AGRICULTURE IN THE WORLD.

Agriculture is the growing of crops (Arable farming) and rearing animals (livestock farming) for commercial and subsistence purposes. The crops grown include; G. nuts, potatoes, bananas, sorghum and the animals reared include; goats, cows, pigs, sheep, poultry.

Agriculture is mostly developed in the tropics, equatorial regions, developing countries and it is less common in Scandinavian, Polar region and developed countries.

IMPORTANCE / EFFECTS OF AGRICULTURE

- ✓ Source of government revenue by taxing people and companies leading to capital accumulation and improving the national income.
- ✓ Source of foreign exchange by exporting agricultural products helping in importation and investment e.g. Rubber from Liberia.
- ✓ Improvement in transport and communication through the construction of roads, railways, benefiting the surrounding communities.
- ✓ Increase development of industries like industries making agriculture equipment, processing agriculture products and using agriculture raw materials.
- ✓ Provision of employment opportunities leading to high standards of living like the farmers, people working in agro-based industries, traders, extension workers.
- ✓ It leads to economic diversification by reducing on dependency burden e.g. industrialization, transport, tourism.
- ✓ Promotion of international relationships and regional cooperation through export and import trade like between developing and developed countries.
- ✓ Source of food reducing on the dangers of hunger and malnutrition and food buying like cassava, bananas, cows, sheep.
- ✓ Growth of urban centres like towns and ports around marketing industrial areas because of increase in population.
- ✓ Resource exploitation leading to economic growth and development e.g. land in developing countries.
- ✓ Promotion of education and research by visiting farms, industries, markets for acquiring skills and improving science and technology.

- ✓ Capital accumulation by foreign investors through taxation, foreign exchange earnings leading to other projects.
- ✓ It helps in environmental conservation through climate modification, soil formation and conservation and protection of wildlife like plant species and animals.
- ✓ Agriculture is an alternative land use in areas with limited resources, low population, areas with fertile soils, wet climate like in the tropics, equatorial regions and the developing countries.

NEGATIVE EFFECTS / DISADVANTAGES

- Soil exhaustion because of monoculture, using poor methods of farming like shifting cultivation, over cultivation, Nomadic pastoralism and using plantation farming with specialization.
- Displacement of people and activities by occupying big areas like plantation farms, ranches.
- It leads to pollution of air, water and land around agro-based industries, using fertilizers, pesticides, insecticides with toxic ad acidic elements causing destruction of plants and animals.
- Diversion of labour and capital by investing in agriculture limited the development of other sectors.
- It leads to economic dependence and its related problems like Balance of payment, poor terms of trade, price fluctuations, due to specialization like in developing countries.
- It leads to profit repatriation by foreign investors causing capital outflow and lowering the national income like in less developed countries, foreigners owning plantations.
- It is affected by marketing problems because of over production, perishability and this affects planning and it causes problems of competition.
- Agriculture mostly depends on environmental factors like climate, soil fertility, pests and diseases and this affects planning.
- Agriculture encourages soil erosion like gulley, rill, shit, and the occurrence of landslides and mass wasting like rock fall, rock slide or slump and these affect soil fertility and may lead to destruction of plants and animals especially in highlands, mountain slopes and densely populated areas.

FACTORS FOR THE DEVELOPMENT OF AGRICULTURE

There are physical and human factors influencing and accounting for the location, growth and development of agriculture.

- Presence of favourable climate like wet conditions like heavy rainfall, moderate temperature in equatorial regions, tropics, savannah areas in less developed countries.
- Presence of flat and gentle slopes form undulating landscape leading to easy mechanization, transport, drainage, construction like in hilly areas.
- Presence of fertile soils and well drained like loam soils, volcanic soils, alluvial soils found in highlands, mountain slopes, lowlands and valleys.
- Agriculture is developed in areas with limited pests and diseases to destroy crops and livestock e.g. in highlands and mountain slopes.
- Presence of water supply and well drained areas leading to easy exploitation limited pests and diseases like in gentle slopes, hills, plateaus.
- Agriculture is developed in areas with limited other resources like minerals, fishing potentials, forests for lumbering.
- Presence of better breeds of crops and livestock which are pest resistant with quick maturity contributing to increased production.
- Agriculture is developed in areas with limited obstacles like relief features, land forms, drainage features and thick vegetation making exportation easy and cheap like in Savannah areas.
- Presence of improved transport like the construction of roads, railway lines, modern ports helping in transporting labour supply extension workers and agriculture products to the markets.
- Presence of labour supply both skilled and unskilled leading to development of agriculture in areas with increased population tropics or savannah areas.
- Presence of wide market intern and external like in urban areas with increased population and exporting to other countries like cotton from Sudan to Britain, rubber from Liberia to Japan.
- Presence of capital provided by the government and private investors used for buying farming equipment, paying workers and building industries.
- Presence of improved science and technology leading to availability of skilled labour and the use of modern methods of farming e.g. irrigation in Sudan, Horticulture in Holland and Ranching in Argentina.

- Presence of positive and supportive government policies like offering loans to farmers, constructing transport routs, attracting investors and market research.
- Presence of research stations leading to better breed and helping in controlling pests and diseases, processing agricultural products and marketing.
- Presence of political stability and security helping in attracting investors and diverting resources to improving infrastructure, social sciences and economic activities e.g. like developed countries.
- Presence of good international relations and regional cooperation helping in marketing getting loans and in labour supply like between low developed countries and more developed countries.
- Presence of cultures and traditions influencing agriculture e.g. Banana growing by Bantu communities, millet by Nilotics, Nomadic pastorlism by Karamajongs, Masai and the Turkana.
- Presence of land tenure system ownership like private land ownership, freehold leading to easy availability of land for agriculture purposes.
- Presence of entrepreneurs' big companies and cooperatives providing capital managerial skills, for large scale and commercial farming like firestone for rubber growing in Liberia.
- The factors influencing agriculture are many and they work in a combination there is no single factors which can explain in isolation. The physical factors mainly influence in developing countries and human factors mostly in developed countries.

TYPES / AGRICULTURAL SYSTEMS IN THE WORLD

The types of agricultural system in the world are commercial, modern large scale and traditional or subsistence or small scale and these include; Extensive farming, ranching, paddocking, Nomadic pastoralism, horticulture, floriculture, market gardening, plantation farming, Arable irrigations, cooperative farming, factory farming, truck farming, shifting cultivation, rotational bush fallowing, collectivization.

A SKETCH MAP OF THE WORLD SHOWING TYPES OR SYSTEMS OF AGRICULTURE

SUBSISTANCE FARMING

This is the growing of crops and rearing animals on a small scale for domestic or home use. It is mainly practiced in the tropical equatorial regions. Less developed countries by peasants in rural areas. It includes shifting cultivation, rotational or bush fallowing.

Nomadic pastoralism, intensive subsistence farming.

Characteristics of subsistence farming.

- Farms cover a small area like five acres.
- The farms are scattered or fragmented.
- They use traditional methods of farming or simple technology.
- They use mixed and intercropping like maize with beans, G.nuts and soya.
- They mainly grow food crops like cassava, millet and maize.
- They grow cereal and annual crops which are harvested in a year.
- They use family labour because of small plots.
- There is law production for subsistence purposes.
- They depend on natural environment, physical factors.

SHIFTING CULTIVATION

This is a subsistence method of farming involving farmers moving from one place to another when the soil loses fertility. It is mostly practiced in sparsely populated areas like equator regions, the tropics e.g. Zambia, DRC, Brazil, Argentina, Zimbabwe, India, Indonesia and Venezuela.

Characteristics of shifting cultivation.

- There is bush burning during clearing land.
- Movement of people from one place to another after a loss of fertility.
- They have temporary settlement patterns.
- They grow crops for subsistence purposes.
- They grow cereal and annual crops like maize, millet.
- They use simple technology like hoes, pangas
- They specialize in growing food crops.
- They use barter system of trade.
- They grow some few cash crops.

- They are found in sparsely populated areas.
- They use communal and ownership for easy movement.
- They depend on nature and physical factors with no improvement and little attention.
- The land regains fertility by abandoning.
- They use family labour because of small plots.
- They use simple and traditional technology.

Importance / effects of shifting cultivation. Positive advantages:

- ✓ Source of food like cereal and annual crops reducing on dangers of hunger, malnutrition and food imports.
- ✓ Mixed and intercropping reduce on soil exhaustion e.g. Beans and maize.
- ✓ The farmers get enough time for other activities like hunting, fishing, art and craft.
- ✓ It is less expensive because of using simple tools like hoes, pangas, using family labour.
- ✓ Bush burning destroys pests and diseases, weeds and it adds soil nutrients like potash.
- ✓ The land regains fertility naturally by abandoning, there is no use of fertilizers.
- ✓ The cracks created by burning and during cultivation encourages the penetration of air and water for the living organisms in the soil which helps in soil formation.
- ✓ Provision of employment opportunities like the farmers leading to increased standards of living like Zambia, Brazil, India.
- ✓ Improvement in transport and communication like the rural feeder roads and social services in areas occupied by the farmers.
- ✓ The system is simple to use because of simple technology and no need of training like peasants in rural areas.

Disadvantages / Negative

- It encourages deforestation leading to loss of timber during the clearing of land.
- Bush burning leads to destruction of humus causing soil exhaustion.

- It leads to poverty and law economic development because of specializing in food crops and hence low production.
- It encourages soil erosion because of bush burning exposing to erosion agents e.g. wind, running water like rill, sheet, gulley and splash.
- It is found application in areas with sparse population and with population increase it becomes difficult.
- Time is wasted by moving from one are to another because the crops are scattered and fragmented.
- It leads to environment degradation because of bush burning, deforestation, swamp reclamation leading to destruction of plants and animals.
- It leads to poor land mismanagement because soil conservation measures are not practiced and land is owned communally. Reasons for the decrease in shifting cultivation
- Population increase leading to shortage of land and changing to other systems like rotational, bush fallowing, intensive subsistence farming.
- Change of land tenure / ownership system from communal to private land ownership discouraging movement.
- Agricultural modernization leading to use of modern and scientific methods of farming leading to development of commercial agriculture.
- Economic diversification leading to other economic activities depending on other resources reducing on the dependence on agriculture e.g. fishing.
- Introduction of other crops and other types of farming reducing on specialization and monoculture.
- Improvement on marketing both internal and external contributing to increased production.
- Presence of research stations leading to better breeds and helping in controlling pests and diseases.
- Change of cultures due to education interaction and exposure reducing on ignorance and backwardness.
- Improvement in transport like the construction of feeder roads helping in marketing, movement of workers e.g. extension workers to advise the farmers.
- Development of agro-based industries processing agricultural products for easy marketing and transport.

- Improvement in educated farmers using seminars / workshops by using extension workers e.g. agriculture, officers, veterinary officers, use of soil conservation measures leading to proper land use management e.g. intercropping, mulching, strip cropping.
- Environment conservation leading to gazetting of land as game and forests reserves, wetlands reducing on the rate of deforestation and encroachment.
- Presence of positive and support government policies like giving seedlings, giving loans, constructing transport routs, extension workers.

Qn: Account for the development or existence or persistence of shifting cultivation in either Congo basin or Amazon basin.

ROTATIONAL BUSH FALLOWING

This is an advanced form of shifting cultivation replacing it because of population increase leading to scarcity of land and need for agriculture modernization. It involves farmers moving from one plot to another when the land looses fertility but in the same area on rotational basis.

Similarities between rotational bush fallowing and shifting cultivation

- Subsistence crops are grown in both like cassava, beans and potatoes.
- They both use bush burning for clearing land.
- They use small plots leading to low production.
- Mixed cropping and intercropping is used in both.
- They use simple or rudimentary tools like pangas, axes and hoes.
- They use traditional methods of farming like peasants in rural areas.
- Both depend on nature and environment no use of fertilizers or irrigation.
- They both use simple technology like the peasants for subsistence farming.
- They are both practiced in areas with low population.
- They both grow cereal and annual crops which are harvested within a year.

Differences / contrasts

- ✓ In rotational bush fallowing villages are demarcated and settlements are permanent which in shifting cultivation it is temporary.
- ✓ In shifting cultivation land returns to forests and woodland while rotational bush fallowing it doesn't because it takes a short time.

- ✓ Rotational bush fallowing is practiced in areas with increasing population which sifting cultivation is in sparsely populated areas like DRC, Zambia and Brazil.
- ✓ In rotational bush fallowing the plots are well defined and there is a fixed system of rotation whereas in sifting cultivation the system is harpzard.
- ✓ In shifting cultivation there is specialization in arable farming whereas in rotational bush burning there is also livestock farming like keeping cattle.
- ✓ In rotational bush fallowing land ownership is private whereas in shifting cultivation it is communal.
- ✓ In rotational bush fallowing they are applying some modern and scientific methods of farming where in shifting cultivation it is subsistence farming.
- ✓ In rotational bush fallowing there is proper land use management and using some soil conservation measures whereas in shifting cultivation land is poorly managed.
- ✓ In shifting cultivation land regains fertility by abandoning while in rotational bush fallowing there is mixed farming.

Qn: Compare and contrast shifting cultivation and rotational bush fallowing.

SMALL SCALE FARMING (INTENSIVE SUBSISTENCE FARMING)

This is the growing of crops and rearing animals on a small scale for subsistence purposes e.g. growing cereal crops, annual keeping local breeds e.g. cassava, potations, beans, millet. It is mostly practiced in low developed countries e.g. Africa, S. Africa, Australia and some parts of Asia.

Characteristics of intensive subsistence farming.

- They have permanent fields for rice, bananas, coffee.
- They use family labour.
- They mainly grow food crops and some few cash crops e.g. cotton and coffee. The plots are small and scattered (land fragmentation).
- They use simple and rudimentary tools e.g. pangas, hoes, and axes.
- They depend on physical environment, natural conditions or environment factors.
- Soil fertility is maintained by fallowing and by adding manure and using mulching, they don't use fertilizers.

- It's mainly practiced in sparsely populated areas e.g. in rural areas by peasants.
- They use intercropping / mixed cropping and this helps to maintain soil fertility.
- They mainly grow crops for subsistence purposes and sell some surplus for purchasing the basic equipment.

Advantages of small scale farming / intensive subsistence farming.

- ✓ Source of employment opportunities leading to high standards of living.
- ✓ Development of infrastructure e.g. rural feeder roads.
- ✓ Development of agro based industries e.g. maize milling plants and dairy industries, etc.
- ✓ Source of foreign exchange through exporting coffee, cotton.
- ✓ Promoting education and research like fieldwork and scientific experiment.
- ✓ Source of food e.g. crops and livestock products e.g. beans, millet, milk, meat.
- ✓ International and regional relations because of exporting and importing.
- ✓ Development of tourism industries e.g. rice growing in India and China.
- ✓ Environmental protection by providing habitants for plants and animal species.
- ✓ Source of government revenue through taxation.
- ✓ Alternative land use pattern like sparsely populated area.
- ✓ Provides market for industrial products e.g. fertilizers, pesticides, hoes.
- ✓ They take limited capital / cheap and easily managed by farmers.
- ✓ Leads to promotion of economic diversification reducing on problems of independence.
- ✓ Climate modification through evaporation and evapotranspiration
- ✓ There is use of small pieces of land.
- ✓ There is use of limited labour and are cheap.

Demerits of subsistence farming

- It leads to poverty and low economic development because of low production.
- They lead to environmental destruction because of deforestation.
- In small areas, there is specialization e.g. cocoa growing in Ghana, G. nuts in Gambia and Senegal leading to problems of economic dependence.

- Soil exhaustion because of monocultures e.g. G. nut growing in Kondoa district central Tanzania.
- Pollution by agro-based industries.
- Limiting land for other activities because they occupy a big area.
- Leads to rural urban migration like to towns which are used as marketing centres.
- Price fluctuation on the world market affecting planning leading to low prices.
- Bush burning leads to destruction of plants and animals.

COMMERCIAL INTENSIVE FARMING

This is the growing of crops and rearing animals on a small piece of land using scientific and modern methods of farming leading to high production. It is mostly practiced in densely populated countries, near urban centres, densely population areas.

Examples: Horticulture is the growing of fruits and vegetables on a small piece of land leading to high production in Netherlands, Holland, and Carlifornia through irrigation. Market gardening: This is the growing of fruits, crops and vegetables near urban centres where there is easy access to markets. Truck farming: This is the growing of crops and rearing animals where there is good means of transport to the market. Factory farming: Is the rearing of animals using factory feeds like poultry, piggery, zero grazing, dairy farming.

Characteristics of intensive commercial farming

- Farms are small i.e. 3-6 hectares because of increased population density.
- Production per unit area is high because of using modern and scientific methods of farming.
- They use labour intensive technology because of small plots.
- Land is not allowed to rest because of population pressure.
- Fertilizers are used in this system.
- They grow cereal and annual crops.
- They rear animals for milk and its products are perishable and they need good transport (truck farming and easy market) in market gardening.
- They use supplementary feed from factories for livestock (factory farming.)
- Crops and animas are for commercial purposes.

Intensive commercial farming in Netherlands or Holland

Netherland or Holland is found in Europe and it is a developed country and it is important for horticulture like the growing of fruits and vegetables and it is important for dairy farming and zero grazing.

Agriculture is mainly carried out on reclaimed areas like Zuyder zee, Eastern Polder, Western Polder, Friesland, Makerland and these are found near North sea and mouth of R. Rhine.

It is important for growing fruits and vegetables like grapes, Barley, Apples, Spinach, Lettuce, Pears, Tomatoes, Cabbage, Cucumber. The animals reared include Fresian, New Jersey, Aghus, Red bull which are important for milk production and its products e.g. Cheese, Butter, Ice cream.

There is increased production for internal and foreign market.

A SKETCH MAP OF NETHERLANDS OR HOLLAND SHOWING AGRICULTURAL AREAS IN RECLAIMED LAND.

Factors of commercial intensive farming in Netherlands.

They are physical and human factors.

