills in Mumbai, Thane & Kalyan. By the beginning of 20th century, minor decentralisation involving Gujrat, TN; and post-independence country-wide decentralisation has been registered for this industry. The determiners of location of cotton mills are primarily raw materials. It is because till the vertical integration of cotton thread making, desired climatic conditions are same as reqd. for cotton production. However, beyond reeling

level, the industry reveal market-oriented characteristics as well. Among the other determiners, consistent cheap supply of labour and water resource are included.

Major producers of cotton textile in the country include MH, GJ, TN. In Maharashtra, centred around COTTONOPOLIS of the country Mumbai, cotton textile have well diffused growth with important centre including Thane, Kalyan, Nashik, Jalgaon, Akola, Amravati, Nagpur, Pune, Satara, Kolhapur, Sangli and Solhapur. The state marked the benefit of early beginning and cotton-producing hinterland.

Compared to it, Gujarat, the 2nd prominent producer with cotton industry centred around Ahmedabad, the Manchester of N. India, benefit from agglomeration diseconomy of Mumbai-Pune clusters. With well-diffused growth important cotton producing centres in the state include Vadodara, Bharuch, Nadiad, Rajkot and Surendranagar.

TN, the 3rd prominent cotton producer, involves

Coimbatore, the Manchester of Sⁿ India as the nodal city with the benefit of cotton producing hinterland. Among the other centres, Tirupur, Madurai, Tirunelveli and Chennai are included.

Bhavnagar → Minor port in GJ → Cotton production.

Other Producers :

Decentralised development of cotton textile have pan-Indian extension involving UP (Kanpur, Allahabad, Varanasi), WB (Kolkata, Haora, Murshidabad), MP (Gwalior, Bhopal, Ujjain, Ratlam) and Karnataka (Mangalore, Belgaum). The cotton textile mills represent Srinagar in North, Thiruvananthpuram in South, Guwahati in East and Jaisalmer in west as its countrywide development. Cotton textile mills in the country representing progressive face of development have enhanced Indian status as 2nd leading producer after China, surpassing USA. Being a mill sector, it is also significant employer with additional benefit of

decentralised countrywide growth. Exclusively for cotton textile, cotton technological mission with 4 specific mini-missions have been mobilised involving production (agri), procurement, processing and marketting. The sector is also benefitting from the flagship program for textile development :=

<i> TUFS = Technological Upgradation Fund Scheme
<ii> SITP = Scheme for Integrated Textile Parks

CHALLENGES/PROSPECTS :=

The present challenges faced by the cotton textile is lower productivity level largely due to less output per labour along with erratic electricity supply. In the secondary domain, cascading increase of unusual weather mechanism resulting in irregularity of yield from agricultural field are also included. The prevailing prospects of the sector involves substantive external marketing links which in the light of prevailing quantitative restriction on Chinese cotton textile is most favourable. Additionally specialised processing techniques including golden

thread work, tie-and-die cotton, Batik & Block printing have segregated market for Indian cotton textile. Even at domestic front, regularised retail with big player, Reliance Apparel, future growth and in the pipeline, Walmart, have enlarged market potential for the sector. However, with globalised economic setup, multiplying the number of competitors that, apart from including traditional competitor China, USA, Turkey, Pakistan, have added Thailand, Taiwan, Vietnam, and Bangladesh – that have registered aggresive growth in the past decade.

Challenge

→ Productivity, Electricity, Unfriendly weather, low per capita labour output.

→ Prospects

↳ External: Specific cotton printing Rate in China

↳ Internal: Industries' involvement in apparel.

Date 30/04/2014

Lecture 69

JUTE TEXTILE

The golden fibre, jute textile marked up its modern genesis in mid 19th century with the establishment of Modern Jute Mill in W.B. Jute textile since its genesis till date identifies to be absolute raw-material oriented industry, with more than 90% of the production capacity & output confined along 100 kms of stretch of R. Hooghly in W.B. The prominent centres in this belt includes Kolkata, Haora, Murshidabad, Haldia Barrackpore, Chunchura and Titagarh. Among the other producing states of jute textile A.P. – Guntur and Srikakulam; U.P. – Gorakhpur, Azamgarh; Bihar – Katihar; Odisha – Cuttack; and Assam – Guwahati are included. Jute textile involves the benefit of <u>jute technological mission</u> which at par with <u>cotton technological mission</u> includes – production, procurement, processing and marketing as four mini-missions. In the agricultural front, as