

URBANIZATION

Urbanization is the process whereby an increasing proportion of the population becomes concentrated in towns. There is a continuous shift of the population from rural areas to towns and cities, and the resultant growth of urban areas.

The criteria of classification /identification of urban areas is based on: population size, population density, administrative and legal status, social and economic functions. But the most common determinant of whether an area is a town or not is the population size.

Basic concepts

- **Urban morphology**

This refers to the internal structure and arrangement of the town. The morphology of towns differs from place to place due to differences in site, functions, history of development and the age of the town.

- **Urban fields**

This is the area around a town which it serves and from which it draws customers for its goods and services. The town itself is called the central place and the area around it is the field of influence (urban field). The urban field depends upon the size of the town and kind of services it offers.

- **Urban hierarchy**

This is the ranking of towns according to the services they provide and the size of their fields.

- **Urban sprawl**

This is the outward spread of built-up areas caused by their expansion. Or it is the areal expansion of rapidly growing cities (as a result of urbanization)

Towns are continuously growing and in some areas the suburbs of a number of neighboring towns may be so close together as to form an almost continuous urban development called a conurbation

- **Hinterland**

This is the area which serves and is in turn served by a port. Or It is the area from which supplies are drawn for export and to which imports are distributed. For example the hinterland of Rotterdam covers countries like Netherlands, Germany, Belgium, and Switzerland.

FUNCTIONS OF URBAN AREAS/TOWNS

Towns are multifunctional and the major functions include:

- 1) Commercial function. The major function is business /trade and commerce.
- 2) Manufacturing/industrial function
- 3) Administrative function
- 4) Residential function
- 5) Cultural function
- 6) Entertainment function
- 7) Defensive function
- 8) Recreation function/resorts

CONSEQUENCES /EFFECTS OF URBANIZATION

Positive effects

1. The increased population **widens the market potential for goods and services** produced. It also provides market for agricultural output –hence linking rural and urban areas.
2. The increased population **increases the labour potential** due to a large number of people who can be employed in various sectors like trade, banking and industry.
3. Results into cultural integration and unity .There is also transmission and diffusion of ideas/information, which in the long run leads to balanced regional development.
4. People **acquire skills which can be used for rural transformation**. Labour is trained in urban areas, which may in turn, establish small scale industries/projects in the rural areas.
5. **Creation of employment opportunities** in the urban areas than the countryside. The job opportunities in the industrial, business and service sectors lead to increased standards of living for the urban dwellers such as in Lagos, Tokyo, and London.
6. Leads to **industrial development** due to increased investment.
7. Expands the tax base for collection of government revenue. Many urban activities are taxed by the government in order to develop various sectors like transport, tourism.
8. Stimulates production due to competition. This leads to increased investment and innovativeness, and hence increase in national income.
9. Results improvement in social services such as education, health services etc. urbanization awakens the government to provide social services to support the large numbers of people.
10. Results into technological transfer and development since urban areas attract many economic activities such as trade, and banking.

Negative effects

1. Urbanization **results into unemployment** which in turn leads to high crime rate. In many cases the people who are flocking to the towns in developing countries are unemployed .the increased movements of people to towns does not match with the available job opportunities. Many young men and women seeking employment in cities, unfortunately fail to find the jobs.
2. Leads to **strain on the social economic infrastructure** such as roads, medical facilities, piped water, electricity-due to increasing demand by the increasing population. This strains the government budget especial with the case of urban sprawl (such as in Cairo-Egypt and Lagos-Nigeria).
3. Leads to **the growth of slums due to inadequate housing**. The squatters cleared from one area may settle in another unless housing can be found for them. Therefore the town dwellers inevitably outnumber the housing facilities provided. Slums are characterized by poor conditions especially poor /inadequate housing such as the blacks who have squatted in and around Johannesburg in South Africa. Slums are also characterized robbers, drug abuse, and easy spread of diseases.
4. **Results into traffic congestion in the urban areas** leading to unnecessary delays. The larger the town and the more important its functions become, the need for vehicle s increases for the town dwellers and outsiders. Increased trade leads to increased demand for commercial vehicles, which

add to the traffic .the greatest traffic congestion occurs in the central business districts (CBDs) of towns are concentrated.