- Presence of market because of increased population in towns like Rotterdam, Amsterdam, Hague. Foreign market by German, Britain, France.
- Presence of fertile alluvial soils like clay in low lands near water bodies like R. Rhine and the North sea.
- They improved transport by constructing roads, railway lines, water transport, Air transport for easy marketing because the products are perishable.
- Presence of water supply for crops and animals from R. Rhine, North sea, manmade lakes by reclamation.
- Netherlands has limited pests and diseases because of cool temperate climate encouraging the growth of fruits, vegetables and rearing animals.
- Presence of flat and gentle slopes for easy transport and easy flow water by gravity in reclaimed areas like Friesland, Makerland
- Presence of strategic location near the North sea and R. Rhine for cheap water transport are near international ports like Rotterdam.
- Holland has limited resources like minerals, land discouraging other activities and encouraging intensive farming.

- Presence of improved science and technology like the use of modern scientific methods of farming like irrigation, glass have contributed to increased production.
- Presence of improved and better breeds with quick maturity, pests and diseases resistant e.g. Fresian cattle, fruits and vegetables.
- Presence of capital provided by the government and private investors for constructing lands, aqueducts for building industries.
- Presence of agro-based industries processing agricultural products e.g. diary factories for making beverages.
- Good international relations and regional cooperation helping in marketing, transport and labour supply like in Germany, Britain and France.
- Political stability and security leading to a favourable investing, climate and reducing expenditure defence.
- Use of cooperatives helping in marketing, giving loans, transport, processing, supervision and monitoring.
- Presence of positives and supporting and government policies like land reclamation, giving loans, carrying out research.
- Temperate climate with cold conditions for the growth of fruits, vegetables, rearing animals and hot summers for ripening the fruits and harvesting.
- Presence of labour supply both the skilled and unskilled because of increased population in town like Rotterdam, Amsterdam using immigrants and holiday makers during harvesting.
- Presence of research stations leading to better breeds, control of pests and diseases, processing and marketing.

Importance/ effects of commercial intensive farming in Netherlands.

Positive / advantages

- ✓ Small piece of land is used making it good for densely populated areas like near urban centres and reclaimed areas.
- ✓ Mixed farming is less affected by price fluctuations and crops are used as animal feeds and animals provide manure.
- ✓ It helps in soil conservation like getting manure from animals, growing cover crops.
- ✓ Constant production because of using irrigation farming and this helps in planning.

- ✓ Crops have increased food value like vitamins improving health of people and ensuring food supply.
- ✓ Growth of urban centres around marketing areas and processing factories e.g. in Amsterdam, Rotterdam, Hague.
- ✓ Improved transport and communication by constructing roads, railway lines, ports connecting agricultural areas to markets and industries.
- ✓ International relations and regional cooperation with counties like German, Britain, Iceland, and Belgium.
- ✓ Government revenue by taxing people and companies improving the national income.
- ✓ Employment opportunities like the farmers, in agro-based industries leading to increased standards of living.
- ✓ Foreign exchange by exporting fruits, vegetables and livestock products helping in importation and investments.
- ✓ Development of agro-based industries e.g. Dairy plants, industries for making beverages.
- ✓ Capital accumulation through investments, taxation, foreign exchange earnings leading to development of other products.
- ✓ Education and research by visiting fruit and dairy farmers, agro-based industries for acquiring skills and improving technology.
- ✓ Alternative land use because of limited resources and land.

Disadvantages

- It uses labour intensive technology making it tiresome and labourious.
- The products are perishable and expensive for storage like using cold rooms, freezers and refrigerators.
- Low production because of using small plots reducing on exports.
- It is not easy for peasants because of using scientific and modern methods of farming (it is expensive / needs a lot of capital.)
- It is expensive because of applying fertilizers, pesticides, insecticides, weed killers, irrigation and research.
- Environmental degradation because of deforestation, swamp reclamation and destruction of landscape in the reclaimed areas.
- Urban problems because of increased population around marketing areas, industries.

- Soil exhaustion because of using monoculture, specialization and latant cultivation, soil Stalinization by floods.
- Diversification of labour and capital into Agriculture affecting other sectors.
- Displacement of people and activities by occupying big areas.
- Breeding grounds around irrigated areas and reclaimed lands.
- Regional imbalance causing economic problems.

COMMERCIAL EXTENSIVE FARMING - WHEAT GROWING IN THE CANADIAN PRAIRIES

Extensive Commercial Farming is the growing of crops and rearing animals on a large scale using a big piece of land for commercials purposes. The Canadian Prairies are found in North America covering part of Canada and USA covering the provinces of Alberta, Saskatchewan, Manitoba and it is important for growing wheat and other crops like soya bean, maize, barley, oats, wheat using scientific and modern methods of farming under specialization of monoculture with low production per unit area but high production because of using extensive land for external and foreign market.

A SKETCH MAP SHOWING WHEAT GROWING IN THE CANADIAN PRAIRIES

Factors favouring wheat growing in the Canadian prairies.

Physical factors:

- ✓ Availability of land for extensive farming because of sparse population in the provinces of Alberta, Manitoba and Saskatchewan.
- ✓ Presence of fertile, Black Chenozerm soils which are well drained less acidic and not easily leached and they have high content of potassium and phosphates.
- ✓ Improved transport and communication like wing railway lines, roads, modern ports for export like Vancouver using St. Lawrence Sea Way and New York port.
- ✓ Presence of Savannah tropic climate with wet and dry conditions having rainfall around 1000mm, frost / free conditions encouraging the growth of wheat.
- ✓ Presence of relief which is flat and gentle slopping with hills, plateaus, broad valleys leading to easy mechanization, drainage and transport.

- ✓ Presence of wide market both internal and external because of increased population in towns like Vancouver, Regina, Emonton, Winnpeg and exporting wheat to other countries like China, Britain, Japan.
- ✓ Presence of industries supporting the growing of wheat for making equipment and inputs, for processing what and using wheat as a raw material e.g. bread, beverages.
- ✓ Strategic location near the coast near Pacific ocean leading to development of ports like Vancouver, Churchill, Prince Rupert are near the Great Lakes helping in use of cheap water transport internally and externally.
- ✓ Presence of capital provided by the government and private investors used for by buying machinery, equipments like tractors, combine harvesters, purchasing inputs like fertilizers.
- ✓ Limited resources in the Canadian Prairies like minerals, forests, discouraging other activities leading to specialization in wheat growing.
- ✓ Presence of international relations with wheat importing counties like China, Britain, Japan.
- ✓ Presence of labour supply both the skilled and unskilled working on wheat farms, processing factories contributing to increased production.
- ✓ Presence of improved breeds of wheat and other crops like soya bean, maize with quick maturity, pest and diseases resistant, drought resistant leading to increased production.
- ✓ Presence of positive and supportive government policies like gazetting agricultural land giving loans, training skilled labour, building industries, carrying out research.
- ✓ Political stability and security in USA and Canada leading to a favourable investment climate and reducing expenditure on defence.
- ✓ Limited obstacles like relief features, drainage features, land forms, thick vegetation making exploitation and development easy because of Savannah vegetation with grassland and scattered trees.
- ✓ Presence of entrepreneur and big companies providing capital and managerial skills for large scale commercial farming.
- ✓ Limited pests and diseases because of good climate using scientific and modern methods of farming.
- ✓ Presence of improved science and technology leading to availability of skilled labour working on the farms and industries.

- ✓ Presence of water supply for the growth of wheat like rainfall during winter season and from water bodies like rivers, swampy areas and Pacific Ocean.
- ✓ The nature of the population being hardworking, innovative, good planners, enterprising people composed of Negroes, Jews, Indians, Europeans contributing to economic growth and development.

Importance / effects on environment

- Provision of employment opportunities leading to increased standards of living like the farmers and in processing factories.
- Source of government revenue by taxing farmers and companies improving the national income.
- Source of foreign exchange by exporting to China, Japan, Britain helping in importation and investment.
- Improvement in transport and communication like the construction of railway lines, modern ports like Vancouver connecting the wheat growing areas to markets and industries.
- Growth of urban centres around marketing areas and industries because of increased population like Regina, Edmonton, Winnpey, Calgary.
- Economic diversification by influencing other activities like trade, transport and industrialization.
- It requires few workers because of using capital intensive technology like tractors, combine harvesters.
- Less fertilizers are used because the land regains fertility by fallowing.
- Source of food like making bread reducing on the problems of hunger and food imports.
- Development of agro-based industries like bakeries, milling wheat.
- Leads to increased production because of specialization, monoculture, using modern scientific methods and extensive farming for internal and foreign market.
- Development of tourism industries like visiting the farms, industries of high income.
- Promotion of education and research by visiting wheat farms and industries for acquiring skills and improving technology.

Disadvantages / negative effects.

- Low production per unit area because of depending on nature and environment.
- Soil exhaustion because of monoculture and specialization contributing to environment degradation.
- It is only practiced in areas with sparse population and having extensive land.
- It leads to over production leading to problems of price fluctuations at the world market.
- It uses a lot of capital for purchasing tractors, combine harvesters which is not easily managed by scale farmers.
- It is affected by weather and frost (climatic) conditions like winter and snow.
- Pests and diseases because of low rainfall affecting planning.
- It causes unemployment because of using capital intensive technology.
- Pollution of air, water and land around agro-based industries, using fertilizers, weed killers.
- It leads to urban problems because of increased population like high costs of living around market areas and industries.
- Environmental degradation because of deforestation, swamp reclamation, destruction of the landscape affecting plants and animals.
- Regional imbalance in economic development causing economic problems like the provinces of Alberta, Manitoba, Vancouver.

PLANTATIONAL FARMING

This is the growing of one type of perennial crop on a large scale for commercial purposes e.g. sugarcane, tea, cotton, rubber, cocoa, palmoil.

Characteristics of plantational agriculture.

- It involves specialization or monoculture.
- It employs many people both the skilled and unskilled.
- Capital intensive technology is used.
- It has a processive factory because the products are perishable and bulky.
- Crops are grown for commercial purposes.
- The management provide social services to attract the workers.
- It covers a big area or extensive land.
- A lot of capital is used.
- Mostly found in areas with sparse population.

- They are found in equatorial climate or tropical region.
- They use research / modern and scientific methods of farming.

RUBBER PLANTAION IN LIBERIA

Liberia is a developing country found in West Africa and it is important for rubber growing in the areas of harbel, Carvalla, Bomi hills near Monorovia. Rubber plantations are contolled by firestone company from USA and Britain. And the Rubber was introduced from Malaysia.

A SKETCH MAP OF LIBERIA SHOWING RUBBER PLANTATION

Factors for Rubber growing in Liberia

There are physical and human factors accounting for rubber growing in Liberia.

- ✓ Presence of equatorial (wet) climate with wet conditions like rainfall around 1000-500mm humidity of 70%, temperatures around 250c because Liberia is found near the equator.
- ✓ Availability of land for extensive farming because of sparse population in rubber growing areas like Habel, Carvalla, Bomi hills.
- ✓ Presence of fertile soils like volcanic soils in hills and plateaus, alluvial and loam soils in lowlands and valleys e.g. at Carvalla.
- ✓ Presence of flat and gentle slopes leading to easy transport, mechanization and drainage like Bomi hills.
- ✓ Presence of improved breeds imported from Malaysia which are pest and disease resistant with quick maturity leading to increased production.
- ✓ Presence of equatorial forests near plantations leading to fertile soils, heavy rainfall and helping in soil conservation.
- ✓ Limited pests and diseases to attack rubber plantations contributing to increased production and reducing on the costs of growing rubber.
- ✓ Strategic location near Atlantic ocean leading to development of ports like Monrovia, USA, Japan, Germany.
- ✓ Presence of water supply for the growth of rubber like from Atlantic ocean, from rivers, wetlands, leading to growth of rubber without irrigation.
- ✓ It has limited resources like minerals discouraging other activities and promoting the growth of rubber.
- ✓ Presence of improved science and technology leading to availability of skilled labour helping in rubber growing and processing.

- ✓ Availability of adequate labour supply both skilled and unskilled because of increased population in towns like Monorovia using expatriates and immigrants like from Benin, Togo.
- ✓ Presence of capital provided by the government and firestone company for financing the growth of rubber, building processing factories, constructing transport routes, carrying out research.
- ✓ Political stability and security in Liberia helping in attracting investors like firestone company and diverting resources, to economic activities, improving infrastructure and social services.
- ✓ Presence of positive and supportive government policies like gazetting land to Habel, Carvalla, Bomi hills attracting investors like firestone company, improving infrastructure, building industries.
- ✓ Presence of good international relations and regional cooperation helping in marketing, getting loans, labour supply e.g. USA, Japan, Britain.
- ✓ Presence of entrepreneurs and big companies like firestone company providing capital and managerial skills for rubber growing.
- ✓ Presence of industries related to rubber growing e.g. rubber processing industry making shoes, tyres, insulators.
- ✓ Presence of improved transport and communication like the construction of roads, railway lines, modern ports connecting rubber growing areas to markets and industries.
- ✓ Presence of research stations like at Monorovia leading to better breeds, control of pests and diseases helping in processing and marketing.
- ✓ Presence of market both internal and external in towns like Monorovia and exporting rubber to other countries like Japan, USA, Britain.

Importance / effects of rubber growing in Liberia.

- ✓ Provision of employment opportunities leading to increased standards of living like the farmers in industries, in areas of Habel, Monorovia.
- ✓ Source of foreign exchange by exporting rubber, Germany, Britain and this helps in importation and investment.
- ✓ Source of government revenue by taxing employed people and companies like Firestone helping in improving national income and leading to capital accumulation.

- ✓ Growth of industries related to rubber growing like processing factories at Monorovia, industries for making tyres, shoes, insulators.
- ✓ Improvement in transport and communication like the construction of industries, modern ports like in areas of Monorovia and Habel.
- ✓ Promotion of international relations and regional cooperation like in USA, Japan, Britain because of international trade.
- ✓ Promotion of education and research by visiting plantations at Habel, Carvalla, Bomi hills, Monorovia for acquiring skills and for improving technology.
- ✓ Economic diversification by influencing other activities like trade, transport, tourism.
- ✓ Alternative land use because of limited resources and due to availability of extensive land for large scale farming.
- ✓ Development of tourism industries by visiting rubber plantations, processing factories at Monorovia and because of increased income.
- ✓ Growth of urban centres because of population around industries, marketing centres like Monorovia town helping in promoting trade and improving social services.
- ✓ Environmental conservation through climate modification, soil conservation and providing habitats for plant and animal species.
- ✓ Capital accumulation by foreign investors through taxation, foreign exchange earning leading to development of other projects.
- ✓ Improvement in social services in areas like Harbel, Carvalla, Bomi hills, leading to high standards of living e.g water.
- ✓ Development of out growers like small scale farmers growing rubber benefiting from the near by plantations like forgetting seedlings, market, extension workers.

Negative effects or disadvantages

- ✓ Soil exhaustion because of monoculture leading to infertile soils due to specialization.
- ✓ Pollution of air, water and land around processing factories using fertilizers, pesticides, weed killers.
- ✓ Regional imbalance causing economic problems like Monorovia town, Harbel, Carvalla.

- ✓ Displacement of people and activities by occupying big areas.
- ✓ It leads to urban problems because of increased population in towns like in Monorovia like increased crime rates, creation of slums.
- ✓ Profit repatriation by foreign investors like firestone company causing capital outflow.
- ✓ Diversion of labour and capital into rubber growing affecting the development of other sectors.
- ✓ Environmental degradation because of deforestation, swamp reclamation and degradation of the landscape in rubber growing.
- ✓ It is affected by marketing problems like price fractuation on the world market, competitions and this affects planning.
- ✓ It is affected by environmental factors like climate and weather, soil fertility, pests and diseases and this also affects planning.

SUGARCANE GROWING IN ANTAL PROVINCE IN SOUTH AFRICA

Natal province is found in S.A and it is important for sugarcane growing in areas like coast of Indian Ocean, areas near Durban port and River Tugela, River Mkuse, R. Umazimkulu, R. St. Lucus and the sugarcane is managed by S.A sugar association.

A SKETCH MAP SHOWING SUGARCANE GROWING IN NATAL PROVINCE.

Factors of sugarcane growing in S.A

- ✓ Presence of wet climatic conditions like heavy rainfall, increased temperature, increased humidity because of warm Mozambique ocean currents.
- ✓ Presence of labour supply both the skilled and unskilled working in plantations and processing factories.
- ✓ Flat and gentle slopes leading to easy transport, mechanization and drainage.
- ✓ Presence of water supply from Indian ocean, River Tugela and from swamps and wetlands.
- ✓ Improved transport like the construction of roads, modern ports, railway lines connecting the plantations to markets and industries.
- ✓ Presence of capital provided by the government for financing, sugarcane growing and processing.

- ✓ Availability of land for extensive farming because of sparse population in the areas of River Tugela, Umzimukulu, Mkuse.
- ✓ Improved breeds of sugarcane with quick maturity, drought and pest resistant leading to increased production.
- ✓ Positive and supporting government policies towards sugarcane growing like giving loans, constructing industries.
- ✓ Strategic location near Indian ocean leading to development of ports like Durban and suing cheap water transport.
- ✓ Political stability and security helping in attracting investors, developing infrastructure, social services and economic activities.
- ✓ Presence of good international relations and regional cooperation helping in marketing, getting loans, labour supply in Zimbabwe, USA which import sugar from S.A.
- ✓ Improved science and technology leading to availability of skilled labour working in plantations and processing factories.
- ✓ Presence of fertile alluvial soils are found in lowlands, valleys near water bodies.
- ✓ Nature of the population being hardworking, innovative, good planners, enterprising people leading to agriculture on a large scale and the development of industries.
- ✓ Limited pests and diseases to destroy sugarcane plantations and reducing on the costs of production.
- ✓ Presence of forests acting as windbreakers, increasing on rainfall, soil conservation by providing humus and building materials.
- ✓ Limited resources in the Natal region like minerals, discouraging other activities and encouraging sugarcane growing.
- ✓ Presence of research stations leading to better breeds helping in controlling pests and diseases, processing sugarcane and marketing the products.
- ✓ Presence of industries like for processing sugar, sweets, papers, distilling alcohol from sugarcane wastes.
- ✓ Presence of entrepreneurs and big companies like S.A. sugar association leading to good management, provision of capital for large scale commercial production.

Importance / effects of sugarcane growing in Natal.

