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## Geography (UACE 250/2) paper 2 Revision questions for manufacturing industry in the world

1. To what extent has availability of power and energy influenced the distribution of industries in either Germany or the USA.

(Candidates should select one of the countries; define industrialization; give the example /types of industries and their locations /industrial towns; explain the extent to which the availability of power and energy influenced the distribution of industries, wrap-up by explaining other factors that have influenced the distribution of industries. NB. Emphasis should be put on distribution of industries other than general factors for development of industries for the effective interpretation of the question)

Solution

Industrialization as a process in which countries become increasingly involved in the production of manufactured goods.

### Germany

**Types of power include:** Coal, oil, Natural gas, (thermal energy), H.E.P from rivers, Nuclear energy from Uranium etc.

**Industrial regions/towns/centres include;** The Ruhr conurbation with towns such as Essen, Duisburg, Dortmund, Bochum etc.

Other industrial towns in Germany include Hamburg, Cologne, Munich, Berlin, Frankfurt etc.

**Types/examples of industries include:** Iron and steel. Heavy machinery, chemical, Engineering, Motor vehicle, ship building, textiles, food processing, electronics etc.

### U.S.A

**Types of power include:** Coal. Oil, Natural gas (thermal power), H.E.P from rivers, Nuclear energy predominantly from Uranium etc.

Industrial regions/towns include;

- The great lakes region e.g. Chicago, Detroit, Duluth, Cleveland, Buffalo etc.;
- The Mid-Atlantic States region e.g. New York, Philadelphia, Washington;
- New England e.g. New Bedford, Providence Manchester, New Haven, Bethlehem Bridge port etc.
- Western region around California, e.g. in Los Angeles, San Francisco, San Diego.
- Other towns e.g. Pittsburg, Atlanta. Birmingham, Houston, St Louis etc.

Type of industries include iron and steel, heavy machinery, electrical engineering, motor vehicles,

aircrafts, chemical industries, textiles, shipbuilding, food processing, electronics etc.

### **The influence power on distribution of industries include**

- Coal provides thermal electricity for running industries and heat for smelting Iron ore Industries are therefore attracted in the Ruhr region to make use of this coal - in towns like Essen, Bochum, Duisburg etc. e.g. Iron and steel, heavy machinery, engineering, motor vehicles etc.
- Similar industries depending on coal are found in other towns of Germany e.g. Hamburg, Frankfurt, Cologne etc.
- In USA similar industries depending on the presence of coal are found in the following industrial regions e.g. Pennsylvania, the Great lakes, Appalachian California's New England etc.
- The towns include Chicago, Detroit, Pittsburg, Birmingham, Boston, Manchester, Los Angeles, San Francisco e.tc.
- Petroleum and Natural gas provide thermal electricity used to run industries. Industries in the Ruhr depend on oils and natural gas. The presence of oil in Northern Germany has attracted industries in towns like Hamburg, Hannover etc.
- In USA the presence of oil and natural gas around the great lakes region has attracted industries in towns like Chicago, Detroit, Buffalo, Cleveland, and Rochester. Imported oil and natural gas has attracted industries in New York, Philadelphia, San Francisco, Santiago etc.
- H.E.P in Germany has attracted the location of industries around the Ruhr, generated from River Rhine and its tributaries
- In U.S.A, HEP is generated from rivers like. St Lawrence, Mississippi and its tributaries, Colorado, Sacramento and San Joaquin. This has attracted industries in the great lakes region, Tennessee valley, California state respectively.
- Nuclear power has attracted the development of industries but these are wide spread in the major industrial regions of Germany and U,S.A

**N.B.** The distribution of the industries should be followed by the role of power i.e. running of industrial machinery, heating, lighting, cooling and transport