5. **Results into high crime rate** since due to unemployment and overcrowding especially in the outskirts of the busy urban areas. There is increase in robbery, prostitution, and gambling.
6. **Pollution of the environment leading to environmental deterioration.** There is increased air pollution from car fumes, smoke from factories and houses, water pollution from factories and rubbish. There is also noise pollution from factories and traffic. Japan has one of the worst pollution problems in the world due to its rapid industrialization. Pollution from towns also affects the surrounding areas.
7. **Expansion of towns results in deforestation** and general vegetation destruction this is due to expanding built-up areas for settlement, industrial sites and other business activities. For example, the expansion of towns in the Rand is affecting the vegetation in the surrounding zones. There is also increased swamp reclamation and high rate of flooding in some areas of the expanding towns.
8. **Encroachment on the adjacent land reduces the land for other activities** and leads to the displacement of people who lose their settlement land and sometimes they are not fairly compensated.
9. **Dereliction/destruction of the landscape** for example due to exploitation of minerals –mining pits left behind. There is also garbage heaps created in some corners of urban areas.
10. **Overexploitation of natural resources** in the surrounding areas such as forest resources ,fisheries resources, mineral resources, due to increased demand in the urbanized areas.
11. **Leads to break down of social norms and values** because most urban inhabitants tend to ignore the traditional values and adopt western culture/values. More so urban areas are collections of various cultures from all areas –which influence erodes traditional values of a particular culture.
12. **Threat of terrorism and tension** in the urban areas. The terrorists are mostly interested in areas of large population and thus a potential destruction of life and property.
13. Results into **regional imbalance in development.** The urban areas are more developed in terms of infrastructure than other areas of the country. This in turn increases rural urban migration.

SOLUTIONS TO URBAN PROBLEMS

1. Developing a good transport system to reduce traffic congestion in the urbanities for example constructing subways, flyovers. There is also restricting the movement of certain vehicles into the central business districts.
2. Strengthening patrols and police in the urban centers to control the high crime rate.
3. Recycling, treating and proper disposal of waste material to reduce pollution and contribute to a clean environment.
4. Reclamation of swampy grounds to create more room for urban expansion.
5. Setting up /creating more public facilities to such as medical centers, education centers, recreation centers, to match with the rising population.
6. Politicization to reduce racial discrimination.
7. Construction of skyscrapers to solve the problem land shortage. These buildings usually have all the facilities such as shopping, and cinema.

8. etc

Case studies—ports and towns

- Rotterdam
- Newyork
- Lagos
- Tema
- Mombasa
- Calcutta
- Hongkong

ROTTERDAM

Rotterdam is an international port and it is situated at the mouth of the Rhine River as the river enters the North sea .it derives its name from a stream called **Rotte** and it has existed for over 600years .

Rotterdam is the most important port in the world and its greatest growth began with the construction of a new waterway through the polders. It was after the construction of this giant canal that the port got access to the North Sea usable by large vessels. This made it possible for Rotterdam's expansion such that today it is the world's largest port with the capacity of handling many vessels at a time.

A sketch map showing the location of Rotterdam and Europort

Factors responsible for the growth and development of Rotterdam as an international port and urban center

1. **Presence of a well sheltered natural harbor** at the sheltered estuary of the New Maas. This deep natural harbor makes Rotterdam to handle all types of ocean-going vessels (barges and ships) and has therefore developed a modern port due to handling large cargo.
2. **The low tidal range** which allows easy shipping/anchoring of vessels to the coastline of the North Sea. Therefore, ships easily come and go at any time.
3. **Ice-free conditions throughout the year** due to the effect of the warm north Atlantic drift (ocean current). This allows continued use of the port throughout the year and hence its modernization.
4. **The topography of the area is relatively flat** and this allows easy construction of port facilities and accommodation facilities for the large population.
5. **The Presence of a large and productive hinterland.** Rotterdam is situated at the mouth of river Rhine serving countries like Switzerland, Germany, Belgium, Luxembourg and The Netherlands itself. Rapid industrialization especially in the Ruhr region of Germany leads to increasing cargo handled at Rotterdam port because it was the easiest port to trans-ship cargo to and from the Ruhr. The cargo

to the interior includes iron ore, cotton, tropical rubber, coffee, and oil. The cargo from the interior (seaboard goods) include general merchandise, automobiles, chemicals, machinery.