Positive

- ✓ Source of foreign exchange by exporting sugar to other countries like China, Zimbabwe and the foreign exchange is used for importation and investment.
- ✓ Provision of employment opportunities leading to increased standards of living like workers in plantations, processing factories like at Durban.
- ✓ Improvement in transport and communication by the construction of roads, railway lines, modern ports around areas of Natal and Durban.
- ✓ Environmental conservation through climate modification, soil conservation and providing habitats for plants and animals.
- ✓ Promotion of education and research by visiting sugarcane plantations, processing factories for improving skills and technology.
- ✓ Economic diversification by influencing other activities like transport, trade, industrialization, tourism.
- ✓ Growth of urban centres around industries and marketing areas because of increased population e.g. Durban
- ✓ Development of industries related to sugarcane growing like for processing sugar, distilling alcohol, making sweets, papers.
- ✓ Improvement in social services like water supply, power supply, health facilities leading to increased standard of living.
- ✓ Production of power like Biogas, Biomas used for domestic and industrial purposes reducing on deforestation for firewood and charcoal.
- ✓ Source of government revenue through taxation, foreign exchange earnings, capital by investors, helping and improving international income and developing other economic products.
- ✓ Development of tourism industries by visiting plantations, processing factories and because of increased income.
- ✓ International relations and regional coperations like USA, Britain, Zimbabwe leading to development of international trade.

Negative effects / disadvantages

- ✓ Soil exhaustion due to monoculture.
- ✓ Unemployment and air pollution due to high level of technology and use of machinery such as tractors.
- ✓ Displacement of people from areas which have been gazette for sugarcane growing like Natal.
- ✓ Profit repatriation by foreign investors by S. African sugar association causing capital outflow.
- ✓ Diversion of labour and capital into sugarcane growing affecting the development of other sectors.
- ✓ Environmental degradation because of deforestation, swamp reclamation and destruction of the landscape in rubber growing areas.
- ✓ It leads to urban problems because of increased population in towns like Natal and Durban like increased crime rates and creation of slums.
- ✓ Regional imbalance causing economic problems.
- ✓ Fluctuation in world market prices of sugar which affects the incomes farmers receive.
- ✓ Large quantities of cane being destroyed due to large wild fire outbreaks.
- ✓ High costs of production such as those involving irrigation.
- ✓ Over dependence on foreign markets hence fluctuation in rubber prices.

IRRIGATION FARMING

Irrigation farming is the artificial application of water to growing crops either permanently or temporarily. It is mostly practiced in dry areas e.g. Mubuku, Gezira, Carlifornia, Egypt, Middle East and types of irrigation include; Basin irrigation, perennial, annual, well, overhead sprinkler, drip and canal irrigation.

GEZIRA IRRIGATION SCHEME IN SUDAN

It is found between Blue Nile and White Nile at the tributaries of R. Nile. In the south there is Sennar dam, North there is Khartoum town, started by the British in 1910 and it is managed by Gezira irrigation board. It is important for cotton and other crops like maize, millet, beans, G. nuts.

A SKETCH MAP SHOWING GEZIRA IRRIGATION SCHEME

Factors for the development of Gezira irrigation scheme

- ✓ Water supply from Blue Nile and White Nile which are the tributaries of River Nile providing water for irrigation.
- ✓ Presence of flat and gentle slopes leading to easy flow of water by gravity helping in transport and mechanization.
- ✓ Limited pests and diseases to destroy crops reducing on the cost of production leading to increased production.
- ✓ Presence of dry climatic conditions with rainfall below 1000mm leading to irrigation for supplementing the rainfall.
- ✓ Limited obstacles like relief features, vegetation types, water bodies because it is found in a savannah area making exploitation easy and cheap.
- ✓ Presence of fertile, clay and loam soils which are less porous and permeable helping in retaining water.
- ✓ Availability of land for extensive agriculture because of sparse population.
- ✓ Improved breed of cotton with quick maturity, pest and drought resistant.
- ✓ Limited resources like mineral, forests, water bodies for fishing discouraging other activities.
- ✓ Strategic location near river Nile and its tributaries near Khartoum town which is used as a port, marketing area and an industrial area.
- ✓ Presence of capital provided by Britain and Sudan used for constructing canal, building canals, carrying out research.
- ✓ Positive and supportive government policies like gazetting land, attracting investors from Britain, avenging extension workers.
- ✓ Presence of wide market for cotton and other crops in towns like Khartoum and exporting to other countries like Britain.
- ✓ Labour supply both skilled and unskilled working in the farms, processing factories because of increased population in Khartoum and getting expatriates from Britain.
- ✓ Improved science and technology leading to availability of skilled labour like Engineers, technicians for constructing canals, aqueducts, industries like Ginneries, carrying out research.
- ✓ Good international relations with importing countries like Britain and helping in getting loans, political stability and security, attracting investors and diverting resources to economic growth and development.
- ✓ Power supply like HEP from Sennar dam, Jabel dam used in engineering, spinning mills, textile industry and used for irrigation.

- ✓ Presence of research stations leading to better breeds, control of pests and diseases, processing of cotton and marketing.
- ✓ Good management by Gezira irrigation board helping in providing capital, extension workers, social services, loans.
- ✓ Presence of industries related to cotton growing, textile factories, cotton ginneries, oil processing and industry for marketing equipment and inputs.

Importance /positive effects of Gezira irrigation scheme Advantages

- Food supply like the growing of maize, beans, G.nuts, cooking oil from cotton, reducing on dangers of hunger and malnutrition and food inports
- Provision of employment opportunities leading to high standards of living like in irrigation farms and processing factory e.g. ginnery, textile.
- Promotion of international relations and co-operations with Britain promoting international trade.
- Growth of urban centres because of increased population around marketing areas, industries helping in promoting trade and social services e.g. Khartoum town.
- Source of foreign exchange by exporting cotton to Britain helping in importation and investments.
- Government revenue by taxing people and companies and the money is used for development activities for infrastructure and social services.
- Promotion of education and research by visiting irrigation areas and industries helping in acquiring skills and improving technology.
- Economic diversification by influencing other activities like trade, transport, tourism.
- Development of industries e.g. cotton ginning and spinning, cooking oil extraction.
- Improvement in transport and communication like the construction of roads, railway lines benefiting the surrounding communities.
- Environmental conservation by encouraging afforestation and reafforestation programs in areas not good for agriculture.
- Source of HEP from Sennar and Jabel dams used for domestic and industrial purposes.
- Control of floods by constructing canals, aqueducts, reducing on pests and diseases and attracting people for settlement and agriculture.

- It has helped in land reclamation by controlling floods, pests and diseases and application of water in a dry area.
- Development of tourism industry by visiting irrigation areas like Gezira, managing dams, visiting dams and industries.
- It has helped in demonstration and influenced the development of other dams like Manergil.
- Promotion of forestry and lumbering, getting timber for building and construction.

Disadvantages / Negative

- Soil exhaustion because of monoculture and specialization in cotton growing.
- Displacement of people and activities by gazetting land like the nromadic pastoralists who occupied the area.
- Regional imbalance causing economic problems.
- Breeding grounds for disease vectors like mosquitoes, tsetse flies, Bilharzia – snails.
- Environmental degradation, swamp reclamation, deforestation, destruction of landscape, construction of canals, aqueducts.
- Encourages floods leading to breeding grounds destroying crops and property and causing soil salinization (infertile).
- Diversion of labour and capital into the agricultural sector destructing other economic activities.
- Foreign repatriation by foreign investors from Britain causing capital outflow and lowering the national income.
- Pollution of air, water and land around industries by using in fertilizers, pesticides and weed killers.
- Urban problems because of increased population around industries, marketing areas like increased cost of living in Khartoum.
- Marketing problems because of over production, price fluctuations, affecting planning.
- Loss of fertile soils through siltation and deposition, sedimentation.
- Increased costs of maintenance and rehabilitations through constant dredging like removing silt, sediments, and deposits.
- Water loss by evaporation from water reservoirs from canals, aqueducts.
- Promotion of accidents because of HEP, canals, aqueducts, water reservoirs, dams, floods.

IRRIGATION IN CALIFORNIA (USA)

California is a dry area found in USA and it is important for irrigation farming in areas around imperial valley around rivers San Joaquin, Colorado and Scramento, around Delta Mondata, Frient dam, Shasta dam.

It is important for crops like fruits and vegetables like cucumber, eggplants, oranges, pears, lime berries, cauliflower.

Factors for irrigation farming in California

- Dry climatic conditions because of being in a rain shadow of the Sierra Nevada and Appalacian markets.
- Presence of fertile soils composed of clay, alluvial soils which are less porous and permeable. These soils are found around rivers Sacramento, San Joaquin.
- Flat and gentle slopes leading to easy flow of water by gravity and helping in transport.
- Water supply from R. San Joaquin and from a dam like Shasta, Frient dam and Atlantic ocean.
- Availability of land because of low population for extensive agriculture.
- Improved breeds of fruits and vegetable which were pest resistant, have quick maturity and high production e.g. cauliflower, apples, etc.
- Limited pests and diseases to attack crops contributing to high production.
- Limited resources like mineral dry conditions discouraging other activities and promoting irrigation farming.
- Positive government policies like gazetting land, developing infrastructures and subsidization and also availing extension workers which has helped in promoting irrigation farming in California.
- Adequate capital provide by government and private investors for constructing canals aqueducts, water reservoirs.
- Wide market for fruits and vegetables in towns like Ney York, Los Angels, San Francisco exporting to Japan, Canada, etc.
- Improved science and technology leading to the availability of skilled labour working in farms and agro based industries.
- Labour supply both skilled and unskilled because of high population in towns like Los Angels using holiday makers during harvesting.

- Good management by using co-operatives and educated farms contributing to high population.
- Political stability leading to a favourable investment climate.
- Presence of research station helping in improving breeds, controlling pests and diseases.
- Presence of agro based industries helping in processing fruits, vegetables and adding value for easy marketing like soft drinks, beverages, wine, tomato sauce, etc.
- Strategic location near Atlantic ocean developing its own ports like Los Angeles and using cheap water transport.

A SKETCH MAP FOR IRRIGATION FARMING IN CALIFORNIA

Importance of irrigation farming in California. Advantages

- Source of government revenue leading to capital accumulation and improving national income.
- Development of tourism industry by visiting irrigation areas like around the Imperial valley, Shasta dam.
- Source of foreign exchange by exporting fruits and vegetables in California / Canada.
- Provision of employment opportunities e.g. fruits and vegetable farmers, holiday makers and people working in agro based industries hence improving on the standards of living.
- Source of food to the people of California e.g. fruits, vegetables, etc reducing on malnutrition and food imports.
- Land reclamation by using desert areas and flooded areas.
- Good international relations with importing countries like Canada, Japan and Britain.
- Economic diversification by influencing other activities like trade, transport, tourism, reducing on depend burden.
- Development of urban centres used as marketing areas and having industries helping in trade and improving social services e.g. Los Angels.
- Improvement in transport like construction of rails, railway lines connecting agricultural areas to major water ports like San Joaquin, Los Angels.
- Power supply by dams used for domestic and industrial purposes e.g. Frient dam, Shasta dam.

- Control of floods reducing on pests and diseases attracting settlement.
- Provision of raw materials for the agro based industries which leads to industrial development.
- Environmental conservation though afforestation and re-afforestation programmes in flooded areas and areas with infertile soils.
- Promotion of education and research by attracting people for demonstration purposes.

Disadvantages

- Loss of water by evaporation from canals and aqueducts, water reservoirs.
- High costs of development maintenance and rehabilitation like constant dredging.
- Loss of fertile soils through sedimentation, deposition, siltation by floods around canals, aqueducts.
- Pollution of air, water, land around agro-based industries using fertilizers.
- Breeding grounds for disease vectors because of poor drainage and floods.
- Urban problems because of population like high costs of living, creation of slums.
- Environmental degradation because of deforestation, swamp reclamation and destruction of landscape.
- Limited land for other activities by occupying big areas displacing people and activities.
- Promotion of accidents caused by floods, power supply destroying people's lives and property.
- Regional imbalance in economic development causing income inequality.
- Soil exhaustion by monoculture and specializing in growing fruits and vegetables.
- Marketing problems because of high production, poor storage, price fluctuation.

LIVESTOCK FARMING

This is the rearing of animals for commercial and subsistence purposes e.g. cattle, sheep, pigs and goats. It also has types like Nomadic pastoralism, ranching, dairy farming, zero grazing, poultry, piggery.

NOMADIC PASTORALISM

This is a subsistence form of livestock farming involving farmers moving from one place to another looking for water and pasture like latitudinal Transhumance which is moving according to latitude like in wet season moving North wards then dry season moving South wards.

And Altitudinal transhumance moving according to altitude like in the wet season they move to highlands and in dry season moving to lowlands.

Characteristics

- Constant movement looking for water and pasture.
- Temporary settlement patterns like building hats which are grass thatched.
- Found in areas with sparse population with enough land for easy movement.
- Keep large numbers of cattle because they value quantity.
- Keep local breeds.
- They are found in dry areas with limited water and pasture.
- They use traditional methods of farming.
- They depend on nature and environmental factors.
- They practice cattle rustling causing conflicts and tensions.
- They are found in remote and backward areas with poor social services and infrastructure.
- They specialize in animal rearing.
- They are found in areas with infertile soils with limited resources not good for other economic activities.
- Communal grazing because of communal land ownership.
- They keep cattle for subsistence purposes e.g. for food, bride price.
- Examples Fulani, Sahel W. Africa Barbers in Tuaregs Sahara desert. Masai, Kenya, Tanzania Bushmen Hotentos Namibia, Kalahari. Turkana, Western Kenya. Bahima in Uganda. Somali in Kenya & Somalia. Karamajong North Eastern Uganda.

THE FULANI OF WEST AFRICA

The Fulani nomadic pastoralists are found in the Sahel region of West Africa covering areas of Northern Nigeria, Mali, Gambia, Chad, they practice altitudinal and latitudinal transhumance according to different seasons. They specialize in cattle keeping using local breeds for subsistence purposes.

They have introduced using modern and scientific methods of farming like setting up demonstration farms, carrying out cross breeding, valley dams for water supply.

A SKETCH MAP SHOWING FULANI REGION IN WEST AFRICA.

Factors that have favoured Nomadic pastoralism in the Fulani region

Qn: Account for the persistence in nomadic pastoralism in Africa.

- Presence of dry conditions leading to low and unreliable rainfall causing aridity and desertification e.g. rainfall between 500mm discouraging the growing of crops.
- Sparse population giving enough land for constant movement and keeping large quantities of cattle.
- The Fulani region in the Sahel has limited resources like mineral, water bodies for fishing, forests for lumbering, fertile soils for arable farming leading to specialization in Nomadic pastoralism.
- Presence of wild animals scaring people for settlement and for other economic activities e.g. Hyenas, Leopards, Lions.
- Presence of pests and diseases like tsetse flies, locusts discouraging settlement of other activities and promoting the keeping of local breeds which are resistant.
- Presence of poor infertile soils which are porous and permeable discouraging the growing of crops.
- Poor social services leading to low standards of living like water supply and power discouraging settlement.
- Poor science and technology like the use of traditional methods of farming like bush burning for clearing land.
- Presence of savannah and desert vegetation like grassland, herbs, shrubs giving pasture for animals.
- Limited water supply leading to constant movement discouraging other activities and encouraging keeping of local breeds.
- Presence of backward cultures and traditions making them conservative not willing to change like valuing quantity rather than quality.
- Practicing cattle rustling, being wonderers.

- Presence of flat and gentle slopes with broad valleys leading to easy movement of animals looking for water and pasture.
- Poor government policies like not giving them loans, not developing infrastructure, social services making areas remote and backward discouraging other activities.
- Limited capital to purchase modern equipment leading to subsistence farming.
- Limited market for cattle and their products contributing to small production.
- Keeping local breeds which are resistant to pests and diseases can survive dry conditions, they consume limited pasture.
- Limited extension workers like veterinary officers, agricultural officers to advise the farmers.
- Lack of co-operatives to help in giving loans, supervising the farmers, storage contributing to low production.
- Limited industries to process livestock products like dairy plantations, leather turning industry, meat packing leading to subsistence farming.
- Political instabilities like cattle rustling causing conflicts and tensions discouraging settlement of other activities.

Problems faced by Nomadic pastoralists.

Qns: a). To what extent are the problems faced by Nomadic pastoralists of their own making.

b). The problems facing Nomadic pastoralists are physical and human. Some are of their own making, others not of their own making.

- Over stocking causing over grazing contributing to environmental degradation like promoting soil erosion.
- Cattle rustling causing conflicts hence leading to death of people and animals hence creating instabilities.
- Animal diseases like rinder pest, tick fever, anthrax.
- Drought leading to limited water supply for animals and growth of pasture because of low rainfall and limited water bodies.
- Moving for long distances looking for water and pasture making animals tired leading to low production.
- Keeping of poor breeds like long horned cattle, zebu, Masai land leading few production in terms of meat and milk.

- Presence of wild animals like hyenas and lions eating people and animals hence leading to movement from one place to another.
- Limited market because of low income and population causing wastage and discouraging high production.
- Poor social services and infrastructure like roads affecting marketing.
- Ignorance and backward culture by being more conservative limiting modern agriculture and contributing to cattle rustling.
- Limited government support in form of loans not developing infrastructure and availing extension workers.
- Communal grazing encouraging the spread of diseases and poor land use management.
- Presence of poor pasture composing of shrubs and leading to low production.
- Natural calamities like locusts, floods destroying pasture for animals.
- Bush burning leading to environmental degradation and growth of poor pasture used as the means of clearing land.
- Competition with other countries on the world market leading to low prices and because of having other substitutes.
- Infertile sandy soils discouraging the growth of vegetation for pasture.
- Limited capital to purchase modern equipment like spray pumps.
- Limited skilled labour like agricultural officers to advice farmers.
- Using poor farming methods like bush burning accelerating environmental degradation and causing low population.
- Political instability scaring away investors and farmers, diverting resources for defense.
- Lack of co-operation among farmers affecting getting loans.
- Poor transport in remote areas affect marketing and movement of farmers and workers.