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### **Other factors**

- The presence of abundant minerals such as iron ore and manganese which are used as a raw material in the iron and steel industries.
- Presence of efficient and reliable means of transport such as canals, railways, roads that are used to transport iron ore to industries and manufactured goods such as sheet metal to market.
- The high level Of technology such as robots, conveyor belts that are used in preparing of iron ore into other products like railway wagons, sheet metals, iron bars have made work easy and fast
- Presence of abundant water supply which is used for industrial processes in the iron and steel industries such as cooling of machines, heated metal products as well as cleaning purposes.
- The presence of abundant skilled and semi-skilled labour used in processing of iron and steel and products. Skilled labour is used in operation of machines, marketing of manufactured products, maintenance of industrial machines while the semi-skilled labour is used in transportation of iron ore to iron and steel industries, cleaning of machines, loading of products onto trucks etc.
- Presence of adequate capital to purchase land, machines, iron ore as a raw material to establish iron and steel industries, pay salaries to workers have encouraged distribution of the industries.
- The presence of relatively cheap vast land in the Ruhr region has encouraged establishment of

large scale iron and steel industries in the region. Iron and steel industries requires vast land to establish storage centers, processing ware houses, parking area and storage areas for finished products.

- The historical factor or industrial revolution owing to the fact that some of the first large scale iron and steel industries in Germany were located in the Ruhr region and have continued to attract many others in the area led to distribution of industries in the area.
- The supportive or favourable government policies such as allocation of land to iron and steel industries in the Ruhr region, tax holidays, development of power; roads and extension of water to industries in the area have encouraged distribution of iron and steel industries in Germany.
- Presence of a ready or large market for iron and steel products from Germany both local and foreign have encouraged distribution of the iron and steel industries because much of what is produced is purchased thus encouraging the industrialists to produce more.
- Security and political stability in Germany have encouraged distribution of iron and steel industries in Germany because it facilitates large scale investment in the sector without the threat of destruction or nationalization of private industries.
- Intensive research to make various up to date steel and Iron products, minimization of raw materials, searching for market needs have encouraged distribution of iron and steel industries in Germany.
- The influence of industrial inertia in that industries tend to be located near each other(s) so as to enjoy economies of scale such as using each other's products as a raw material, sharing of social services like electricity; dumping areas, security, roads have encouraged distribution of the iron and steel industries.
- Research e.g. in modern technology for mechanization, exploitation of raw materials etc.
- Favourable climate especially for the space craft industry, film industries especially in U.S.A

2. Examine the factors that have led to the growth of industries in either New England region of USA or the Manchuria region of China

**(Candidates should select one region and then examine the factors that have led to the growth of industries)**

### **New England**

New England is located in the North East of U.S.A. It constitutes of Maine, New Hampshire, Vermont, Massachusetts, Connecticut and Rhode Island.

- The major industrial cities are Boston, Springfield, Bridgeport, New Bedford, Lowell, Beverly, Manchester etc.
- Industries found here include textiles; ship building, Leather industry, Watch making, Jeweler, electric machinery, air craft, fire arms etc.

### **Factors for development of industries**

- Agricultural raw materials such as cotton, timber, sugarcane
- Market factors in that the presence of a high population with a high purchasing power to readily consume whatever has been produced in Boston, Springfield, Bridgeport, New Bedford, Lowell,

Beverly. Manchester has attracted industries such as textiles, Leather industry, Watch making in the region.

- Industries that produce bulky and perishable products such as furniture, dairies, Industries which require little raw materials e.g. Electronics and industries producing specialized goods such as spare parts, packaging materials are as well located in New England.
- Existence of Agricultural raw materials like cotton for textile making, timber for furniture, sugarcanes, sugar, milk used for dairy industry have attracted several industries in the region.
- Reliable , fast and efficient transport in form of roads; railways which radiate from Boston has attracted textiles, iron and steel, Apparel, meat - packing industries such transport route facilitate distribution of raw materials to industries as well as finished goods to market centres.
- Existence of abundant skilled labour to do metal fabrication, mixing of chemicals, designing of industrial spare parts; marketing of the goods etc. For instance the southern New England state centered at Boston was the earliest to be developed due to skilled settlers from England. They set up ship building, textiles and engineering industries.
- Existence of abundant and reliable energy sources for example HEP generated from Niagara Falls used in processing of industrial raw materials attracted industries in Boston, Spring field, Bridgeport, New Bedford. Such industries include textiles, ship building, Leather industry, Watch making, Jeweler, etc.
- Industrial inertia where by industries tend to benefit from each other due to their proximity to each other have led to industrial concentration in the New England state. Such benefits include sharing specialists labour, security, social facilities like water, transport etc.