6. **The strategic location of Rotterdam port-** near the North Sea and on the mouth of river Rhine. The port is also located in the center of Europe. This made Rotterdam to develop into an Entreport to the interior and hence development onto an international port. The location also made Rotterdam to have an extensive hinterland.
7. **Navigability of the Rhine River/ *the Rhine is navigable for a large part from Rotterdam up to Basel.*** For this part, it is not interrupted by waterfalls/rapids in its channel. This increases the volume of goods handled at Rotterdam port.
8. **The construction of a deep water channel called the New water way,** linking port to the North Sea. This giant canal was completed in 1872 and it made the port usable by very large vessels since they could sail through. It enabled Rotterdam to become more of a transit port for bulky goods to the interior. More so major developments have taken place on the banks of the waterway, most important being the construction of Europort (5000 hectares large).
9. **The reconstruction of the port after the devastation of the Second World War.** This enabled new plans to be drawn up for the expansion of the port in 1947, and an industrial complex was set up at Botlek to the south bank of the New waterway.
10. **The development of many industries at Rotterdam** which include oil refineries, shipbuilding, general engineering, brewing, and food processing. This has attracted many people to the port to look for employment and also increased the cargo handled by the port.
11. **High level of technology** which led to improvement in modern port handling facilities .there construction of the new waterway, construction of Europort, dredging and reclamation of land from the sea. There is also increased containerization at the port.
12. **Presence of adequate capital to develop the port and city.** The Dutch government and other countries of Western Europe provided the necessary capital for port rehabilitation and development. This was important in designing Europort, the new water way and the implementation of the expansion programme.
13. **Political stability of the region,** which has enabled the port to expand without any ravages of war. The area has been stable since the Second World War and therefore many modern port handling facilities have been put up.
14. **Improvement in transport systems linking the port to the large hinterland.** For example roads and railways linking to the interior of The Netherlands and the Ruhr complex of Germany. This also increases the volume of cargo handled by Rotterdam port.
15. **Supportive government policy** for example the need to open up the Rhine basin as a whole—by easily accessing markets for the manufactured goods such as chemicals and sources of imported raw materials such as iron ore, topical rubber. This explains why the governments have heavily financed the modernization of the port.
16. **Presence of skilled labour in the area**—to carry out modern construction and development of the port. The large population of the region supplied the required labour.

Problems facing Rotterdam port and city

1. There is congestion of vessels and people. Due to this maintenance of the city is extremely expensive such as water supply, sewage disposal, law and order.
2. Pollution of the environment especially oil/petroleum related industries such as oil refineries, petro-chemical industries, automobile industries.
3. Silting of the new Maas River and the new waterway .this necessitates constant dredging which costly.
4. Some sections of the port experience winter freezing which at times interferes with port activities such inconveniencing shipping schedules.
5. Narrowness and shallowness. There is still work to be done to expand the port and to deepen it in order to accommodate even larger ocean-going vessels.
6. Risks of fire hazards due to presence of oil tanks all over the port.
7. Unemployment problems. This is attributed to high levels of rural urban migrations and settlements due to port attraction facilities.
8. High crime rate due to overcrowding.

Solution to the above problems

1. Reclamation of land from the sea to create more room for expansion.
2. Vertical expansion of the port to minimize the problems of limited space (use of skyscrapers).
3. Containerization to ensure fast handling and dispatch of cargo.
4. Industrialists have advised to build elsewhere away from the concentrated area of Rotterdam.
5. Treating industrial wastes before disposal into water to reduce pollution.
6. Industrial fumes have been exposed high up in the atmosphere by very long chimneys.
7. Regular dredging to reduce the effects of silting.
8. Greenbelts have been created in the city to reduce CO₂ from the atmosphere and in turn produce O₂ which is in short supply.
9. Police has been strengthened to be more alert against crime among citizens, although it is still a challenge.