Ways of developing Nomadic pastoralism area (solutions)

- Carrying out cross breeding between local and exotic breeds thus increased production.
- Formation of co-operatives among the farmers helping in marketing, getting loans.
- Construction of valley dams and tanks for storage of water to be used in the dry season (areas).

- Using insecticides, pesticides and animals drugs for controlling pests and diseases.
- Mass advocation and mobilisation about modern methods of farming and environmental conservation.
- Planting artificial pasture like Alfalfa for feeding animals on fodder crops leading to increased production.
- Using modern methods of farming e.g. using paddocks leading to controlled and reducing on spread of diseases by communal grazing.
- Improvement in transport like construction of rural feeder roads helping in marketing and movement of workers and farmers.
- Getting loans for putting up modern facilities like dip tanks and buying drugs.
- Economic diversification reducing dependence burden like arable farming.
- Political instability attracts investors developing infrastructure and economic activities through good governance and regional co-operation.
- Reduction on cattle rustling by decreasing nomadic pastoralists and through massive education and mobilization.
- Availing extension workers like veterinary officers and advise the pastoralists on better farming methods.
- Supporting government policies like developing infrastructures attracting investors.
- Introduction of exotic breeds leading to increased production like Fresian cows.
- Building agro-based industries processing livestock products e.g. dairy plants helping in adding value for easy transport and marketing.
- Increase in market by expanding market centres and exporting animal products to other countries.
- Gazetting areas for livestock, tourism and environmental protection.
- Training skilled labour by promoting science producing agricultural officers and veterinary officers.
- International relations and regional co-operation helping in marketing and labour supply.
- Promotion of research modern methods of farming helping in disease control.

RANCHING IN ARGENTINA

Ranching is the rearing of animals on a large scale or extensive basis like Boran, Aghus. It involves using paddocks, rotational grazing, dipping animals, spraying and using scientific and modern uses of farming.

Argentina is found in South America and near Atlantic ocean and it is important for ranching around the pampas grassland in the Eastern part of Argentina.

Factors favoring the development of Ranching in Argentina

- Presence of soil with medium fertility composed of sand and clay leading to growth of pastures, food crops and animal feeds like Alfalfa.
- The pampas of Argentina have limited resources like minerals discouraging other activities like mining, no forests for lumbering, limited water bodies for fishing hence promoting livestock farming.
- Strategic location near Atlantic ocean leading to development of ports e.g. Buenosaires and helping in using cheap water transport.
- Presence of better breeds like Boran, Aghus which are pest resistant with quick maturity and having increased production.
- Extensive land for large scale farming because the area is sparsely populated.
- Presence of Savannah grassland on the pampas giving enough pasture for the animals and leading to increased production.
- Presence of savannah climate with wet and dry conditions, frost free conditions favoring the growth of pasture and fodder crops like maize, corn.
- Limited pests and diseases to affect livestock leading to increased production and reducing on the cots for operation.
- Relief which is flat and gentle slopping on the pampas leading to easy mechanisation, transport and drainage.
- Presence of water supply for the growth of pasture and for the animals like from Pacific Ocean, rivers like Uruguay, Paraguay.
- Presence of limited obstacles in the pampas like thick vegetation relief features, landforms, water bodies making exploitation and development easy and cheap.
- Political stability and security leading to a favourable investment climate and helping in diverting resources, economic activities, infrastructure and social services.
- Presence of wide market both internal and external and in towns like Buenosaires and exporting to USA, Japan and Britain.

- Improved transport and communication like the construction of roads, railway lines connecting the interior and the coast and connecting to markets and industries.
- Presence of capital provided by the government and private investors to purchase equipments, pay workers and set up industries, constructing valley dams.
- Presence of improved science and technology leading to the availability of skilled labour like agricultural officers, veterinary officers, bio chemists helping in suing modern and scientific methods of farming e.g. cross breeding, fattening animals, artificial insemination.
- Good international relations with beet importing countries like Japan, USA and Britain and helping in getting loans.
- Presence of labour supply both the skilled and unskilled like the cowboys, grazing the animals, people working in factories, veterinary officers, agricultural officers and biochemists.
- Presence of positive and supportive government policy i.e. giving loans to farmers, constructing roads for transportation of products, gazetting land, availing extension workers, building industries.
- Presence of industries supporting livestock farming like beet processing factories, dairy factories, leather canning industries.
- Presence of research stations helping in controlling pests and diseases, getting better breeds, processing livestock products and marketing.

Importance / effects of ranching in Argentina Positive

- Source of government revenue by taxing people and companies leading to capital accumulation and improving international income.
- Presence of co-operatives and big companies e.g help in management.
- Provision of employment opportunities like cowboys grazing the animals in processing factories, vet and agricultural officers leading to increased standards of living.
- Source of foreign exchange by exporting beet to Canada, Japan helping in importation and investment.
- Development of industries like beet processing, dairy plants, leather industry because of getting raw materials from ranches or animals.

- Source of food like beef, milk, cheese, ghee reducing on hunger, malnutrition, famine and food imports.
- Development of tourism industry by visiting ranches, processing factories and because of increased income.
- Promotion of education and research by visiting the ranches, processing factories, helping in acquiring skills and improving science and technology.
- Growth of urban centres like Buenosaires because of increased population around marketing areas, industries promoting trade and improving social services.
- Promotion of international relations and regional co-operation through export trade with USA, Japan and Britain.
- Promotion of economic diversification by influencing other activities like trade, tourism, industrialization reducing on the dependency burden.
- Alternative land use because of limited resources like minerals, having infertile soils being dry, limited water bodies discouraging other activities.
- Capital accumulation for other development projects because of foreign investors through taxation, foreign exchange earnings contributing to economic growth and development.
- Environmental conservation because the animal products are used for improving soil fertility like cow dung, urine and they are also used for producing bio-gas energy, reducing on deforestation for firewood and charcoal.

Negative.

- Environmental degradation because of deforestation in the farms through the construction of industries, transport routes, destruction of the landscape and swamp reclamation.
- Displacement of people and activities by occupying big areas around the pampas.
- Pollution of land, water and air around industries and using drugs and chemicals.
- Profit repatriation by foreign investors causing capital outflow and lowering the national income.

- It leads to urban problems because of increased population around marketing areas and industries like Buenosaires e.g. increased cost of living, congestion, slums, unemployment.
- Diversion of labour and capital into livestock farming e.g. the cowboys affecting other economic activities because of specialization.
- Marketing problems due to over production, price fluctuations and the products being perishable.
- It leads to regional imbalance in economic development e.g. coastal towns like Buenosaires causing economic problems like wage difference, income inequalities, labour immobility.
- Economic dependence because of specialization causing problems like balance of payment, poor terms of trade, inflation.

DAIRY FARMING IN DENMARK

Dairy farming is the rearing of animals for production of milk and its productions e.g. Bongo, cheese, yoghurt, ghee, butter, etc. it is a modern method of farming using scientific methods. Denmark is a developed country found in Western Europe and it is important for dairy farming.

A SKETCH MAP OF DENMARK SHOWING FARMING AREAS.

Factors for dairy farming in Denmark

- Medium soil fertility composed of sand and clay for the growth of pasture and fodder crops.
- Temperate climate with low temperature leading to limited pests and diseases encouraging growth of pasture.
- Availability of land gazette for dairy farming because of low production due to temperate climate.
- Good breeds like Fresians, new jersey with quick maturity contributing to increased production.
- Use of co-operatives helping in marketing, transport, getting loans, processing, carrying out supervision and monitoring.

- Use of scientific and modern methods of farming like artificial insemination, deworming, dipping, spraying contributing to high production in terms of quantity and quality.
- Improved transport like using railway lines, modern ports like Copenhagen, air transport helping in marketing.
- Adequate capital provided by the government and private investors for purchasing modern equipments, building factories and developing infrastructure.
- Wide market because of increased income in Copenhagen, Alberg, Odense and exporting to the neighbouring countries like Britain, Germany and France.
- Good management because of trained farmers helping in fighting diseases and planning.
- Positive government policies like maintaining political stability, giving loans to farmers and availing extension workers e.g. agricultural officers and veterinary officers.
- Good international relations with European union member countries helping in marketing like Germany, France, Britain.
- Alternative land use because of limited resources like minerals, having temperate climate discouraging arable farming.
- Strategic location near the coast because it is made up of Islands developing its own ports like Copenhagen and using cheap water transport.
- Presence of agro-based industries helping in processing and marketing for easy transport and marketing like making butter, cheese, ghee, packed milk.
- Presence of enough pasture like alfalfa and using artificial feeds, maize, aiming at increased production.
- Flat and gentle slopes help in transport and drainage and mechanization.

Importance of Dairy farming in Denmark

- Source of foreign exchange by exporting milk and its products like cheese, butter, ghee, packed milk to other European countries.
- Source of food like milk and its products reducing on malnutrition and food imports.
- Improvement in transport like expansion of Copenhagen port, construction of roads, railway lines in areas of Alberg and Odence.

- Provision of employment opportunities like the dairy farmers in dairy industry leading to increased standards of living in Copenhagen.
- Government revenue through taxation of farmers and companies generating capital and improving natural income.
- Development of industries processing milk, cheese, butter and ghee making biscuits like ice cream and leather industries.
- Growth of urban centres used as marketing areas and industries like Copenhagen improving trade and social service provision.
- Promotion of education and research by visiting the farms factors for scientific studies.
- Alternative land use because limited resources, having infertile soils, temperate climate surrounded by water discouraging other activities.
- Development of tourism industry by visiting the farms, industries and because of increased income.
- Good international relations and regional co-operations with importing countries like Germany, Britain, France hence creating friendship.
- Environmental conservation by getting manure from animals and using animal products for the production of power e.g. biogas.

Disadvantages

- Limiting land for other activities by occupying big areas.
- Pollution around agro-based industries because of water and sewages.
- Urban problems around marketing areas and industrial centres.
- Environmental degradation because of deforestation, swamp reclamation and destruction of the landscape during clearing of farms and because of construction work.
- Marketing problems because of high product price fluctuations, competitions affection planning.
- Agricultural products are highly perishable.
- Regional imbalance causing income inequalities, wage difference, labour mobility around Copenhagen.
- Diversion of labour and capital in the development of dairy farming affecting other sectors like industrialization, arable farming.

CO-OPERATIVE FARMING

This is the grouping of farmers in different areas helping in improving quantity and quality of agricultural products leading to agricultural modernization e.g. Denmark, Usama villages in Tanzania, Communes in China.

They are characterized by;

- Use of modern and scientific methods of farming.
- Managers are chosen from the farmers.
- They mediate between government and the farmers.
- Leaders are chosen democratically.
- Communal ownership of means of production.

Factors for the development of co-operatives in Denmark

- Presence of educated farmers using modern and scientific methods of farming.
- Good management because of choosing leaders democratically from the farmers.
- Presence of adequate capital for improving infrastructure, building factories and for purchasing equipment.
- Improved transport like the construction of roads, railway lines and ports connecting agricultural areas to market and industries.
- Presence of wide market both internal and external leading to increased production for commercial purposes.
- Positive and supportive government policies like giving loans, availing extension workers, carrying out research.
- Political stability and security leading to a favourable investment climate and diverting resource to economic growth and development.
- Good international relations with European union member countries helping in marketing.
- Availability of land for extensive farming because of sparse population e.g. areas for dairy farming.
- Presence of temperate climate with cool conditions encouraging dairy farming growing of fruits and vegetables.
- Presence of research stations helping in controlling pests, diseases, improving breeds, processing, marketing.
- Presence of labour supply both the skilled and unskilled like extension workers, biochemists.

- Presence of agro-based industries for processing agricultural products e.g. dairy plants.
- Presence of flat and gently slopes for easy transport, mechanization for the growth of fruits, vegetables, fodder crops, pasture.
- Presence of water supply because Denmark is made up of Islands and water helps in the growth of crops, pasture and for animal rearing.
- Improved science and technology leading to availability of skilled labour working on the farms, processing factories, and using modern and scientific methods of farming.
- Limited resources like minerals discouraging other activities and promoting agriculture.

Importance of co-operatives (contributions) / effects Positive:

- They help in marketing by carrying out research and collecting the products from the farmers.
- They help in getting loans for the farmers by acting as security.
- They help in transport by constructing roads, railway lines, expansion of ports.
- They help in processing agricultural products by building agro-based industries, helping in adding value.
- They help in fixing prices by marketing boards like minimum and maximum price.
- They help in agricultural modernization by using scientific and modern methods of farming like application of fertilizers, using pesticides and insecticides.
- They help in training farmers by using workshops, seminars, establishing demonstration farms using extension workers.
- They help in improving storage reducing on wastes and helping in marketing and transport.
- They help in supervision and monitoring, helping in maintaining quality and quantity.
- They improve social services leading to high standards of living like health facilities.
- They control pests and diseases by spraying, dipping, vaccination using drugs.

- Economic diversification by developing other income generating projects reducing on the dependence value.

Negative.

- They are affected by poor administration because of government interference and using farmers who are not trained.
- They kill the spirit of competition because of working jointly leading to low production.
- They are affected by managers being corrupt and embezzling funds.
- They are affected by poor transport in rural areas affecting marketing.
- They are affected by limited capital leading to low production.
- They are affected by environmental factors like climate, weather, pests, diseases, floods and this affects planning.
- Environmental degradation because of deforestation, swamp reclamation, pollution of air, water and land because of wastes and sewage.
- They are affected by marketing problems because of over production, price fluctuations, competitions, perishable products.
- Soil exhaustion because of monoculture, specialization, over cropping.
- Poor land mismanagement due to communal ownership of means of production.
- Promotion of conflicts and tensions over the management of resources.

COMMUNES, COLLECTIVE FARMS, GREEN REVOLUTION

A commune is a large scale farm created by compulsory grouping people (farmers) into large units of production for the improvement of quality and quantity of the agricultural products leading to agricultural modernization e.g. in China, Russia, Middle East countries, South East Asia, Mexico, Romania.

In China they are found in areas like Honan, Kiangish, Kweichow, Skiang, Shiang, River Yangho, R. Yangtze, Knang. They were important of growing crops like rice, wheat, soya bean, oats and rearing animals like cattle, goats, sheep, piggery, fish farming.

Characteristics of communes

- There is compulsory ownership of means of production e.g. land, capital.

- They are divided into teams and brigades for easy management e.g. Grigade has an inspector approved responsible to the state.
- Use of labour intensive technology.
- The state controls the marketing of the produce.
- The state determines the crops to be grown and animals to be reared.
- The state controls the people who work on the farm as employees.
- The state determines the quotas of production.
- The surplus above the fixed quotas or amount is shared depending on the input.
- The state provides financial and technical assistance.
- They undertake processing of the produce.
- They use modern and scientific methods of farming.
- Research is carried out by the state.
- Teams decide on how the surplus is used like sharing or they save it for buying machines.
- The management committees act as mediators and they provide social services.
- The leaders of the teams and brigades are chosen from the farmers democratically elected.

Contributions of communes in China / importance / effects.

- They encourage co-operation and teamwork leading to increased production.
- They provide employment opportunities like the farmers in industries, the managers leading to high standards of living.
- They lead to improvement in quality and quantity of the agricultural produce because of using scientific modern methods of farming and because of specialization.
- It enables easy government assistance to farmers because the farmers are together e.g. like social services, infrastructure.
- They lead to improvement of social services e.g. power supply, education, health facilities leading to increased standards of living.
- They enable the development of agro-based industries helping in adding value before marketing like processing wheat, barley, oats.

- Development of urban centres used as marketing areas and industries like in Shangai province.
- Co-operative marketing eliminates exploitation of farmers because they work as mediators.
- There is improvement in transport and communication like the construction of roads, railway lines around agricultural areas.
- Provision of food for the increasing population reducing on hunger, malnutrition, food imports.
- Land consolidation leading to extensive farming and commercial farming.
- Economic diversification reducing on dependence burden.
- Source of government revenue by taxing people and companies.
- Land reclamation by controlling floods and using irrigation in dry areas.
- Source of foreign exchange by exporting agricultural products like wheat, oats.
- Development of international trade, regional co-operation and international relations.
- Promotion of education and research by visiting farms, industries for better skills and technology.
- Development of tourism industry by visiting the farms and industries leading to foreign exchange.
- Controlling floods by building canals, dams, aqueducts for easy flow of water reducing on pests and diseases and attracting people for settlement.
- Soil conservation though application of organic and inorganic fertilizers.
- Environmental protection through afforestation and re-afforestation programs like in dry areas and poorly drained areas.
- Increase in agricultural production because of using better breeds, using scientific and better modern methods of farming.
- Help farmers in getting credit facilities like loans for purchasing modern equipment.

Disadvantages

- Mismanagement of farmers who are not trained.
- Poor production because of large farms which were hard to supervise.
- Soil exhaustion because of monoculture and agricultural specialization.
- Pollution around agro-based industries using pesticides and insecticides.

- Urban problems because of high population around marketing areas leading to problems like increased cost of living.
- Environmental degradation because of deforestation, swamp reclamation, destruction of landscape.
- Marketing problems because of price fluctuations.
- Promotion of conflicts and tensions due to displacement of people and isolation of people's rights by taking land.
- It was the top bottom policy which started with poor planning and not involving the farmers leading to success for a short time eventually collapsing.
- The new breeds were tasteless and this affected marketing, they couldn't be grown in very part of land e.g. rice.
- High costs of production like using machines, fertilizers, carrying out irrigation.
- It reduces on the spirit of competition among the farmers.
- Regional imbalance causing income inequalities like communes in well favoured areas and these are poor areas.
- It was affected by bureaucracy like consulting many people according to teams, brigades delaying decision making.
- They were affected by environmental problems like pests and diseases, drought which affected planning.
- Soil salinisation by irrigation farming causing salination, sedimentation.
- Agriculture modernization like using tractors causing unemployment.

Factors for the development of communes Areas with communes in China include Skiang, Shiang.

Physical factors:

- Flat and gentle slopes for easy irrigation and mechanization.
- Fertile soils near river valleys like alluvial soils.
- Favourable climate like heavy monsoon rainfall and high temperatures.
- Water supply from rivers like Yangtze for irrigation purposes.
- Availability of gazette land for communes e.g. in Chaunshan, Skianga.
- Improved breeds leading to high production like rice, wheat, soya beans, etc which have quick maturity.
- Limited resources like mineral discouraging other activities.