### **Manchuria**

- Manchuria industrial region is located in the North East of china. This is China's greatest area for heavy industry. It's centered on the Anshan-Fushun-Shenyang triangle.
- Industries here include iron & steel. Engineering, Automobile, factory equipment & chemicals.

### **Factors favoring growth of industries in Manchuria**

- Abundant agricultural raw materials such as cotton for use in textiles, timber from the Sichuan province for furniture and timber processing industries like saw mills, Milk for dairy processing industries, hides and skins for shoe making industries.
- Abundant mineral resources such as iron ore from the Manchuria region for the iron & steel industries; Limestone used for the cement industries.
- Varied and abundant energy resources e.g. Coal, HEP tapped from R. Yangtze, local and imported oil, Nuclear energy are used for processing industrial raw materials, lighting of ware houses, storage of perishable commodities like beef and dairy products etc.
- With a large local population; Manchuria has both abundant skilled & semi-skilled cheap labour for industrial development Skilled labour is involved in planning and managerial tasks, operation of machines, mixing of chemicals, and maintenance of machines while semi skilled labour does loading of raw materials and finished products on trucks, transportation leading to growth of industries.
- Manchuria is one of the biggest or largest local markets for industrial goods in the China. This has boosted production of electronics, textiles, processed foods, enabling rapid growth of industries. .

- The indented Coastline in the East along the Pacific Ocean has led to development of several ports such as Shenyang. These handle imports of raw material and are direct conduits for exports of manufactured goods. This has led to growth of Shanghai as an industrial centre.
- Political stability ensured by the communist government since 1976 with death of Moa Zedong have ensured security required for industrial growth. Today China has the world's fastest growing economy because established industries operate throughout the year without political interference.
- Manchuria region have benefited from technological transfer from USA, Germany, Britain who trained people industrial operations such as mechanical engineers, structural, chemical engineers as well as importation of modern industrial technology from USA, Japan, Germany.
- China is one of the biggest countries in the world. This implies that there is cheap and extensive land for industrial establishments at the Manchuria industrial region.
- China have adopted a technically- biased education system. This has produced innovative graduates in form of technicians, engineers necessary to develop the industrial sector.
- Existence of people's communes in Manchuria has led to industrial development. Each commune was encouraged to establish own processing factory for food stuffs, production of agricultural machinery and chemicals.
- Abundant water supplies from R. Yangtze, Chang Jiang, Huang He, Nen Jung. Yellow rivers have been used in the production of industrial steam, processing of textiles, paper and timber industries, cooling in the iron & steel industries as well as being used as an input in the distilleries, Breweries & soft drink industries at Shenyang.
- Manchuria region has a developed transport Network: in form of railways. These favor transportation of raw materials to industries and distribution of manufactured goods to market centers for sale.
- Large sums of capital to purchase industrial land, machines, raw materials, payment of wage; have been raised by rich entrepreneurs as well as loans from Banks for example the industrial & commercial Bank of China formed in 1984 to has different kinds of deposits for industrial & commercial enterprises.
- Supportive government policy towards industrialization such as allocation of land, capitalization of state owned industries/companies such as Sinopec, development of infrastructures like roads in industrial zones, tax holidays.
- Increased research to provide efficiently, cheaply and high quality goods have led to development of the Chinese industrial sector particularly in Toys, iron & steel, textiles & pharmaceuticals.
- Persuasive advertisement to attract a bigger market through use of international television Network such as BBC, Sky Net, CNN have promoted industrial growth in Shanghai, Beijing etc..
- The Chinese are naturally hardworking people. Working for long hours moving all over the world and highly innovative has enabled them to develop their industrial sector in Manchuria
- Industrial inertia in the Manchuria, Tianjin-Beijing, Wuhan, Sichuan industrial regions have promoted industrial growth. Industries benefit from each other in form of sharing raw materials; joint marketing, research & specialized labour etc.
- Broad plains in the Manchuria region offered a good relief where industries could easily be built at relatively lower costs.
- Influence of foreign investors in China has led to industrialization. These include Toyota Motor Corporation. Nissan Motor Corporation from Japan, J.P Morgan, IBM, Chevron, General electric, WallMart from U.S.A, British petroleum (BP) from Britain etc. Owing to the big Chinese market,