NEW YORK PORT /CITY

New York is located on the eastern coast of USA to the Atlantic Ocean on the Manhattan Island. It is the principal city of United States of America and the most developed port in North America.

Its growth and expansion started with the arrival of foreign settlers –the Dutch who bought Manhattan Island from the local Indians (Red Indians) in 1624 who had settled in the area earlier. At that time, New York was called New Amsterdam.

Later in 1664 the British conquered the island and re-named it New York from then many Europeans settled in New York port and it over powered all other cities to become the leading commercial centre of North America.

New York port is located/sited on many islands such as Manhattan(the major), Staten island, long island, Bronx island, Brooklyn island , Queens island.

A sketch map showing the location/ site of New York port/ city

Factors for the growth and development of New York port/city

- 1. Presence of a well sheltered natural harbor**, with a deep and broad channel directly leading to the Atlantic Ocean. The harbor is well protected from strong water waves which favoured the construction of the port. This deep natural harbor makes New York to handle all types of ocean-going vessels (barges and ships) and has therefore developed a modern port due to handling large cargo.
- 2. The low tidal range** of less than 2 metres which allows easy shipping or anchoring of vessels to the Atlantic coastline. Therefore ships easily enter and leave the port at any time.
- 3. Ice-free conditions throughout the year** due to the conducive sub-tropical climate. This allows continued use of the port throughout the year and hence its modernization.
- 4. The topography of the area is relatively flat** which allows easy construction of port facilities and accommodation facilities for the large population.
- 5. The Presence of a large and productive hinterland** which covers the New York city, Great lakes region, the agricultural and interior plain of the south, the Appalachian region, Pittsburgh industrial area and New England. Rapid industrialization especially in the Great lakes region and New York City led to increasing cargo handled at New York port. This was because New York is one of the easiest ports to trans-ship cargo to and from the region .The imports/ cargo to the interior are agricultural products such as cotton, tea, coffee, cocoa, sugar mainly from Africa. Minerals are also imported such as oil, copper, gold, diamonds, uranium, and iron ore. The exports/ cargo from the interior include: general merchandise, automobiles, chemicals, machinery, electronics, wheat, and timber products.
- 6. The strategic location of New York port** along the Atlantic Ocean and on the mouth of navigable Hudson River. This made New York accessible to major markets especially in Europe. Therefore the coastal location made the port to handle large volumes of cargo to and from the interior and hence development into an international port.
- 7. The construction of the Hudson –Mohawk canal**, which connected New York to the Greatlakes region through Lake Erie. This gave New York port an advantage to handle large volumes of exports and imports, leading to the rapid development of New York port.
- 8. Presence of many water bodies** such as rivers (Hudson, east), upper and lower bays. These provide a large area for anchoring of ships. The water bodies also favoured the setting up of landing sites upon which the modern port originated.
- 9. Relatively flat landscape of New York** which facilitated the construction of port facilities. This in turn increases the volume of cargo handled at the port.
- 10. Presence of a hard rock** which provided a firm foundation for the construction of port facilities and the construction of tall buildings.

11. **The absence of strong Chinook hurricane winds on the eastern seaboard of north America** also favoured the location of the port on that side of USA. The winds would otherwise make the landing of vessels difficult.
12. **Historical factor—its position as the original capital city of USA** made the government to develop New York into a port before shifting to Washington DC. New York was also the first state to be settled by foreigners such as the Dutch and the British. This led to a high population that favoured many activities like industry and trade, hence development into major urban centre and port.
13. **Presence of adequate capital to develop the port and city.** The initial capital was provided by early settlers such as the Dutch and British; and later the US government. This favoured the construction and development of port facilities.
14. **High level of technology** which led to improvement in modern port handling facilities, construction of the waterways, and reclamation of land to expand port facilities. There is also increased containerization at the port to save space and time of loading and unloading of cargo.
15. **The development of many industries at New York** which include oil refineries, iron and steel works, ship building, general engineering, textiles, paper and printing, brewing, food processing. This has attracted many people to the port to look for employment and also increased the volume cargo handled by the port.
16. **Political stability of the region** which has enabled the port to expand without any ravages of war. The area has been stable for a long period of time and therefore many modern port handling facilities have been put up.
17. **Improvement in transport systems linking the port to the large hinterland.** For example roads and railways linking to the interior of USA such as New England, Appalachian region and Pittsburgh region. This also increases the volume of cargo handled by New York port.
18. **Supportive government policy** for example the need to open up the interior —by easily accessing markets for the manufactured goods such as chemicals and sources of imported raw materials such as iron ore, tea, and cotton. This explains why the government has heavily financed the modernization of the port.
19. **Presence of skilled labour in the area** to carry out modern construction and development of the port. The large population of the region supplied the required labour.