- Limited pests and diseases promoting arable farming, fishing, livestock farming.

Human factors

- Availability of cheap labour both skilled and unskilled because of high population.
- Wide market for food because of dense population.
- Change in land tenure system from land fragmentation to consolidation.
- Supportive government policy of socialism helping in sharing resources and state control.
- Improved science and technology helping in land reclamation and using irrigation farming.
- Improved transport helping in marketing, movement of extension workers using roads and rails.
- Adequate capital provided by the government for purchasing modern equipment developing infrastructure.
- Good management by using team spirit using brigades.
- High level of research helping in improving breeds, controlling pests and diseases.
- Political stability by the communist government helping in diverting resources to economic activities and infrastructural development.
- Good international relationship helping in marketing, getting loans.
- Presence of entrepreneurs providing capital and managerial skills.
- Positive government policy of creating marketing opportunities to the high population and improve standards of living.

AGRICULTURAL MODERNISATION

Agricultural modernization is the use of scientific and modern methods of farming helping to improve the quality and quantity of agricultural products through land extension and intensification of agriculture land this aimed at improving the quality. In low developed countries they're common with subsistence methods of farming e.g. shifting cultivation, bush fallowing, small scale farming, modern methods of farming like irrigation, horticulture, ranching, dairy farming are limited and this is because of physical and human problems.

Problems hindering agricultural modernization

- Presence of rugged and steep slopes in highlands and markets are limiting the use of mechnisation and leading to small scla e farming e.g. Kenya Ethiopian highlands.
- Limited capital to purchase modern equipment to carryout research to build processing factories e.g. shifting cultivation in Zambia, DRC, Brazil, Nomadic pastoralists in Masai, Karamoja.
- Poor government policies like not giving loans to farmers leading to low production and putting high taxes increasing on production expenses.
- Presence of pests and diseases destroying crops like cotton stain, banana weevil, coffee wilt and animal diseases like Nagana, East coast fever, Anthrax e.g. among the Masai or Turkana.
- Drought leading to low rainfall causing shortage of water for animals, for growing crops leading to low production like in the Sahel region, Kalahari, Karamoja, Masai land.
- Limited research leading to poor breeds, affecting processing and marketing.
- Limited skilled labour like agriculture, veterinary officers to advise the farmers in rural areas and bio chemists to process agricultural products.
- Limited international market because of low incomes causing low production like for dairy farms, horticulture.
- Competition with other countries on the world market like coffee from Brazil, livestock products from Argentina, Denmark and because of other substitutes which leads to low prices.
- Poor transport and communication affecting marketing the movement of workers e.g. in the Congo basin, Amazon basin, Sahel region, Southern Tanzania.
- Political instability and insecurity leading to destruction of crops, livestock, making people refugees and diversion of resources to defense like DRC, Somalia, Southern Sudan, Northern Uganda, LRA.
- Poor science and technology leading to limited skilled labour affecting processing of agricultural products and discouraging the use of modern methods of farming.
- Limited land for agriculture in densely populated areas causing conflicts and tensions, causing over cultivation and soil exhaustion, land fragmentation, Kenya highlands, China, India, Jos plateau in Nigeria.

- Poor entrepreneurship skills by peasant farmers leading to poor management, poor services and low production, poor planning.
- Presence of other resources diverging in Gabon, fishing in S.A.
- Presence of backward cultures and ignorance causing low production and environment degradation because of conservation like shifting cultivation in Zambia, Nomadic pastoralists in Fulani region and peasants in rural areas.
- Poor breeds of crops and livestock which are easily attached by pests, diseases and drought leading to poor products and low production. E.g. shifting cultivators in DRC, animals kept by nomadic pastoralists.
- Presence of infertile soils like sandy soil in Sahara desert which are porous and permeable discouraging the growing of crops and pasture.
- Poor drainage near water bodies which are flooded, water logged, increasing the costs for exploitation are affecting transport and encouraging multiplication of pests and diseases e.g. Sudd region in Sudan.
- Poor land tenure system like communal ownership leading to poor land, mismanagement and encouraging communal grazing leading to easy spread of diseases e.g shifting cultivation in the Brazil.
- Occurrence of natural calamities and natural hazards leading to destruction of people, crops and livestock e.g. floods in Mozambique, locusts in Sahara desert, landslides and mass wasting like on Mt. Elgon.
- Poor storage facilities causing wastage and poor quality products due to lack of co- operatives like in Uganda affecting the cotton, coffee, maize and beans growing.
- Profit repatriation by foreign investors causing capital outflow and lowering the National income e.g. rubber growing in Liberia by foreigners, sugarcane and tea growing in Uganda.
- Price fluctuations on the world market and discouraging farmers and investors because agricultural products are perishable and they are not easily stored.
- Poor economic integration affecting marketing joint investments leading to low bargaining power and causing competition e.g. E. African community, COMESA, ECOWAS, PTA, LGAD.

Solutions, measures, steps, policies of Agricultural modernization

- Using irrigation farming in dry areas e.g. Karamoja, Sahara, Kalahari, Egypt.

- Improvement in transport and communication like rural feeder roads, railway lines, modern ports, water ways, helping in marketing and movement of workers e.g. S.A, Kenya, Nigeria.
- Using modern and scientific methods of farming leading to increased production like ranching in Botswana, dairy farming in Kenyan highlands, plantation farming like rubber in Liberia.
- Economic diversification through exploitation of other resources like lumbering, mining, fishing, tourism reducing on the dependence value e.g S.A.
- Political stability and security through good governance, regional cooperation, strengthening defense leading to a favourable investment climate like S.A, Kenya.
- Acquisition of loans from financial institutions and development agencies like African development bank, world bank for investment in agriculture like soft loans.
- Mass education and mobilisation using informal and formal education about environmental protection and agricultural modernization e.g. UPE, USE, radios, TVs, newspapers.
- Change of land tenure system like land consolidation for extensive agriculture, private land ownership and giving land to landless people.
- Land reclamation like draining flooded areas, irrigation in dry areas, spraying for pests and diseases.
- Positive and supportive government policies like availing land giving loans, extension workers, improving infrastructure, marketing, processing.
- Improving storage facilities by using co-operatives reducing on wastage and leading to good quality like giving granaries, national silos (stores).
- Development of agro-based industries like dairy plants, cotton ginneries, coffee processing helping in adding value transport, marketing, application of organic and inorganic fertilizers helping in improving soil quality.
- Control of pests and diseases by spraying using insecticides, vaccination, drugs, chemicals and controlling weeds by spraying.
- Using soil conservation measures like terracing, crop rotation, strip cropping, contour ploughing, intercropping.
- Promotion of research on control of pests and diseases, on improved breeds, processing and marketing.

- Population control using modern methods of family planning like using pills for females, condoms for males, population policy like in China, Nigeria, Kenya.
- Agricultural diversification by introducing new crop breeds, animal breeds e.g. exotic animals imported from Germany, Netherlands.
- Privatization and economic liberalization leading to capital accumulation, good management, better services, increased production.
- Market extension by exporting to developed countries like USA, Britain, with good marketing and advertisement strategies like using the internet.
- Good international relations and regional co-operations helping in marketing like E. African community, COMESA.
- Agricultural mechanization by using tractors, combine harvesters leading to increased production.
- Training skilled labour by encouraging sciences like Bio-chemists, agricultural engineers.
- Environmental protection by gazetting areas, waste management and proper land utilization.

Revision questions (Sample questions)

1. To what extent have physical conditions affected agricultural modernization in Africa?
2. Write an explanatory account of the distribution and main features of agricultural activities in West Africa.
3. Assess the extent to which irrigation has benefited either Sudan or California.
4. Examine the role of their communes in China or specialization in the USA in the modernisation of agriculture.
5. To what extent are problems faced by the livestock farmers in Africa of their own making.
6. With reference to specific examples from either an MDC or an LDC examine the advantages and disadvantages of monoculture.
7. "The problems faced by nomadic pastoralists are mainly physical" Discuss.
8. a. Describe the main features of co-operative farming.
   b. Assess the role played by co-operative farming to the development of either Denmark or Tanzania.

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 filed). 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 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.

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 CO_2 from the atmosphere and in turn produce O_2 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 may 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 Newyork 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 Great lakes 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, Green bay, Gary, Thunder Bay, Toledo, and Sudbury.

Factors for the growth and development of the Great lakes 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 acvitites 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.

TRANSPORT

Transport is the physical movement of people or commodities from one place to another. The level of development of transport and communication network is usually a reflection of the level of economic development in any given region.

Accessibility is the ease of reaching a desired destination. Mobility in the transport context is the ability of individuals to move about.

Role of transport in economic development

1. ***Transport opens up new markets for produce*** such as highways, feeder roads. This promotes agricultural development by lowering costs, saving time, extending extension services, and opening up the formerly unproductive areas. In order to develop economically, countries must able to export their produce.
2. ***Promotion of industrialization*** by encouraging investors and therefore increases capital inflow, influences industrial location and distribution. This is due to easy movement of raw materials to the industries and movement of finished goods to markets.
3. ***Allows regions to specialize in the production of commodities*** where they have comparative advantage. This creates effective demand and supply relationships. The goods are easily transferred from areas of production to areas of market.
4. ***Joining areas of surplus and deficit***. The export and distribution of commodities leads to sustainable development of economies and minimizing scarcity of commodities. This in turn controls the rate of inflation.
5. ***Promoting local, regional, and international trade*** and this leads to interstate cooperation and unity. This is because the agricultural products, industrial products are easily transferred from areas of production to marketing centres. This in turn increases national income.

6. ***Encouraging spread of ideas leading to cultural, economic, social, and political transformations.*** Transport enables diffusion of ideas such as on science and technology leading to innovation and invention in the countryside. This in turn supports various economic activities like agriculture, and trade.
7. ***Promotion of tourism development*** such as in Republic of South Africa, Switzerland, Mexico, Kenya, and USA. This makes the tourist areas easily accessible/ facilitates easy movement of tourists to various tourist potentials. This eventually increases foreign currency which is invested in various sectors like education, and health.
8. ***Generation of many employment opportunities***, associated with all transport systems and networks. Many people are employed as engineers, pilots/ drivers, cargo managers, and accountants. These earn salaries and wages which they use to improve their standards of living in areas of health , housing, and recreation.
9. ***Enhancing political control, national unity and efficient administration***. This is because the government bodies like ministerial head quarters and police are easily set up in various parts of the country. It also promotes political stability due to easy monitoring of various parts of the country and this is associated with balanced regional development.
10. ***Promoting urbanization/ growth of urban centres***. There is a relationship between transport and settlement especially urban and coastal areas, depending on the trend it takes. Therefore transport increases population concentration in many areas such as towns and this results into expansion of urban activities like trade and commerce, banking, insurance, ware housing, and entertainment.
11. ***Generation of government revenue*** through taxation of the sectors using the transport systems such as agriculture, tourism, banking, and industry. The government revenue is to meet the government budget, hence financing more infrastructural development.
12. ***Promotion of economic diversification*** because of the diversified forms of transport such as road, railway, water and air. The transport systems uplift various economic sectors like tourism, mining and industry. This in turn widens the gross domestic product (GDP) and the export base of the country.

Negative effects/short comings

1. ***Transport is associated with accidents*** which are disastrous to lives of people and property. This is noted with railway, road, water and air transport such as crashing of planes, capsizing of vessels, collusion of vehicles.
2. ***It is associated with traffic congestion*** causing unwanted delays in the delivery of goods and services, and thus undermining the development process.
3. ***Results in high rates of environmental pollution***, that is, air, water and noise pollution. The emitted fumes from automobiles are dangerous to the life forms of the environment like it causes respiratory diseases.
4. ***Results into destruction of vegetation*** such to construct roads, railways, and airports. This results into soil erosion and land degradation due to reduced soil stability on the road/ railway sides.
5. ***Transport is associated with increased crime rates, wherever they occur***. For example there is highway robbery on the Trans-African highway in particular sections like valley areas, and forested zones; railway station theft and of recent world terrorism evident in air transport.
6. ***High costs of construction and maintenance of the networks*** such as port facilities, railway lines, roads etc. In turn, there is increased government expenditure on the maintenance of such networks, hence straining the government budget.
7. ***Over exploitation of environmental / natural resources leading to quick depletion***. This is through increased accessibility to various resources such as mineral resources, forest resources- working against the future generations.
8. ***Results urban-related problems*** such as congestion/ overcrowding, and slum growth. The eradication of such problems is very costly to the government.
9. ***Leads to regional imbalance in development***. Easily accessible areas are more developed in terms of infrastructure than other areas, leading to income inequalities.
10. ***Results in rural-urban migration*** which has disastrous impacts on both the source areas (rural) and receiving areas (urban). For example decline in crop cultivation in the rural areas yet there are urban problems created (like slums).
11. ***Displacement of many people during transport development***. As transport routes are being constructed or expanded, many people are displaced from their

settlement and production areas with little or no compensation. There is also a problem of resettlement of the displaced people.

Guiding questions

1) Explain the role of railway transport in the development of either Switzerland or the republic of South Africa.
2) Examine the contribution the transport sector to the development of either USA or Egypt.

FACTORS LIMITING THE EFFECTIVE UTILIZATION INLAND WATER TRANSPORT IN AFRICA

Inland water transport in Africa involves the use of rivers and lakes. Rivers include: Congo River, Niger River, Nile River, Volta River, and Zambezi River, Senegal River, among others. The lakes include: Victoria, Tanganyika, Malawi, Kyoga, Chad etc. The factors/problems limiting the effective utilization of inland water transport in Africa include:

1. **Presence of waterfalls, rapids and gorges along the courses of rivers** and therefore a few rivers are navigable throughout their length. For example the Nile River has 5 major waterfalls and several rapids. The Congo River is navigable up to 140km, but the course is broken by rapids and falls up to Stanley Pool.
2. **Presence of floating islands and vegetation**/Sudd along the courses of rivers such as along the Nile papyrus rids close in and navigation is not possible up to Juba. This also makes the rivers unnavigable throughout their length. Also the existence of swamps and swamp vegetation on lake shores such as Kyoga limits the use of such lakes for transport.
3. **Presence of rock outcrops along rivers and shores of lakes** such as Nile and Lake Victoria. These prevent the movement of water vessels in such areas. The rivers are also fast flowing in the highland areas, and hence a higher risk of accidents.
4. **Fluctuation in volume seasonally/river regime**. Water levels fluctuate between wet and dry seasons. At low water the rivers may not be navigable yet at flood it

may be too dangerous. For example the 4200 km long Niger River is subject to marked seasonal fluctuation. Others include: Vaal, Zambezi, and Limpopo.

5. **Shallowness and narrowness of rivers**. Many rivers are too short and too shallow for navigation especially the rivers flowing in mountainous regions like Ethiopia highland areas. There are sandbars at the mouth of rivers which make water shallow making it hard for ocean-going vessels. Also many lakes have shallow waters which limit navigation such as Lake Kyoga, Lake Chad.
6. **Remoteness of rivers**/ many rivers which would be capable of carrying much trade flow through sparsely populated areas and thus water transport there would be uneconomical. A case in point is river Congo.
7. **Rivers tend to meander in their flood plains** making the distance covered by the river much longer than a similar journey on land. Some people chose to use land transport instead of water transport.
8. **Presence of steep-sided valleys** such rift valley lakes –Lake Tanganyika, Lake Albert, and Lake Malawi, rendering water transport on such lakes less attractive.
9. **Low level of economic development in the immediate hinterland**. Some rivers flow across empty and unused land, thereby being uneconomical to use, since the areas lack cargo like river Congo. Yet also some areas lack major water bodies to be utilized for water transport.
10. **Silting of many large rivers** especially at their mouths. This increases the shallowness of channels such as Nile River and Nile delta, and Niger River and Niger delta. There is also siltation of lake shores due to deposition.
11. **Strong winds on lakes and some rivers causing accidents**, in certain times of the year. This limits the use of the lakes and rivers for water transport for fear of losing life and property.
12. **Presence of predators such as crocodiles, and hippos**. These at times over turn boats and threaten the lives of the travelers on water, and hence limit the effective use of water transport.
13. **Limited capital to develop the inland water ways**. Canal construction and the streamlining of rivers (e.g. by blasting rocks) requires a lot of capital. Also establishing ports requires high capital engineering. More so the volume of traffic is too small to warrant development of inland water ways.

14. **Low levels of technology and limited skilled labour** to modernize the inland waterways such as to develop ports and related facilities. This also limits the volume of cargo handled by inland waterways.
15. **Political differences between countries through which the rivers pass**. African countries in some cases do not cooperate yet the rivers cut across many countries. For example political differences between Senegal and Gambia have prevented development of the Gambia River, yet it is one of the most navigable rivers on the continent. Other cases are Uganda and Sudan (the Nile River).
16. **Political instability / lake pirates** such as on Lake Victoria, along river Congo. This puts the lives and property of the water travelers at risk all the time especially in the isolated parts where the rivers pass. Eventually the number of people using the inland water transport reduces.
17. **Competition with faster means of transport such as by road and railway**. These are more convenient and quicker means of transport than water transport. These limit the number of people using water transport.

PROBLEMS FACED IN THE UTILIZATION OF INLAND WATER TRANSPORT IN NORTH AMERICA AND WESTERN EUROPE

Inland water transport in Europe and North America involves the use of rivers and lakes. The major rivers in Europe include: Volga, Danube, Rhine, Rhone, Po, Inn, and Elbe. The lakes include Lodoga (N.W Russia), Geneva, Maggiore, Lugano, Lucerne, Constance etc.

The major rivers in north America include: St. Lawrence, Mississippi—Missouri river system, Tennessee, Columbia, san Joaquin, Sacramento, Colorado, Fraser, Yukon, Mackenzie (Canada). The lakes include Great lakes (superior, Michigan, Huron, Erie, Ontario)

The problems limiting the utilization of inland water transport include:

1. **Freezing of the water ways during winter** which limits their use during this season. For example the St. Lawrence sea way is frozen 3 to 4 months (December to march)
2. **Flooding of rivers** especially during spring to summer. For example in spring when the winter snow begins to melt and in early summer when the glacial melt water comes down from the Alps.