most industrialized Nations have invested in China to exploit that potential.

3. Assess the impact of industrialization on the environment in either the Rand (Republic of South Africa) or the Ruhr region (Germany)

(The candidate is expected to explain the positive and negative impact industrialization on the environment in either Ruhr of Germany or Rand of South Africa)

#### **Germany.**

- The Ruhr is the largest industrial conurbation in Germany.
- It lies within tributaries of the Rhine e.g. Ruhr, Lippe, Emscher.
- The conurbation is made up large towns that expanded towards each other and the examples include Essen, Duisburg, Bochum, Dortmund Dusseldorf etc.
- The example of the industries; in Ruhr region are: manufacture of chemicals; textiles, ship building, Motor vehicles, oil refineries/mineral refineries, manufacture of iron and steel products/metallurgical, food processing, paper/printing etc.

#### **South Africa.**

- The Rand is the largest industrial conurbation in the republic of South Africa.
- It lies in the Orange free-state and Transvaal state, ·
- The conurbation is made up towns e.g. Johannesburg, Klerksdorp, Krugersdorp, Springs, Pretoria, Vereeniging etc. .
- The types of industries include motor vehicle assembly, Textiles, refining of minerals like iron and gold, manufacture of paper and printing works, heavy engineering /iron and steel works, food processing etc.
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**The impact of industrialization to a selected country is more or less similar**

#### **Positive impact**

- It has led to development of urban centres e.g. Johannesburg, Springs etc. on the Rand or Dortmund, Essen etc. on the Ruhr. ·
- Industrialisation has led to development of infrastructure e.g. Roads and Railways to create access to markets etc.
- It creates market for agricultural products hence development of agriculture to feed the urban population.
- It has created employment opportunities in the various industries and secondary social service industries like Banking; insurance etc.
- It has led to diversification of the economy i.e. widening the range of exports in addition to minerals, agricultural, forest products etc. are industrial manufactured products.
- It is a source of local revenue for the government through local taxation.
- Industrialization enhances both local and international trade.
- It is a source of foreign exchange through exportation of industrial products/creates favourable

balance of payment.

- Industrialization enhances tourism.
- It has attracted foreign investments hence increasing inflow of foreign capital.
- It has promoted education and research.
- Industrialization encourages technological advancement for high quality/quantity and better methods of production.
- It has reduced expenditure on foreign imported goods.
- Provision of social services e.g. health, insurance, Banks and education.
- It has encouraged exploitation of natural resources e.g. minerals like gold, iron in south Africa/coal for Ruhr in Germany

### **Negative impact**

- Industrialization has led to environmental degradation through pollution of land, air and water and resultant effects.
- Industrialization has led to destruction of vegetation i.e. in the process of construction of large industrial plants.
- It has led to urban related problems like crimes, unemployment, traffic congestion etc.
- It destroys agricultural land as preference is made to construct industrial plants.
- Creation of large industrial plants has led to displacement of people.
- Industrialization has encouraged rural urban migration which affects/deprives off labour for rural development.
- It has led to over exploitation of natural resources that serve as raw material that are power resources like coal.
- Occasional accidents due to use or complicated machinery.
- Industrialization encourages profit repatriation due to presence of foreign investors Increasing mechanization and automation contributes to unemployment
- The development of the industrial towns and their associated infrastructure causes regional imbalances when compared to the rest of the country side.