Problems facing New York port

1. There is congestion of vessels and this leads to delays in loading and unloading of ships. Also due to this congestion, the maintenance of the port is extremely expensive.
2. Pollution of the environment/ port area such as water pollution from oil spills and air pollution from industries such as oil refineries, petro-chemical industries, automobile industries.
3. Limited land for expansion which has made the port to develop vertically especially on Manhattan island.
4. Inadequate accommodation which has led to growth of slums and associated problems such as poor hygiene, moral decay and easy spread of diseases.
9. Unemployment problems, attributed to high levels of rural urban migrations and settlements attracted by port facilities. The unemployment leads to high crime rate due to overcrowding

10. Narrowness and shallowness. There is still work to be done to expand the port and to deepen it in order to accommodate even larger ocean-going vessels.
11. Risks of fire hazards due to presence of oil tanks all over the port.
12. Thick fog due to mixing of cold Labrador and the warm gulf stream. This leads to great risk of accidents due to poor visibility.

Solution to the above problems

1. Vertical expansion of the port to minimize the problems of limited space (use of skyscrapers).
2. Reclamation of land from the sea to create more room for expansion.
3. Containerization to ensure fast handling and dispatch of cargo.
4. Industrialists have advised to build elsewhere away from the concentrated area of New York.
5. Treating industrial wastes before disposal into water to reduce pollution.
6. Industrial fumes have been exposed high up in the atmosphere by very long chimneys.
7. Use of radars to solve the problem of fog.
8. Police has been strengthened to be more alert against crime among citizens, although it is still a challenge.
9. Construction of more industries to create more jobs.

Guiding questions

- 1) To what extent have physical factors contributed to the growth of either Rotterdam or Mombasa port?
- 2) Account for the growth and development of Rotterdam or Lagos into a modern port and urban centre.
- 3) Account for the development of either Port Tema or New York as a port and urban centre.
- 4) Examine the significance of New York as a port and an urban centre in North America
- 5) (a) Examine the factors which have favoured the development of Rotterdam as an international port
(b) Explain the problems faced by the Rotterdam as a port.

CONURBATIONS

A conurbation is a large continuous built-up area formed by the joining of several towns/urban settlements. OR It is a single urban complex formed by the merging of two or more neighboring urban centers.

The towns grow and merge such that there is no clear distinction between them, and conurbations are often formed due to urban sprawl.

Examples of conurbations in the world include:

- The Rand industrial complex in south Africa
- The Great lakes region of USA

- The Ruhr industrial complex of Germany
- New York / Northeast of USA
- Los Angeles –san Francisco in USA
- West Holland conurbation –consisting of Amsterdam, Rotterdam, Utrecht, and The Hague
- London, Manchester, Liverpool, Sheffield and Bristol in Britain.
- Tokyo, Nagoya, and Osaka in Japan are centers of large conurbations.

THE RAND OF SOUTH AFRICA

The Rand (Witwatersrand) is the only true industrial conurbation in Africa, and it extends for approximately 100km from Randfontein to springs on the veld.

The major towns in this conurbation include Johannesburg, Germiston, Krugersdorp, Pretoria, springs, Klerksdorp, Witbank. Others include Kimberley, Bultfontein, Vereeniging, Vanderbijl Park, Benoni, Middleburg, and Waterburg.

The Rand has about 35% of all South African industrial establishments.