3. **The rivers meander in their lower courses** which makes navigation difficult. For example, the Mississippi river meanders through the flood plains for about 1600km.
4. **Shallowness and narrowness of river valleys**. The materials eroded upstream is deposited on the river's bed in the lower section making it shallow and therefore limiting the size of the vessels it can handle. There are also narrow valleys and fast flowing rivers in the highland regions, making navigation very difficult.
5. **Presence of rapids and waterfalls** along river channels .For example Niagara Falls and rapids along the St. Lawrence River. The Rhine River is only navigable up to Basel and beyond this point; there are many waterfalls and rapids especially in the rapids.
6. **Some rivers flow through unproductive and under populated regions**, which also limits their use.
7. **Foggy conditions** cause poor visibility and accidents. For example at the mouth of the st. Lawrence, and this affects shipping.
8. **High costs of maintenance of the waterways** such as costs of constant dredging, construction of canals and locks.
9. **Delays in shipping of cargo**. For example St. Lawrence seaway has many locks used to adjust water levels for navigation(both single and double)
10. **Limitation in the size of ships/vessels especially the canal sections**. Due to ever growing technology, the bigger ships cannot sail through these sections; which affects the delivery of goods. This is a case with St. Lawrence Seaway and Rhine waterway.
11. Water faces **competition from other forms of transport** such as road network and railway.
12. **Flooding during the rainy seasons** also limits the use of the waterways.

Steps taken to solve the above problems

1. Construction of locks in areas where the water levels are different, some single locks and other double locks. For example Beauharnais locks and st. Lambert locks along the st. Lawrence Seaway.

2. Construction of canals to bypass some rapids and waterfalls such as Welland canal which by-passes the Niagara Falls.
3. Constant dredging to maintain the depth of the water channels /rivers by removing the silt to allow large cargo-liners to sail.
4. Construction of dams or barrages which hold back water and give greater depth thus overcoming the problem of shallow channels.
5. Use of ice-breakers during the winter season to enable navigation.
6. Use of alternative routes such as roads and railway in winter when the waterways are frozen. This enables continuous distribution of goods.
7. Blasting using explosives to shatter rocks into small pieces, which can easily be removed. This makes the rivers deep and wide for navigation.

Guiding questions

1. Examine the problems encountered in the utilization of inland water transport in either USA or Africa and suggest the steps that can be taken to improve water transport in the chosen area.
2. Examine the influence of inland water transport on urban development in either North America or Europe.

THE RHINE WATERWAY

The Rhine is the most important waterway in Europe and is the world's most efficient waterway system. It is the principle route from Basel in Switzerland to Rotterdam in Netherlands. It is linked with a system of canals which improves its transportation capacity; such as Rhine-Rhone canal, Main-Danube canal, the Mosel-Rhine canal, Dortmund Ems.

The Rhine passes through the most industrialized part of the continent-the Ruhr region) and enters the busiest sea in the world –the North Sea. From the source (Swiss Alps) to the mouth (Rotterdam) it serves 6 Western Europe countries – Switzerland, Germany, France, Netherlands, and Belgium. Its tributaries include: Mainz, Lippe, Mosel, and Ruhr.

A sketch map showing the Rhine waterway

Factors which have favoured the development of the Rhine waterway

1. ***The availability and exploitation of various mineral resources*** such as iron ore from the Ruhr, coal from the Ruhr and from the Saar coalfields of Germany; limestone from Swiss Jura. These needed to be shipped to industries such as in the Ruhr Westphalia region, Zurich and Berlin in Germany. This has increased the importance of Rhine waterway-hence its development.
2. ***The Rhine waterway is linked with a system of canals*** which improves its transportation capacity. These canals include: Dortmund Ems, Lippeseite canal, Main-Danube canal, Mosel-Rhine canal (connecting to the Lorraine coal fields of France); Rhine-Rhone canal to Basel. This has enabled the Rhine to be a transit waterway for bulky goods from Germany, Switzerland, Austria, and France.
3. ***Strategic location of the Rhine in the centre of Europe***. Still its mouth is on the North Sea which is the busiest sea in Europe. This made the Rhine usable by many vessels in countries such as Belgium, France, Germany, Switzerland, and The Netherlands.
4. ***High level of industrial development***. The Rhine passes through one of the most industrialized parts of the world—the Ruhr industrial complex of Germany and enters the North Sea (the busiest sea). Rapid industry has enabled the Rhine to trans-ship cargo to and from the Ruhr region. The cargo to the interior includes iron ore, cotton, tropical timber, coffee and today the most important is oil. The seaboard goods include automobiles, engineering machinery, chemicals, and general merchandise.
5. ***The rapid development of Rotterdam port.*** The Rhine enters the North Sea at Rotterdam which also owes its growth to the rich hinterland. Rotterdam is an entreport to Europe, has a New Waterway and major industrial establishments. This has also increased the importance of the Rhine waterway.
   Apart from Rotterdam, other important ports along the Rhine include Bonn, Koblenz, Mainz, and Basel. This has made the waterway to handle thousands of deep sailing ships handling over 220 metric tons per year.
6. ***The desire to link the Rhine countries*** such as Switzerland, Germany and Netherlands. The Rhine has a position as a unifying factor in Europe. It upon this that the governments have made the Rhine developed such as modernizing

Rotterdam port at the mouth, development of canals, New waterway. Political unity among the countries increases the volume of traffic handled by the waterway.

7. ***Ice free conditions of the waterway***. In the lower part of the Rhine, there are ice-free conditions throughout the year due to the effect of the north Atlantic drift ocean current. This enables usage of the Rhine for a greater part of the year.
8. ***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 its use and the volume of cargo handled by the waterway.
9. ***Presence of adequate capital*** provided by the Swiss, Germany and Dutch governments. This helped to streamline the river for navigation, establishing ports for shipping and purchasing technology used for dredging, straightening and construction of various canals.
10. ***High level of technology***/Advanced technology is used for dredging, straightening and the vessel construction technology. This in turn increases the number of vessels using the Rhine waterway.
11. ***Presence of highly skilled labour force*** such as engineers, geologists who helped the waterway such as dredging of the waterway to deepen it for use, vessel construction for shipping, port construction, and canal construction. This has increased the importance of the waterway.
12. ***Relative political stability in the area*** where the Rhine waterway flows. This has increased the confidence of investors in developing the waterway and also increasing the volume of cargo transported along the waterway.
13. ***The rapid urbanization in parts of Europe*** where the Rhine passes, hence capable of handling much trade. It flows through the densely populated Ruhr conurbation, Basel area of Switzerland, port Rotterdam area. This makes the use of the Rhine waterway more economical

Importance of the Rhine waterway

1. ***Facilitates trade and commerce through importing and exporting large quantities of commodities*** for countries like Germany, France, Belgium, Netherlands and Germany. The upstream cargo(imported goods) comprises of iron ore, coal, crude oil, cotton wool, food stuffs(like wheat, dairy products);

and tropical hard wood timber. The downstream cargo (exported goods) comprises of chemicals, vehicles, machinery, diesel engines, newsprint, textiles, optical instruments (like cameras, binoculars from Switzerland), and automobiles especially from Switzerland –Germany. This leads to the expansion of productive activities such as industry.

2. ***Promotion of industrial development*** along the length of the Rhine River, the most spectacular being the Ruhr industrial complex attributed to the cheap water transport for imports and exports. Duisburg is known for smelting, metal works, and chemical industries. Other industrial regions are Rotterdam in the Netherlands, Cologne in Germany, and Basel in Switzerland. The waterway provides cheap and easy transport for bulky industrial raw materials such as coal, petroleum, limestone, steel, iron, agricultural products as well as accessibility to the overseas markets.
3. ***Promotion of port and urban development***, the most spectacular being Rotterdam port at the mouth of the Rhine River acting as the entreport for Western Europe with modern facilities such as containerization use of cranes. Other important towns include Basel, Strasburg, Mainz, Bonn, Essen, Dusseldorf, Leverkusen, and Koblenz. These are developed industrial towns, trade, recreational, and financial centres, and with high population concentration.
4. ***Promotion of mineral exploitation*** for example coal mining from the Ruhr and Saar fields of Germany, limestone from the Jura region of Switzerland. The waterway helps to transport bulky ore from the fields to the processing and smelting centres and to various industries where they are needed as raw materials. This in turn increases the income levels.
5. ***Facilitation of agricultural development*** by opening up agricultural regions such as the alluvial plains of Germany for growing of sugar beet, maize, tobacco, vines and market gardening in Germany; horticulture and cattle rearing in Netherlands. The waterway provides cheap and easy transport to the industries and markets to be processed and consumed respectively.
6. ***Promotion of tourism development in the Rhine lands*** especially in Switzerland apart from the waterway being a tourist potential itself. It provides cheap transport for tourists from Germany, Holland, Belgium, Luxembourg, to the tour resorts. Most of these resorts are linked to the Rhine by road and rail. The resorts

in Switzerland include Kloster, Arosa, Davos, Murren, and Kandersteg. This in turn increases the inflow of foreign exchange which is used to import foreign technology and consumer goods.

7. ***Provision of employment opportunities to many people*** such as engineers who carry out dredging, straightening of the waterway, hydrologists who monitor the water levels. There is employment in shipping companies as pilots, cargo handling, and hostesses in passenger liners. They earn income for improving their social and economic welfare /standard of living.
8. ***Generating of government revenue*** by taxing the shipping companies /cargo handling companies pay and workers' incomes. The revenue is used to develop various sectors such health, education, recreation, and agriculture.
9. ***Facilitation of international relationship between the Rhineland countries*** that is, Netherlands, Germany, Switzerland. The countries ensure diplomatic relationship for the joint and smooth operations on the Rhine. This forms a basis of economic contacts/trade relations and economic integration (such as in the European Union).
10. ***Diversification of the economy in the Rhineland countries***. It has diversified transport in Western Europe but also the economy by providing an alternative source of income /revenue which can be used to develop various activities such as mining, agriculture, service sectors.
11. ****Stimulation of forestry development*** by enhancing the exploitation of forests such as the black forests of south Germany, and Haardt forests of central Germany. The Rhine opened up these forests by providing cheap transport means for logs to be floated to the saw mills, furniture workshops and ship building workshops at cologne, Mainz and Basel.

Negative Effects/Short Comings of the Rhine Waterway

1. ***Congestion of vessels on the waterway*** due to increasing use of the waterway by many vessels, it limits its size causing delays.
2. ***The waterway limits the size of vessels used on the route***. Due to the ever growing technology the bigger ships cannot sail easily along some sections of the waterway especially the canal sections.

3. ***Silting of some sections of the Rhine River*** and this calls for continuous dredging which is costly yet the period of dredging limits the use of the waterway.
4. ***The upper course of the waterway has rugged relief*** that is, from Basel towards the Alps. This makes the upper part less or not navigable and thus foregone economic opportunities.
5. ***Freezing of the Rhine River during winter season*** especially in the upper course, which limits its use as a waterway.
6. ***The waterway is associated with urbanization and related problems*** such as traffic congestion, slum growth, drug trafficking, unemployment, and high crime rate.
7. ***Pollution problems are associated with the waterway*** such air and water pollution due to moving water vessels, growth of industries due to the discharge of toxic wastes and other urban activities. this is disastrous to the environment (flora, fauna and aquatic life)
8. ***The Rhine waterway results into regional imbalance in development*** since it has attracted most economic activities along its course from Basel to Rotterdam in Netherlands such as agriculture, tourism, industry, social services at the expense of other areas in the interior.

Guiding questions

1. Account for the development of the Rhine waterway as an important waterway in Europe in the area where it is located.
2. For either the st. Lawrence Seaway or the Rhine waterway, assess its contributions to the development of the region where it occurs.

St. Lawrence sea way

The St. Lawrence Seaway is the most important waterway in North America shared by Canada and USA. It connects the great lakes region and the Atlantic Ocean on the eastern part of North America.

It stretches for over 3760km (2350miles) from Duluth on Lake Superior to the estuary of the St. Lawrence below Quebec.

The major construction activities along the sea way included:

- Construction of locks in areas where the water levels were different, some are single locks and others are double locks. Examples are: Beauharnois locks, St. Lawrence lock, St. Lambert lock, Iroquios lock
- Construction of dams in some sections to raise the water levels and submerge the rapids such as the Moses Saunders dam
- Construction of canals to by-pass some rapids and waterfalls such as the Welland canal which by-passes Niagara falls a distance of 40mk (Niagara falls is about 99m high (326ft). the drop of 6m (20ft) by a rapid at Sault Ste. Marie is avoided by the Soo canal between Lake and lake Huron. There are also canals that link the seaway to major production areas such as the 320 km Superior canal from Lake Erie at Buffalo via the Mohawk gap and Hudson River to New York. Also the Carillion and Greville canals from Montreal to Ottawa, Rideau Canal to Kingston.
- Constant dredging to maintain a depth of over 7.5m (25ft) to allow large cargo-liners into the Greatlakes (to widen the waterway by removing silt).
- Blasting using explosives to shatter rocks into small pieces which could easily be removed (remove the islands), hence making the river deep for navigation.

Note:

- The US and Canadian governments constructed the St. Lawrence sea way which was completed in 1954.
- The main traffic on the water way includes iron ore, coal, grains, (especially wheat), timber, furs, dairy products, metallic ores (nickel, copper, gold) and a whole range of manufactured goods.

A sketch map of the St. Lawrence sea way

Factors that favoured the development of the St. Lawrence sea way

1. ***Availability of large deposits/ a variety of minerals*** which include iron ore, uranium, gold, copper, and coal at the great lakes fields. The sea way was to provide cheap transport for these mineral resources to the major industrial centres such as Montreal, Detroit, Pittsburgh, Chicago, and Toronto. This increases the volume of cargo handled by the seaway.

2. ***High level of industrial development in the great lakes region*** and along the sea way such as in Chicago, Detroit, Quebec, Montreal, Pittsburgh which manufacture bulky products such as automobile, machinery which required cheap means of transport especially to overseas markets. This also increases the volume of goods transported along the seaway.
3. ***Availability of adequate capital provided by both the US and Canadian governments*** shared equally (the project spent over one billion US dollars). This capital was invested in the purchase of modern technology, construction of canals, building of locks in case of different water levels , dredging of the riverbed to deepen it for vessels, and straightening the sea way.
4. ***The high level of technology*** which involved the use of earth movers, excavators for dredging , construction of modern canals and locks, dam construction, which also explains the development of the waterway to navigable level.
5. ***Availability of highly skilled labor provided by the US and Canada*** in form of engineers , hydrologists, surveyors, who carried the feasibility study and construction activities like construction of dams, locks and canals to make the sea way more navigable.
6. ***Political stability in the continent*** of North America for a long period of time which has enabled establishment and maintenance of the seaway. It also increases the confidence of people to transport their goods via the seaway.
7. ***The rapid development of ports making the seaway to handle much trade***. The inland ports include Duluth, Chicago, Detroit, Cleveland, buffalo, Toronto, Montreal, Quebec with major industrial establishments. The sea way can now handle thousands of ocean-going vessels.
8. ***The large scale agricultural production in the region*** such as wheat from the prairies , cotton from north and south Carolina, maize/ corns from Illinois, and Ohio, dairy production in Michigan and Iowa, etc the St. Lawrence sea way was constructed to provide cheap transport for the bulky agricultural products to the major industrial centres and urban markets as well as overseas markets.
9. ***The St. Lawrence Sea way is linked with a system of canals***, which increases its transportation capacity. The canals include the 320mk canal from Lake Erie at buffalo via the Mohawk gap and Hudson River to New York, the Carillion

canal and Grenville canal from Montreal to Ottawa, Rideau Canal to Kingston; and these link the sea way to the major production areas, making it a transit waterway for bulky goods to and from the interior.

10. ***Positive / favourable government policy towards the construction and maintenance*** of the seaway. For example by providing the required capital and purchasing modern machinery for construction of the seaway, hiring labour to maintain the seaway. This in turn increases the use of the seaway.
11. ***Strategic geographical location of the seaway in the centre of North America and linking to the Atlantic Ocean***. This enables it to handle large volume of cargo from both Canada and USA. It also transports large quantities of goods (imports) from Europe.

Economic significance of the St. Lawrence sea way

- ***The sea way has promoted trade and commerce in the region*** for example Importing large quantities of commodities like iron ore, coal, crude oil, cotton wool, food stuff; tropical hard wood timber. Transporting large amounts of exports from North America such as chemicals, vehicles, machinery, diesel engines, newsprint, textiles, and automobiles. This in turn increases national income.
- ***Promotion of industrial development*** along the length of the St. Lawrence seaway attributed to the cheap water transport for imports and exports. Today the great lakes region is known for smelting, metal works, chemical industries, textiles, automobiles, agro-based industries in Detroit, Quebec, Toronto and Chicago. The waterway provides cheap and easy transport for bulky industrial raw materials such as coal, petroleum, limestone, steel, iron, agricultural products as well as accessibility to the overseas markets.
- ***Promotion of port and urban development*** with modern facilities such as containerization, use of cranes. These include buffalo, Chicago, Duluth, Montreal, Cleveland, Thunderbay, and Toronto. These are developed industrial towns, trade centres, and recreational centres, financial centres with high population concentration. This also increases national income.
- ***The sea way has facilitated mineral exploitation*** for example coal mining from Pittsburgh, and Appalachian coalfields, iron ore from Labrador and Mesabi

ranges. The waterway helps to transport bulky ore from the fields to the processing and smelting centres and to various industries where they are needed as raw materials.