4. To what extent has the presence of power and energy influenced the distribution of iron and steel industries in either China or Germany.

**(The candidate is expected to select one country i.e. either china or Germany and explain how the presence of power and energy influences the distribution of Iron and Steel industries and the contribution of other factors.)**

### **Germany**

Iron and steel industries are found in towns; such as Dortmund, Duisburg, Essen, Bochum, Dusseldorf concentrated in Ruhr region.

### **China**

Iron and steel industries are found in Beijing, Canton, Shanghai, Jilin, Shenyang, Shanxi basin, Red basin etc.

The contribution of power and energy to the location of iron and steel industries.

Role of power and energy to the location of iron and steel industries in the Ruhr region

- Presence of abundant coal e.g. from the Ruhr region leading to the concentration of industries dealing with iron and steel production.
- Coal is bulky therefore industries dealing with Iron and steel are located near coal deposits which are their major source of power.
- Coal also yields other types of power like the thermal electricity which is supplied to the iron and steel industries.
- There are also other types of power e.g. Nuclear and Oil which also contribute to location of Iron and steel industries.

**N.B.** China has Coal and Oil reserves / Coal and Oil is imported by both countries e.g. Chines Coal reserves are in Benxi, Shinyang, Red Basin, Shanxi basin Jilin etc.

#### **Other factors that have led to distribution of iron and steel industries in Germany**

- The presence of abundant minerals such as iron ore and manganese, which are used as a raw material in the iron and steel industries.
- Presence of efficient and reliable means of transport such as canals, railways, roads that are used to transport iron ore to industries and manufactured goods such as sheet metal to market centres like Duisburg, Munich for sale.
- The high level of technology such as robots, conveyor belts that are used in preparing of iron ore into other products like railway wagons, sheet metals, iron bars have made work easy and fast.
- Presence of abundant water supply which is used for industrial processes in the iron and steel industries such as cooling of machines, heated metal products as well as cleaning purposes.
- The presence of abundant skilled and semi-skilled labour used in processing of iron and steel into other products. Skilled labor is used in operation of machines, marketing of manufactured products, and maintenance of industrial machines while the semi-skilled labour is in transportation of iron ore to iron and steel industries; cleaning of machines., loading of products onto trucks etc.
- Presence of adequate capital to purchase land, machines, iron ore as a raw material to establish iron and steel industries, pay salaries to workers have encouraged distribution of the industries.
- The presence of relatively cheap vast land in the Ruhr region has encouraged establishment of large scale iron and steel industries in the region. Iron and steel industries requires vast land to establish storage centres; processing warehouses, parking area and storage areas for finished products.
- The historical factor or industrial revolution owing to the fact that some of the first large scale iron and steel in Germany were located in the Ruhr region and has continued to attract more industries in the area.
- The supportive or favourable government policies such as allocation of land to iron and steel industries in the Ruhr region, tax holidays, development of power, roads and extension of water to industries in the area have encouraged distribution of iron and steel industries in Germany.
- Presence of a ready or large market for iron and steel products from Germany both local and



foreign have encouraged distribution of the iron and steel industries because much of what is produced is purchased thus encouraging the industrialists to produce more.

- Security and political stability have encouraged distribution of iron and steel industries in Germany because it facilitates large scale investment.
- Intensive research to make various up to date steel and iron products; minimization of raw-materials, searching for market needs have encouraged distribution of iron and steel industries in Germany..
- The influence of industrial inertia in that industries to be located near each other so as to enjoy economies of scale such as using each other's products as a raw material, sharing of social services like electricity, dumping areas, security, roads have encouraged distribution of the iron and steel industries.

NB. Candidates are expected to concentrate on the location of Iron and steel industries and not general development of all manufacturing industries.