Factors for the location and growth of the Rand Conurbation

1. ***Presence of a wide range of valuable minerals*** for example gold in Johannesburg, springs, Krugersdorp, Klerksdorp; diamonds in Pretoria, Kimberley, Bultfontein; coal in Middleburg, Vereeniging, and Witbank. Many people have been attracted to provide labour in the mining companies.
2. ***Availability of large quantities of power such as in form of coal and hydro electric power.*** Coal has for long been the main source of power for industries in South Africa. Power has also supported various urban activities such as trade and commerce, banking, insurance, recreation, in urban areas like Witbank, Pretoria, and Germiston.
3. ***The development of many industries in the region*** by both local and foreign investors for example iron and steel industries in Pretoria, Vereeniging, and Johannesburg; chemical industries in Pretoria and Germiston. These industries have attracted a large population to provide labour and enjoy other industrial –related opportunities.
4. ***Internal competition among the industrial establishments*** leading to increased productivity, efficiency and development. This competition leads to the expansion of industries and related activities like transport, trade, and therefore the eventual expansion of the towns into a large conurbation.
5. ***Presence of large/abundant water supply for domestic and industrial use*** for example from the Vaal River supporting the iron and steel industries at Vereeniging (for cooling machines). Water is also used as a raw material in some industries such as soft drinks industries in springs and Vanderbijl Park. It is still used in many urban activities recreation, food preparation among others.
6. ***Well developed transport and communication network*** by road, railway, and air. The net works were easy to set up since the area is relatively flat. The railway network is directly comparable with those in Europe and North America for example by being electrified. The transport networks link various towns in the Rand –moving people and produce.

7. **Abundant supply of skilled and unskilled labour** who work in the industries, mining sector, and the service sector in the Rand. The unskilled labour is mainly provided by the black population originating from various parts of South Africa and migrants from the neighboring countries like Lesotho, Swaziland, Botswana, and Namibia. This has led to the expansion of urban facilities like banking, insurance and entertainment.
8. **Presence of adequate capital to invest in various activities** especially mining operations, industry, and trade, provided by white settlers from countries like USA, Britain, Holland. Still the government has invested in many urban facilities such as health centers, education, and power transmission.
9. **Well developed social and commercial facilities** such as educational facilities, recreation, health facilities, banking, insurance, and ware housing. These have also attracted a large proportion of the population to concentrate in the urbanized Rand region.
10. **Geographical/industrial inertia**—where industries /investments fail to change location even when the existing/present location is no longer the most advantageous. The investments are attracted by the developed facilities such as transport and this has resulted into increased population concentration in the Rand region.
11. **Political stability of the region** which has attracted many people and investments to the Rand. Since the end of apartheid many urban activities and facilities have been initiated and consolidated, hence the expansion of several towns like Germiston, Witbank, and Middleburg.
12. **Positive government policy** which promotes local production by restricting importation of similar goods. The governments also finances basic industries such generation of power. It has also spearheaded and encouraged industrial research, and still encouraged local and foreign investors in various urban development activities through enabling policies.

THE GREATLAKES REGION OF USA

The Greatlakes region is an example of a conurbation in USA with many towns /cities which have grown and merged. These include Pittsburgh-Cleveland, Detroit-Dearborn-Windsor, Chicago-Cicero-Milwaukee, Port Arthur and Fort William, Duluth and superior. Other towns include Buffalo city, Wheeling, Young's town, Greenbay, Gary, Thunderbay, Toledo, and Sudbury.

Factors for the growth and development of the Greatlakes region as a conurbation

1. **Presence of valuable mineral resources such as iron ore and coal** for example iron ore exists in the Lake Superior region (Mesabi Range, vermilion range). Coal is got from Pittsburgh region. This has led to increased population concentration in the region, since many people provide labour in the mining activities such as mineral extraction, processing, transportation.
2. **Availability of reliable power supply in form of coal, oil, and hydro electric power.** Coal and natural gas are got from the Pittsburgh region; hydro electricity from various dams along river St. Lawrence (such from Niagara Falls).the power has supported domestic work, industries and various urban activities like banking.