- ***Facilitation of agricultural development*** by opening up agricultural regions such as dairy farming at Michigan, wheat growing in the prairies, horticulture and market gardening, maize production, agro-based industries. The waterway provides cheap and easy transport to the industries and markets to be processed and consumed respectively.
- ***The sea way promotes of tourism development in the region***, apart from the waterway being a tourist potential itself. It provides cheap transport for tourists from Europe, Africa and other parts of the world, to the tour resorts. Most of these resorts are linked to the seaway by road, rail and canals. The tourist attractions are the waterfalls and rapids, industries, mining centres of Appalachians, canals, dams and locks. This also in turn increases the foreign exchange and re-investment in the economy.
- ***Provision of more employment opportunities to the people of Canada and USA*** such as engineers who carry out dredging, straightening of the waterway, hydrologists who monitor the water levels. There is also employment in shipping companies as pilots, cargo handling, and hostesses in passenger liners. They earn income for improving their social and economic welfare /standard of living.
- ***Generating of government revenue*** through taxing the shipping companies /cargo handling companies and workers' incomes. The revenue is used to develop various sectors such health, education, recreation, and agriculture.
- ***The sea way has promoted political harmony/ relationship between the USA and Canada***. The countries ensure diplomatic relationship for the joint and smooth operations on the seaway. This forms a basis of economic contacts/trade relations and economic integration (such as in the European Union).
- ***Diversification of the economy*** because it has diversified transport in North America and by providing an alternative source of income /revenue which can be used to develop various activities such as mining, agriculture, service sectors. This in turn widens the national income and the export base of the two countries.

- ***Promotes the development of other infrastructure*** such ad road and railway network in the Great lakes region, education facilities, canals linked to other areas such as the Hudson-Mohawk canal. This has increased the volume of trade and other economic activities.

Negative Effects/Short Comings of the Seaway

- ***Congestion of vessels on the waterway*** due to increasing use of the waterway by many vessels, it limits its size causing delays.
- ***The sea way has limitation in the size of vessels used on the route***. Due to the ever-growing technology, the bigger ships (super tankers) cannot sail easily along some sections of the seaway especially the canal sections. This limits direct delivery of goods into the Great lakes region.
- ***Silting of some sections of the river*** and this calls for continuous dredging which is costly yet the period of dredging limits the use of the waterway.
- ***Freezing of the river during winter season*** which limits its use as a waterway. The sea way is frozen (bound by ice) for 340 4 months in a year (December to march), which limits its use greatly during these months and navigation comes from a standstill.
- ***The sea way has many locks used to adjust water levels*** and ease navigation. These various locks lead to delays in the shipment of cargo.
- ***The Seaway is associated with urbanization and related problems*** such as traffic congestion, slum growth, drug trafficking, unemployment, high crime rate. Fighting such evils is very costly to the government.
- ***Pollution problems are associated with the waterway*** such air and water pollution due to moving water vessels, growth of industries due to the discharge of toxic wastes and from other urban activities. This is disastrous to the environment (flora, fauna and aquatic life)
- ***The seaway results into regional imbalance in development*** since it has attracted most economic activities along its course such as agriculture, tourism, industry, social services due to easy accessibility at the expense of other areas in the interior

Railway transport

This is not complete you may include the most important missing part of the work before proceeding to the next topic.

INDUSTRIALIZATION

Industrialization is the process whereby countries increasingly become involved in the production of manufactured goods. Industrialization has formed a major criteria of classifying developed and developing countries in the world.

Industries are classified as:

a) **Heavy industries**. These are major industrial enterprises that process large amounts of bulky raw materials, involves heavy investment and large-scale production such as iron and steel industry, shipbuilding, rail engineering, mineral refinery, petrochemical, aluminum smelting, automobile, and Aircraft industry. These are often located close to the supplies of raw materials.
b) **Light industries**. These are industries that use relatively less raw materials and lower capital investment. Examples include textiles, printing and publishing, furniture, pharmaceuticals, optical instruments, agricultural processing.

Contribution of industrialization to development

1. ***Generation of foreign exchange*** through the exportation of the industrial goods such as textiles, chemicals, and machinery to other countries. The foreign currency generated helps to import foreign goods not produced locally, and foreign technology.
2. ***Generation of many employment opportunities*** at various stages directly and indirectly such as the supply of industrial raw materials, industrial processing, grading and packing industrial goods, transportation, and exportation of industrial output. This has helped to improve the standards of living of the people such as through building better houses, accessing better education and health services.
3. ***Promotion of urbanization/ development of urban centres*** for example in the Rand of south Africa –Johannesburg, Pretoria, Germiston, springs, Witbank, and Kimberley. As population increases in these urban centres, a number of associated facilities come up such as banking, insurance, education, hospitals, recreation, entertainment, and research facilities.

4. ***The industrial sector facilitates capital accumulation*** from the sale of the industrial goods. It also attracts many private investors hence raising valuable capital to invest in various sectors of the economy like mining, farming and tourism.
5. ***Generation of government revenue*** from the taxation of the industrial companies, the incomes of people employed in the sector and the related activities. The revenue realized is invested in various sectors like fisheries, education sector, and farming.
6. ***Promotion of international relationship/cooperation with other countries*** such as the countries where the foreign industrial companies originate, countries importing the industrial products. This has increased trade and economic contacts with those countries—hence more capital inflow.
7. ***Promoted development of transport infrastructure*** for example today South Africa has the most advanced road and railway network in Africa comparable to that of Europe and North America. Various railway lines were developed to connect industrial centres to raw material sources and the export ports such as Cape town-Johannesburg—St.Lucia railway and Pretoria—Kimberley railway in South Africa . These networks also support other economic activities such as tourism and farming.
8. ***Diversification of the economy*** due to the development industries which supplement on the number of economic activities in the country. It has therefore reduced over dependence on few sectors like agriculture; and yet industry is not badly affected by price fluctuations of primary products. This therefore expands the export earnings and national income.
9. ***Facilitation of technological development*** and research in the country, through using modern industrial processing technology to improve the quality of products like chemicals, electronics, and textiles. There is improvement of indigenous technology after a long period of industrialization and adoption of modern techniques from developed industrial nations. The highly industrialized countries of the world are at the same time them most technologically advanced nations.
10. ***Promoted development of other sectors*** like agriculture, trade and commerce, tourism—given the linkages with such sectors. For example, the mining sector

provides raw materials to the industrial sector such as coal, iron ore; the agricultural sector supplies food to the industrial sector and provides market for industrial goods such as fertilizers and tractors. This in turn increases the national income.

11. ***Improves the country's balance of payment position*** through increasing the receipts/ earnings from exports by adding value via processing the primary products. The processed goods command higher prices in outside markets. Still it reduces the expenditure on imports by substituting them with locally produced goods.
12. ***Promotes self-sufficiency in the production of manufactured goods*** (capital and consumer goods). This reduces economic dependence on other countries and problems of political and economic dominance by other countries.
13. ***Facilitates efficient exploitation/utilization of a country's resources*** such as mineral resources, forestry resources, water resources, agricultural resources.

Short comings/ negative effects of industrialization

1. ***Pollution of the environment*** that is, air, water and noise pollution. Industries pollute through direct emissions or indirectly through automobiles and other products. Water sources are used as dumping grounds for industrial wastes, which reduces the quality of water sources. Pollution results into health problems like deadly diseases.
2. ***Urban-related problems*** due to industrial concentration like high crime rates, traffic congestion, overcrowding, poor garbage disposal, easy spread of diseases due to poor sanitation, growth of slums. it is difficult and very costly to eradicate these problems..
3. ***Leads to unemployment problems***/ labour under utilization due to the failure of modern industries to create sufficient number of jobs. Many industries are highly capital-intensive and hence they are not a major solution to unemployment. This also reinforces the high crime rate in the urban areas.
4. ***Accelerates rural-urban migrations*** leading to urban labour surplus due to migration in excess of available job opportunities. It also results into decline of the agricultural sector due to reduced labour supply in the rural sector. *(Rural-urban migration is due to income inequalities between the urban industrial*

workers and the rural dwellers who are mostly peasant farmers in developing countries).

5. ***Leads to profit repatriation and foreign dominance***. The foreign ownership of especially medium and large-scale industries in developing countries has increased profit repatriation and foreign influence by the developed countries. More so, the expatriates used by foreign companies are expensive to support since they are paid in hard currency.
6. ***Leads to over exploitation of natural resources*** such as minerals, forest resources, and water resources in most countries, leading to quick resource exhaustion.
7. ***Destruction of vegetation cover*** through increased deforestation / clearance to set up industrial sites or expand the industrial establishments. This negatively affects the climate and soils.
8. ***Industrialization contributes to global warming*** through destruction of the ozone layer; through emission of dangerous gases to the atmosphere.
9. ***Leads to destruction of the natural landscape*** such as through leveling the landscape, reclaiming of swamps—hence destroying natural beauty.
10. ***Displacement of other activities / encroachment on land for other activities*** like agriculture, forestry and settlement. The location and expansion of industries in a particular area leads to displacement of other activities or people with less or no compensation.
11. ***Results into regional imbalance in development*** due to the concentration of industries in a particular area. There is rapid progress of that area in terms of infrastructure at the expense of other areas. Most industries are urban-based.
12. ***Industrial accidents*** for example fire outbreaks leading to loss of lives and industrial property . This undermines industrial production.
13. ***Industrialization undermines the traditional values*** by completely diverting the way of life such as by changing the cultural identity of dressing, the tools used in daily activities – to adapt to the manufactured goods.

INDUSTRIALIZATION IN JAPAN

Japan is a highly industrialized country in Asia and one of the most industrialized nations in the world. Despite the shortage of industrial raw materials and fuel, the country has been able to industrialize and it is a major exporter of industrial goods.

Major industrial regions of Japan

A. The Keihin region

This is the greatest industrial region of Japan formed by the conurbation of three major towns of **Tokyo, Kawasaki** and **Yokohama**. Tokyo is noted for electrical engineering (especially television sets, refrigerators, washing machines, and computers). Yokohama has precision engineering, shipbuilding, oil refining, and petrochemical. Kawasaki has marine engineering, cement works and glass works.

B. The Hanshin region

This is the second greatest industrial region formed by towns of **Osaka, Kobe** and **Kyoto**. Osaka is the greatest textile town, with plastics, footwear, and textile machines. Kobe concentrates on shipbuilding, oil refining, and petrochemical industries. Kyoto has traditional handcrafts, toy and lacquer works. The Hanshin ports handle much of the foreign trade.

C. The Ise bay region

This is the third industrial region of Japan dominated by one major town-**Nagoya**. The industries include textile mills that process local silk, imported cotton and wool, and also synthetic fibres ; engineering industries of all kind of machinery , automobiles , locomotives and air craft. Other towns are Tajimi, and Seto towns noted for musical instruments (guitars, violins and pianos), ceramics, and motorcycles.

D. The Kitakyushu region

This occupies the Northern Kyushu area, the Chikugo coalfield and good accessibility giving rise to a conurbation with towns like **Yawata, Kokura**, and **Moji**. Other towns are: Tobata, Fukuoka, and extends up to Nagasaki. The major industries are: iron and steel, ship building, machine parts, chemical industry and textile industries. There is also rice milling, wheat milling, distilling. This area is dominated by large-scale factories and massive operations.

Apart from the above four major industrial regions, there are scattered industrial towns including Hiroshima, Kagoshima, Muroran, Akita and Niigata, Kure, Okayama, Chukyo, Hakodate, and Sapporo.

A sketch map showing major industrial regions of Japan

Factors responsible for industrial development in Japan

1. ***Availability of a wide variety of raw materials to use in the industries*** such as the coal (*from Chikugo coalfield)* supporting the iron and steel; limestone in Niigata and Toyama; manganese, iron ore, timber. These few raw materials are put to the greatest use by producing high quality output that commands high prices to offset the high costs of production. The textile industries have turned from cotton to synthetics (like rayon, polyester) which are made within the country from local timber, imported timber or imported oil.
2. ***Japan is the world's leading fishing nation*** and fishing provides raw materials for various industries such as fish canning, cosmetics, oil manufacture, animal feeds, and drugs, chemicals, for example located in Tokyo, Osaka, and Kobe. Still the fishing sector provides market for industries making fishing equipment such as fishnet industries, boat making, shipbuilding, and marine engines.
3. ***Availability of large quantities of power*** to operate the industries. Japan has compensated the limited coal by developing almost all her hydro electricity sources to provide power to run machinery in the industries. Japan's largest dam is the Kurobe dam on Kurobe River in Toyama. The country also has nuclear energy and continues to import oil for power supply in the industrial sector.
4. ***The large population of Japan*** which provides a large supply of cheap labour for industries. Still employment in the industrial sector relieves pressure on the rather small agricultural land. Japan has a population of about 130 million, which also supplies a ready market for the industrial products. This promotes further investment in industry.
5. ***Proximity of Japan to mainland Asia/*** Japan is near other Asian countries like china, Koreas, which have large populations and hence provide large market for industrial products; since they import manufactured goods mainly from Japan.

Despite the rising costs, the market in Europe, North America and Africa is maintained high quality production in the Japanese industries.

6. ***Japan's indented coastline and hence development of modern ports*** for example Tokyo, Kobe, Osaka, Yawata; for the importation of raw materials like scrap and coking coal, iron ore, oil, natural gas—which support the iron and steel industries, electronics, oil refineries, and chemical industries. These ports also help in the exportation of manufactured goods to other parts of Asia, Europe and Africa.
7. ***The destruction of many industrial installations during the Second World War*** which helped Japan to replace the old industrial establishments with new and more efficient ones. This increased the competitiveness of Japanese industries like iron and steel, automobile, and electronics. Indeed, there arose a post-war national desire to rebuild the country.
8. ***Availability of large sums of capital to invest in the industrial sector*.** After the Second World War, loans were advanced to Japan (particularly from USA) to assist in the post-war recovery program. This acted as capital for industrial investment such as purchasing industrial machinery, raw materials, payment of labour and carrying out research in industrial output. In addition, more local and foreign investors have invested in the industrial sector.
9. ***Presence of many large corporations*** which have invested much in industry, they are well-managed and corporate worldwide. These include **Honda motor co ltd** based in Tokyo—a major manufacturer of automobiles and motor cycles; **Sony corporation**—Japanese electronics manufacturer; **Toyota motor corporation**—a major manufacturer of automobiles based in Toyota.
10. ***Availability of skilled labour to work in the industrial sector***. After the Second World War, many Japanese workers were trained in industrial production. Still many Americans were brought in to work in industry with new ideas. Today Japan is among the world leaders in the production and export of automobiles, ships, steel, and electronic equipment due to great skill used. More so, the presence of many local industrialists, Japanese engineers and scientists has greatly contributed to industrial development.
11. ***Presence of advanced technology*** **employed.** The Japanese were able to copy and improve on new techniques from western industrialists, hence producing

high quality products like televisions, radios, computers, microscopes, marine ships, automobiles, jet fighters, commercial planes, which command a large market. Japan is one of the world's leaders in the invention of modern industrial technology and production of highly durable goods.

12. ***The willingness of the Japanese industrial workers to adopt automation*** than elsewhere in the world , which automation is today very necessary in mass production assembly lines for example in the motor vehicle industry. This has promoted high productivity and efficiency in production.
13. ***Well-developed transport system*** such as water transport with modern ports equipped with modern handling facilities; electrified railway network connecting various industrial centres (such as Tokyo connected to Osaka) and a highly advanced air transport. All these have been used to boost industry by promoting foreign trade in manufactured goods and raw materials.
14. ***Large / ready water supply for industrial use*** such as for cooling machines or as a raw material such as iron and steel, metal works, engineering industries, power generation, food processing, soft drink and brewing industries. This is why many industries in Japan are located along the coast, along rivers or where piped water supply is available.
15. **Stiff internal competition among industries** which produce similar products and this promotes industrial efficiency. For example in the Automobile industry with companies like ***Honda motor company, Toyota Motor Corporation, Nissan motor company, and Mitsubishi***. This has led to manufacture of high quality cars, trucks, buses, motorcycles to meet world standards.
16. ***Political stability of the country*** since the Second World War, which has enabled long-term and large scale investment in the industries like in the computer and electronics industry –where the Sony Company designs and manufactures video cassettes, recorders, cellular phones, television systems, and various types of computers.
17. ***Intensive research in the industrial sector*** by the Japanese leading to better products. For example, Toyota was the first manufacturer to produce a hybrid car powered by a combination of electricity and gasoline. The Nintendo co Ltd based in Kyoto is the leading manufacturer of home and portable video games due to a lot of research.

18. ***Favourable government policy towards industrialization*** such as encouraging industrialists and formulating a technically biased education system. Government also ensures quality control through compulsory inspection to meet the export standards. It has spearheaded research and encouraged investment by large corporations.
19. ***Industrial inertia*** where by old industries fail to change location despite change in locational factors such as raw material supply. Many new industries are attracted to the already existing old industrial centres to benefit from the existing infrastructure and the primary industries. For example in the Keihin region where secondary industries like metal works, electric cookers, washing machines, refrigerators, chemicals—have been attracted by the accessibility and the presence of primary industries like iron and steel, and oil refineries.
20. ***Availability of extensive land for industrial development***.

GERMANY

Germany is one of Europe's most developed nations and one of the most industrialized countries in the world. The biggest industrial complex in the country is the Ruhr West Phalia industrial region. It is the largest and most concentrated industrial complex in Europe.

Structure of industries

1. **Iron and steel industry**
   This consumes raw materials like cool water, coke, pre-heated air, iron ore, scrap iron, fluxing stone. It is only iron ore which is imported, but the rest are available locally. Steel is on great demand in many secondary fabricators of steel on the Ruhr and other parts of Germany such as automobile industries, container industries, electrical machinery, appliances, and utensils, agricultural machinery, and shipbuilding. It is also needed in the construction industry—road, rails, warehouses. The major centres of iron and steel are Duisburg, Essen, Bochum, and Dortmund.
2. **Engineering industry**. The main engineering products are agricultural machinery, blast furnaces, heavy vehicles plus those above. The main centres are

Essen, Dortmund, Dusseldorf, Gelsenkirchen, Solingen, Oberhausen, and Rheinhausen.

3. **Chemical industry**. This has developed rapidly due to the presence of coal, local limestone, and the recent use of petroleum. The products include bleaches and dyes for textiles, plastics, synthetic fibre for textile, detergents, pharmaceuticals, and fertilizers. The main centres include Dusseldorf, Leverkusen, Essen, and Duisburg.
4. **Textile industry**. This is dominant in the Valley of Wupper River in the south of the Ruhr region. The products include cloths, artificial textiles, threads, leather products, carpets etc. The main centres are Krefeld, Wuppertal, Elberfeld, and Leverkusen.

   Other industries in the Ruhr region include paper, pottery and glass, rubber, brass, bronze, ship building.