5. To what extent has the presence of raw materials influenced the distribution of manufacturing industries in either Japan or the Republic of south Africa.(25marks)

**(Candidates should select one country and explain the influence of raw materials on the distribution of manufacturing industries in the country selected.)**

**The factors are more or less similar regardless of the country chosen.**

#### **South Africa.**

- Bulky raw materials like the various minerals like iron ore, coal, gold, diamond, limestone etc. have encouraged the establishment of metallurgical/engineering industries like iron and steel, refineries, precision etc. are concentrated at the source around the Rand region.
- Perishable raw materials e.g. agricultural raw materials e.g. sugarcane, milling in natal (Durban). Fruit processing around cape town, maize milling, meat canning, textiles and garments, food processing, fish canning are common in major towns.
- Presence of coal, oil and natural gas has provided sources of raw materials for the chemical and petro, chemical industries.
- There are other raw materials like water bodies, forest products producing raw materials for pulp and paper industries, watch making.
- Imported raw materials are processed at the car assembly at major ports like Durban.

#### **.Japan**

- Presence of iron ore and coal provides raw materials for the iron and steel industries, engineering for the chemical industries around Keilin (Tokyo-Yokohama) Northern Kyusu (Usana-Kobe-Kyoto) auto mobiles, Machinery around Isebay.
- Perishable raw materials, imported raw materials have attracted industries to be located on the sides especially at coast ports coastal ports e.g. Usana, Nagoya, Yokohama etc.
- Light raw materials have their industries spread widely in Japan.

## JAPAN

### Other factors that have led to development of manufacturing industries in Japan

- Existence of an industrially ideal relief in form of plains or gently sloping relief that make
- Infrastructural development such as ware houses, transport routes easy. Examples are Kinki plain where the Hanshin industrial region is located, Kwanto plains for Keihin industrial conurbation, Nobi plains for the Ise Bay industrial/ region .
- Intensive exploitation of energy resources such as Coal from the Chikugo coalfields is used in the iron and steel industry, exploitation of all the HEP resource, along rivers such as R. Asahikawa, R. Oyama and many other Nuclear & thermal energy are all exploit and used for industrial operations such processing raw materials, lighting or' ware houses, storage facilities in Nagoya, Osaka
- Japan has a long Coastline which is favorable for development of sheltered large ports such as Osaka, Kobe, Chiba, Otaru etc. These aid the importation of large quantities of raw materials from all over world. For example iron ore from China, Africa, oil from Iran, Saudi Arabia etc.
- Though the country have limited raw materials it has maximally exploited the available raw materials such as copper, manganese, iron ore, sulphur, Kaolin & timber putting them to the greatest possible use. Textile industries at Nagoya, Okayama turned from cotton to synthetics made from imported oil, silk worms etc.
- Japan has a big population which -provides a big market for industrial goods such as electronics, Automobiles etc. The Neighboring agricultural states such as China, Philippines, Vietnam also provided a big market during the initial stages of development
- The Japanese large population provides all forms of labour for industrial operation. Skilled labour does electrical, chemical & structural engineering services. Semi-skilled labour in Nagaya, Osaka does loading of industrial goods, site cleaning Dismantling of spare parts for example in the Toyota, Nissan Mitsubishi automobile industries.
- Japan got generous aid from U.S.A after the Second World War as part of the post-war recovery package. This was used to replace the old destroyed technology with New and efficient technology copied form USA, Germany & other Countries.
- Supportive government policies towards industrial development for example the government adopted a technically biased educational system that produces several technicians, engineers necessary for industrial development at Osaka, Nagoya etc.
- Nippon/ Japan have developed a modern and efficient transport Network for distributing raw materials & finished goods over the industrial conurbations such as Hanshin, Keihin & Ise Bay. These include electrified railway systems, Roads, Airports, modern fleets (ships) & Tunnels that link Hokkaido to Honshu.
- Intensive research is applied to develop Japanese industrial sector.
- After the Second World War; Japan has been a politically stable country. They vowed never to engage in wars. This has attracted foreign investors from U.S.A, Germany, France thus growth of the textile, electronics, ship building & engineering industries in Osaka, Kobe, Nagoya etc.
- The Japanese are naturally hardworking and creative people. They work long hours in industrial sector.
- Japan has an efficient policy of managing the industrial sector. For example key industries are managed by government and large combines known as Zaibatsu which were created by trading firms. Such Zaibatsu include Toyota, Mitsubishi, Kawasaki, etc. These have invested in mining, processing, banking, telecommunication, etc.