3. **Well developed transport and communication network** such as the St. Lawrence Sea way provides a cheap means of transport for bulky and heavy raw materials and finished goods, and opens up the great lakes region to the Atlantic sea board. The Greatlakes region is also connected with road and railway to the other parts of the continent. Easy accessibility has increased the number of activities in the region, hence increased population concentration.
4. **Presence of a large and very productive hinterland** which provides raw materials for industrial goods including agricultural raw materials (cotton, wheat, maize, dairy products). Cotton particularly comes from the Mississippi lowland yet wheat and livestock products come from the Prairie Provinces. There are also mineral resources such as limestone, coal, and iron ore. This has led to the concentration of activities in the Greatlakes region especially industry and trade—hence urbanization.
5. **Availability of adequate capital to support various activities** especially industry, mining, trade. This capital is generated from international trade, local and foreign investors and it is used to construct industries, construction of locks and canals, banking facilities, road net work—leading to the expansion of various urban centers like Cleveland, Duluth, and Chicago.
6. **The dense population in the area**, which is a source of labour to work in the established industries and other sectors. The large population also provides market for the manufactured and traded goods, hence leading to the concentration of activities in the region.
7. **The development of many industries in the region**, by both local and foreign investors. These include the automobile industries in the Detroit region and the Lake Michigan region, mechanical engineering and chemical industries in Chicago and Buffalo cities. The expansion and growth of industries has also led to the expansion of the urban centers forming a conurbation.
8. **Availability of ready / reliable water supply for both domestic and industrial use.** The water is provided by the Greatlakes –superior, Michigan, Huron, Erie, and Ontario. This supports industries like food processing and house hold activities , leading to increase in the urban population and accompanying activities like banking ,education and medical facilities.
9. **Availability of a large/ extensive land for expansion** of urban activities to the surrounding areas like industry, trade and commerce, recreation; hence forming a large/ continuous urban complex.
10. **Well developed social and economic facilities** which include health facilities, entertainment facilities, banking among others. These have attracted large population concentrations in the urban centers like Detroit, Windsor, Port Arthur, Superior, and Milwaukee; leading to their expansion.
11. **Geographical inertia**—where by old industries fail to change location even when the existing location is no longer the most advantageous. Accordingly, more new industries are attracted to the already existing investment/ industrial centers to take advantage of existing infrastructure. This has led to increased proportion of population being concentrated in such established urban /industrial centers —hence expansion.
12. **Political stability of the region** which has also enabled the expansion of the towns/cities. More modern facilities have also been set up like banking, insurance, recreation, and education facilities- which in turn have attracted large population concentrations in such towns like Cleveland, Milwaukee, and Duluth; leading to their expansion.
13. **Initiative of a number of businessmen.** Detroit became the first automobile centre because of the pioneers of industry happened to be located there. For example Henry Ford who made mass

production possible so that automobiles became affordable to many people. Many people were attracted into the towns to get employment opportunities, leading to the expansion of the towns.

14. **Favourable/positive government policy** for example encouraging export promotion industries – which was a driving force in the setting up of large manufacturing industries. The government has also set up the necessary infrastructure like power supply as well as encouraging local and foreign investors in various urban activities like banking. This in turn leads to expansion of the urban centres into a conurbation.

THE RUHR INDUSTRIAL CONURBATION

The Ruhr region in Germany is the largest industrial complex in Europe. It has developed in the last 100 years into Europe's biggest iron and steel producer, coal producer, chemical centre and engineering centre. The region is enclosed by rivers Lippe, Rhine and Wupper.

The major towns within the Ruhr conurbation include:

Duisburg, Essen, Dortmund, Bochum, Dusseldorf, Bottrop, Hagen, Dinslaken, Solingen, Wuppertal, Oberhausen, Herne, Recklinghausen, Gelsenkirchen, Witten, Remscheid, Rheinhausen, Leverkusen, Krefeld, Elberfeld.