- Stiff competition between internal and foreign firms has driven Japan to industrial success. For example the Japanese Toyota motor corporation is competing with Ford General motors from USA, Leyland motors from Britain and many others. This has seen new brands of cars manufactured every year to beat off competition.
- Availability of extensive land not only in the five industrial conurbations of Keihin, Ise Bay, and Hanshin but also along the thousands of Islands (4000) in Japan have provided land for industrial establishment.
- Abundant water supplies from the numerous rivers and lakes of Japan have promoted industrialization. Water is used in production of industrial steam, cooling process, cleaning of machines and containers, processing for example in the Honshu paper industry and is also an input in some industries such as soft drinks like Coca cola, Pepsi and Breweries. Some of the rivers are Fuji River, lakes include Lake Suraga.
- International Corporation between Japan and other countries have favored industrialization. Japanese companies like Toyota. Nissan, Sony, Aiwa and Hitachi have been able to open up plants in Britain, Germany, Spain. Similarly the countries have open up branches in Japan.

6. To what extent has industrialization contributed to environmental pollution in either Ruhr region of Germany or the Great Lakes region of USA.

(Candidates should select one region and identify the various industries which have polluted the environment and explain how they pollute the environment and then other sources of pollution.)

Contribution of industries to pollution in either country are more or less similar

Land/soil: dumping of wastes

Water: dumping sewage, industrial effluents and oil spillage

Vegetation: destruction of vegetation by hot gases, acidic gases etc.

Air/atmosphere: emission of acidic gases, green house gases such carbon dioxide, hot gases, poisonous gases such as carbon monoxide etc.

Other causes of pollution

- Burning of fossil fuel such as in vehicles liberate carbon dioxide
- Improper sewage and garbage disposal
- Burning of solid and liquid wastes
- Excessive use of fertilizers pollute water bodies via surface run off.
- Leakages from nuclear reactors
- River and lake silting
- Excessive use of pesticides
- Improper disposal of wastes from medical installation

## 7. Account for the changing patterns of industrial growth in the New England region of USA

Most of the industries in the region are found on Rhode Island, Massachusetts, Connecticut and New Hampshire.

Changes in patterns of industrial development were favored by

- Strategic location/coastal location for easy importation of bulky raw materials and exportation of manufactured goods.
- Changes in raw materials such as from raw material of agriculture such as cotton, silk to synthetic fibres such as polyesters.
- Changes in industrial inputs due exhaustion of raw materials such as timber, iron etc.
- Presence of skilled labour in other regions forces some industries to reallocate.
- Limited land for expansion hassled to reallocation of some factories.
- Intensive research has attracted new industries and forces others to reallocate
- Development of efficient transport network to other regions has enabled some industries to reallocate
- Increase in population has attracted many industries to the region
- Innovation of new modern and efficient technology has led to reallocation of industries to and from New England
- Government policy of redistribution, diversification of industries.
- Availability of water to be used in production processes attracts new industries in the in the region
- Industrial inertia in the great lake region have continued to influence location in the New England state; industries tend to reallocate near each other to benefit from joint research, security, skilled labor etc.
- Specialization and zoning requires similar industries to be located in same areas favoring reallocation to enable industries acquire inputs and market cheaply

Main industries include

- Textiles and garment
- Leather and tanning
- Timber and joinery works
- Hardwre and machine tools
- Electronic manufacturing
- Manufacture of air crafts etc.

Thank you

Dr. Bbosa Science