Factors for the growth of the Ruhr region as a conurbation

1. **The industrial revolution** which started in Britain in the 18th century and later it spread to Germany. It involved changes that transformed agricultural economies into industrial ones. It led to widespread replacement of manual labour by machines. Large groups of business enterprises were located within a limited area including the setting up of many industries such as engineering, chemical, and textile industries. This in turn led to the growth and expansion of cities in the Ruhr region as people moved from rural areas into the urban areas in search of work.
2. **Presence of valuable mineral resources such as coal, limestone, and iron ore.** There was high-grade coal (containing a high percentage of carbon that burns with great heat) providing a major source of energy for various industries. Besides the coal was of various types such as bituminous coal, and anthracite coal. The mining activities attracted many people to provide labour, and therefore the expansion of small mining centers that grew into bigger towns.
3. **Availability of large quantities of power in form of coal, natural gas and hydro electricity.** Coal was for long the main source of power for industrial development in the region. However, its use declined due to development of other sources of energy such as hydro electricity, natural gas, imported oil, and nuclear power. This has supported many urban activities such trade, banking, education, advertisement, and industry—hence the expansion of the towns.
4. **Well developed transport and communication networks** by road, railway, water and air. Water transport takes place on rivers such as Rhine, Ruhr, Lippe, Emscher; and water transport has been improved by the construction of canals such as Lippeseite, Dortmund-Ems, and Rhine-Herne. These have facilitated the movement of inputs and finished goods, hence supporting industrial growth and related activities—leading to increased population concentration in the Ruhr region.

5. **Availability of large water supply for industrial and domestic use** provided by rivers like R.Rhine, R.Ruhr, and R.Lippe. This has supported industrial development by acting as a raw material and for cooling machines. Water also supports many urban activities such as recreation, entertainment, and food preparation. This increases population concentration in the ruhr region leading to urban expansion.
6. **Existence of a large and extensive hinterland** which provides raw materials for the Ruhr industries such as agricultural, mineral and forest resources. These include iron ore, fruits, vegetables, sugar beet, maize, vines from the Rhine rift valley, timber from the Black forests and Vosges. In turn, industrial development and trade has enabled the growth/expansion of cities like Essen, Dusseldorf and Bochum.
7. **Presence of adequate capital to invest in general development of the region** provided by government, local and private investors. The developed banking sector has for long provided capital for industrial development. More so the Marshall Aid plan of 1945 after the Second World War provided the necessary capital for reconstruction and rehabilitation of industrial plants and other infrastructure. This in turn increased urban activities and thus expansion of towns.
8. **The dense population of the region** which has provided labour for industries and the service sector. It also provides market for the industrial and other sectors. The big population in the area favoured the development of better social and economic facilities such as entertainment, medical and banking facilities. This in turn led to the expansion of the Ruhr conurbation.
9. **Availability of large land for expansion** of urban activities to the surrounding areas like industry, trade and commerce. This leads to expansion of the conurbation.
10. **Well developed social and economic facilities** which include health facilities, educational facilities, banking, insurance, recreation among others. This has led to increased population concentration in the urban centres like Solingen, Bottrop, Duisburg, and Bochum; hence expansion into a large urban complex.
11. **Geographical inertia**—where new investments are attracted to the already existing industrial centres to take advantage of the existing infrastructure such as power supply, advertising media, transport network, and insurance. This eventually encourages population concentration in the urban area, hence growth of the ruhr conurbation.
12. **Political stability of the region** for a long period of time since world war, hence encouraging developments without ravages of war. This has led to the growth of many urban activities such as industry, trade and commerce; attracting more people for employment opportunities and thus expansion of the conurbation.
13. **Influence of early investors and** these include Krupp at Essen, Mayer at Bochum. In the automobile industry, the invention by Gottlieb Daimler of the gasoline motor and power carriage which was completed by Rudolf Christian Karl. This increased the number of job opportunities offered and thus increased population concentration.
14. **Favourable /Positive government policy** as promoting trade and attracting investments from large companies from all over the world especially from developed countries like USA, Britain. The government has also improved waterways, railways, and road networks. This has increased the concentration of urban activities in the area such as trade and insurance; leading to the growth of the conurbation.

Guiding questions

- 1) (a) Account for the growth of conurbations in either Western Europe or United States of America.
(b) Examine the effects of conurbations on the environment in the region chosen above.
- 2) Account for the development of either New York or Beijing into a large urban centre.
- 3) Examine the causes and effects of urbanization in either Germany or republic of South Africa.
- 4) Examine the causes and effects of the development of conurbations in either the eastern seaboard of North America or China.