Apart from the Ruhr region, other industrial regions in Germany include:

a) **The middle Rhine industrial area**. This is at the confluence of the Rhine and the main rivers. Industries include railway engineering, automobile, electronics, chemical, iron and steel, and brewing. The major centres are Frankfurt, Mainz, Mannheim, and Ludwigshafen.
b) **West Berlin (capital)**. The industries are consumer goods (furniture, luxury articles), chemicals, and engineering.
c) **Hamburg**. The industries are shipbuilding, marine engineering.
d) **Munich**. The industries are brewing, musical instruments, photographic equipment.
e) **Stuttgart, Hannover, Aachen, Saar brucken, and centers in East Germany** (like Leipzig, Jena, Dresden, and Strassfurt).

Factors responsible for industrial development in Germany

1. ***Availability of various power sources***

   Coal was for long the main source of power for industrial development in Germany and the Ruhr coal field had large quantities of coal and relatively cheap to extract due to being near to the surface (exposed). However, the use of coal

has declined due to development of other sources of energy like natural gas, petroleum/oil, and hydroelectric power—used to run industrial machinery and in industrial boilers—encouraging large-scale production.

2. ***Availability of a variety of coal types in the Ruhr region*** which include anthracite coal containing a high percentage of carbon and burning with great heat, thereby suitable for heat boilers. Coking coal is particularly valuable for the smelting iron ore-hence iron and steel industries. It is also for chemical industries as a raw material. Gas coal results into gas supply for domestic and industrial purposes.
3. ***Presence of large quantities of other raw materials*** which include iron ore used in the iron and steel industries. Iron ore is both in the Ruhr and imported from Sweden and France. Timber from the Black forests of south Germany used in the paper industries, grapes grown in the Rhine rift valley for the wine industry, livestock products for dairy processing plus foot wear industries ; and imported cotton for the textile industry. This leads to continuous production and supply of industrial goods.
4. ***Availability of adequate capital to invest in the industrial sector provided by*** the developed banking sector. More so, the Marshall Aid plan of 1945 after the Second World War provided the necessary capital for industrial recovery, that is, construction and rehabilitation of the Ruhr industrial plants and other infrastructure, as well as modernizing technology in industry.
5. ***The initiative of a number of local businessmen*** with the required capital for industrial investment. For example, Krupp family based at Essen—who was the owner of the largest steel and armament combine in Europe. Thyssen based on the Ruhr who invested in the steel industry. Others were Mayer based at Bochum, and Igparen. Given their example, many other industrialists later came up, and thus more industries have concentrated in the same areas.
6. ***Presence of a wide/ large market both domestic and foreign*** partly due to the high quality production. Still Germany has a big and rich population which provides market for industrial goods. There is a large foreign market in the rich European countries such as Switzerland, Italy, France, Belgium, and Austria and the former colonies for goods like electronics, chemicals and textiles. This further promotes industrial investment.

7. ***Regional cooperation*** also promotes industry since Germany is a member of the European Union (EU). This organization is widening the market potential for the industrial products in the member countries. This in turn promotes industrial expansion to satisfy the expanding market.
8. ***Developed/efficient transport system*** for example the Rhine waterway providing a cheap form of transport for heavy goods, both imports and exports. Communications have further been improved by the construction of canals such as **Dortmund—Ems** canal linking the Ruhr region to the North Sea and facilitating the importation of Swedish iron ore. Other canals include **Rhine—Herne canal, and Lippeseite** canal. There are also modern road and railway networks-all used in the transportation of raw materials and finished goods.
9. ***Strategic geographical location of Germany*** in the centre of Europe giving it access to a wider area for market and raw material supply. Still as the use of coal declines and the use of oil rises, the location of the Ruhr region on the Rhine waterway not very far from Rotterdam port is being more advantageous to industry. It is for this reason that the petro—chemical industry is increasingly becoming a major industry in the country such as in the Ruhr region.
10. ***High level of technology employed in all forms of industry*** and this involves the use of highly efficient machinery at various stages of production, including automation in iron and steel, engineering, and food processing. In Germany, there is a constantly growing generation of industrial technologists. This results into high quality and quantity industrial output.
11. ***Availability of large supply of skilled manpower*** such as skilled entrepreneurs, managers, and engineers in iron and steel works, automobile, and petro—chemical industries in the Ruhr region. This leads to greater innovations and high quality industrial goods that command a large market.
12. ***Internal competition among industries and industrial centres*** for example Duisburg, Essen and Dusseldorf are competing in the iron and steel, engineering and chemical industries. This leads to increased inventions and innovations in industrial production. The Germans are known world over for their capacity for hard work that arose out of their national desire to restore their country as an industrial giant.

13. ***The destruction of many industries during the world war/ the post-war national desire of the Germans to rebuild their country***.
    This enabled many firms to re-start with newer and modern equipment that existed in other countries, which were less affected by war. There was need to uplift efficiency and productivity of the industrial sector –hence modernizing the engineering, textiles and food processing industries.
14. ***Political stability of Germany*** since the end of the Second World War *(1945*). More so, the Berlin wall separating West and East Germany was removed in 1989. This has boosted the confidence of both local and foreign investors –hence large-scale investment in automobile, electrical engineering, railway engineering especially in the Ruhr industrial complex.
15. ***Favourable/ supportive government policy towards industrialization*** for example the government accepted the Marshall Aid plan of 1945 to rehabilitate and establish industrial plants such as engineering and chemical industries at Essen and Duisburg. The government has also funded the improvement of waterways, railways and road network and putting up enabling policies such as those encouraging production for export.
16. ***Industrial inertia*** where by many old industries have failed to change location despite changes in locational advantages. Accordingly many new industries are attracted near the already existing industrial centres to benefit from the existing infrastructure. This explains why many industries have been attracted to and concentrated in the Ruhr industrial centres like Essen, Dortmund, and Duisburg.
17. ***Developed industrial research.***
18. ***Availability of large/ ready water supply for industrial use***.

SWITZERLAND

Switzerland has a highly developed industrial sector in Western Europe and one of the highest standards of living. Industrialization began with textiles manufacture and for long it employed the largest number of workers. Today however engineering has taken the lead. Other industries include watch-making, precision instrument, and footwear.

The Swiss industrial structure

1) Engineering industry

Engineering is the most important accounting for a large percentage of the total exports. The products include turbines, electrical appliances, marine diesel engines, locomotives, wagons, vehicles, cableways, ski lifts, weighing and printing machines, and sewing machines. The major centres are Zurich, Basel and Baden.

2) **Watch-making industry**

Switzerland is the world's leading watch-making country based on the Swiss Jura region (for over the last 200 years). It was originally a cottage industry (home-based) but greatly developed. There are over 2700 factories *(producing components and complete watches)*, with a high degree of standardization. The principal centres are La Chaux-de-Fonds, Biel, Le Locle, and Blenna in the Jura region.

3) **Precision instrument industry**

This requires less raw materials but great skill in making high quality products. The optical instruments include binoculars, microscopes, surveying instruments, navigation and meteorology instruments, cameras. Other instruments are balances, voltmeters, and electronic calculators. The main centres are Zurich, Basel, and Baden.

4) **Textile and foot wear industry**

Textile is the oldest industry and emphasizes high quality than mass production (i.e. targeting the latest fashions). It does not venture in mass production because fashions come and go quickly. Cotton is mainly imported from Egypt, but synthetic fibres are also used. The main centres are St.Gallen, Zurich, and Appenzell; and most products are exported.

5) **The chemical and pharmaceutical industry**

This is also an important industry and produces dyes, drugs, soaps, explosives, insecticides, plastics, cosmetics, paper chemicals, photo-chemicals, and pigments. Basel is the most important centre. Other centres are Geneva, Bern and Zurich.

6) **Food processing industry**

The products include condensed milk, cheese, milk chocolate, soups, meat extracts etc. the major centres are Lindt, Tobler, Vevey, Geneva, and Lausanne.

A sketch map showing the distribution of major industrial centres in Switzerland

Factors which have favoured industrial development in Switzerland

1. ***Availability of various sources of power for industry*** for example large quantities of hydroelectric power from the Alps which supports various industries. There are other forms of power especially nuclear power. The natural gas and oil are also imported. Some of such forms of power is for domestic use and thus more Hydro electricity is secured for industry such as textile and engineering industry.
2. ***Availability of large sums of capital to invest in industrial development*** provided by the government, local and foreign investors from Europe. The capital is used to buy modern industrial machinery, carrying out research to develop high quality output, constructing the necessary transport infrastructure. This in turn encourages industrial expansion.
3. In addition, ***the country has a highly developed banking sector***, with a net work of over 4000 banks covering the whole country. Many wealthy individuals and companies bank their money in the Swiss banks, and hence many industrialists find it easy to access credit from the banks. Many industries have developed like the watch making in Jura and chemical industries in the Swiss plateau.
4. ***Large supply of raw materials from different sources***. Though the country virtually lacks most viable natural resources / raw materials, certain inputs are available especially from the agricultural sector such as milk, meat, sugar, vegetables. The livestock industry provides raw materials for producing cheese and milk chocolate in Lindt, and Tobler. The grapes provide materials for wine making. Remember however that most raw materials are imported such as oil, and cotton. This leads to reliable supply of industrial goods.
5. ***Availability of large /extensive land for industrial development*** especially the Swiss plateau which is relatively flat and this favours the construction of industries like engineering at Zurich, textiles at St.Gallen, chemical at Bern. Many industrial sites have been set up in the country and thus increase in industrial output.
6. ***The long policy of neutrality of the country*** which saved Switzerland from the destruction by both world wars and European wars. It also favours rapid development of the banking sector and made the country the head quarters of many international organizations such as International Red Cross and FIFA. The

coming of these organizations provides a large market for the Swiss industrial products, since the delegates take the information back to their home countries.

7. **Switzerland's strategic position in the heart/centre of Europe** which has given it an advantage of acquiring market in all directions such as Germany, Italy, France, Belgium, and The Netherlands. Switzerland also gets raw materials from such countries. Swiss industrial products such as watches, binoculars, cameras, and engineering products command a worldwide demand and the products go to countries like USA, Japan, china, and African countries.
8. ***Availability of large skilled labour supply to work in industries***. Most Swiss industries trace their skills from the old cottage industries such as textiles and watch making. The Swiss have kept on increasing their skills and they produce high quality products such as precision instruments which require less raw materials. These have helped the Swiss to partly overcome the problem of Landlockedness and to compete favourably on the world market.
9. ***Well developed transport networks, including road, railway, air and water***. The Rhine is the most important route for Switzerland linking it to the North Sea. About 90% of the incoming cargo consists of liquid and solid fuels, raw and semi-finished materials. There is a modern electrified railway network and modern air transport for moving inputs to industries and finished goods to various parts of the country and neighboring countries.
10. ***High level of technology employed in the industrial sector*** which has promoted the engineering, watch making, textile and the precision instrument industry. The precision instrument industry uses limited raw materials and yet produces high quality products such as cameras, binoculars , calculators, microscopes; which are highly branded depending on international demand.
11. ***Availability of large water supply for industrial use*** such as cooling machines and as a raw material such as chemical industries and food processing. Therefore many industries are located along rivers (like Rhine), by-lakes (like Geneva, Zurich), or where piped water supply is available.
12. ***The effect of the developed Swiss tourist industry*** based physical and man-made features. Many guests tour and ended up becoming industrial investors. Tourism has also greatly advertised the Swiss tourist products in the rest of the world,

since the guests take the information and samples of the products in Switzerland to their home countries. This promotes industrial expansion.

13. ***Favourable government policy towards industry*** such as by encouraging sound education and research to discover new industrial production techniques. It has also financed certain industries such as power generation, engineering with a desire to maintain the global image of Switzerland. The government also encourages local and foreign investors in industry.
14. ***Developed/intensive industrial research*** for example in watch-making companies in the Jura region (making complete watches and spare parts). Many industrialists invest in automation, production of synthetics and labour-saving technology especially in the engineering and precisioninstrument industries. There is also research into the elimination or minimizing of chemical, biological or physical hazards in the industries.
15. ***Industrial inertia***

Problems facing the Swiss industrial sector

1. ***The country lacks most of the valuable natural resources/ raw materials***, which propelled early industrialization in most developed countries such as coal, iron ore, copper, and oil. The country only has limited coal, iron ore, and salt in the Rhine valley. The country also has few agricultural raw materials due to infertile soils and cold winters. As such, the industries have little bearing on the natural resources and this explains why most raw materials are imported.
2. ***Rugged terrain/ mountainous nature of the landscape*** which limits accessibility. The Swiss Jura and Alps make the construction of roads and railway lines difficult and thus problems in the delivery of raw materials and finished goods to industries and markets respectively.
3. ***Small domestic market*** since the country has a small population *(just over 7.8m)* which cannot support industrialization. This undermines industrial production.
4. ***Competition from other industrial countries for market*** notably Japan, China, USA and Germany. This results into fluctuations in prices and incomes.
5. ***Shortage of labour*** to work in the industries, leading to high labour costs and consequently increased costs of production.

6. ***The country is landlocked with no direct and easy access to the sea***. It is enclosed by several countries like Italy in the south, France in the west, Austria in the east and Germany in the north. However, this problem is undermined by the presence of the Rhine River that helps the country to access imported raw materials and to export finished goods.
7. ***High costs of production***. The production of high quality capital-intensive goods is very costly, the precision products are particularly expansive to make.
8. ***Limited land for industrial expansion*** partly due to the rugged terrain in the Jura and Alps. The industrial centres in the Swiss Plateau are already congested. This undermines industrial production.
9. ***Pollution due to wastes from industries*** which negatively affects the quality of the industrial output.
10. ***Congestion of the Rhine***—which is the main waterway linking Switzerland to the rest of the world and the frequent delays affect the Swiss industry.
11. ***The system of imposing high tariffs on imported goods*** by developed countries, which meant that Switzerland had to fight the tariffs.

USA

USA is the world's leading industrial country, although North America as a whole started her industrialization process later than Europe. USA is also the most developed country in the world.

Major industrial regions and centres

There are six (6) major industrial regions:

1) **Southern New England**
   This comprises of the North Eastern USA centred at Boston and was the earliest to be developed by the settlers from Europe (especially the British). The main industries include electronics, armaments, Aircraft manufacture, computers, and medical instruments. The major industrial towns include Boston, New Bedford, Hartford, Holyoke, Springfield, Bridgeport, and New Haven.
2) **The mid-Atlantic states**
   This is the most densely populated part of USA and the most heavily industrialized. The main industrialized cities include New York, Philadelphia,

and Baltimore. The major industries are iron and steel, engineering, electronics, printing, and publishing, textiles, luxury articles, chemical, and food processing.

3) **Pittsburgh –lake Erie region**
   This region is the core of USA's heavy industry. The major industries are mechanical engineering, glass, pottery, chemical, HEP generation at Niagara Falls in buffalo city, milling. The main industrial centres are Buffalo city, Wheeling, Youngs town, Cleveland, and Pittsburgh.
4) **The Detroit industrial region**
   This is located at the western end of Lake Erie and is the greatest automobile region of USA. Detroit is the head quarters of most giant motor corporations such as Ford, Chrysler, and General Motors. Car assembling is associated with other branches of industry such as tyre making, electrical wire, glass, batteries, and spare parts.
5) **The lake Michigan region**
   This is located at the southern shores of Lake Michigan centred at Chicago. It is a major automobile region, has chemical industries, iron and steel. Others are meatpacking, grain milling, agricultural machinery, railway engine repairing, and coach construction.
6) **The southern Appalachian region**.
   This is centred at Birmingham to the south of the Appalachians in the state of Alabama. Industries have greatly been promoted by the presence of coal, iron ore, oil and hydroelectric power. The major industries are steel making, textiles, chemical, metal works, and machinery. The main centres are Birmingham, Atlanta, and Gadsden.

Other important industrial regions include *Eastern Texas, St .Louis, Kansas City, New Orleans, San Francisco, Los Angeles and San Diego, Seattle, Washington.*

Factors which influenced the location and development of industries in USA

1. **Availability of a wide range of mineral resources for industrial use**. USA produces large quantities of petroleum, natural gas, coal, and iron ore. USA's important minerals are petroleum and coal used as raw materials in chemical industries; iron ore and copper used in iron and steel industries and engineering industries. This promotes industrial expansion and production.

2. **Availability of large quantities of power** since USA is a major producer of petroleum, natural gas, coal and hydroelectric power. There are many HEP stations such as Tennessee valley dams, Niagara Falls and Shasta dam. Today USA has the world's biggest installations of nuclear power. The ready supply of power has facilitates the running of industrial machinery and heating such as aluminum smelting, iron and steel and engineering.
3. **Availability of a wide variety of other raw materials, apart from minerals.** USA has a wide range of agricultural raw materials for example fruits from the central valley of California favouring soft drinks and brewing ; cotton from the southern states for textiles; maize and wheat favouring grain milling; ranching favouring meat packing, and foot wear. There are also fishing –related industries at the ports like New York, Baltimore, Los Angeles, Boston, San Diego, and San Francisco. This ensures continued industrial production.
4. **Availability of adequate capital to invest in industry** generated from international trade and especially from the oil industry. It is also provided by the federal governments of various states, large companies such as Coca Cola at Atlanta, Pepsi cola in New York, Henry ford which opened up automobile technology. There is also credit provided by the banking sector such as in New York and Boston. This has led to large –scale investment in oil refineries, chemical, electrical engineering, and food processing.
5. **Presence of skilled and semi-skilled labour** originally made of immigrants from advanced European countries such as Britain, France, Netherlands, and Germany who settled in centers like New York, Boston, and New Bedford. They came in with experience and technical knowhow needed for industrial development.

   Besides **the education system of USA is technologically biased** because people are allowed to develop their fields of interest from the early stages and hence bringing up skilled engineers, researchers, managers, skilled entrepreneurs and other industrial workers. This has promoted industries like automobile in the Detroit and Lake Michigan regions.
6. **Modern /Advanced technology** continuously upgraded by the sound education and training which is technologically biased. Many skilled scientists and technologists are trained and others attracted form Europe. Today USA is the world's leader in scientific modern industries such as computer technology- with

important companies like Microsoft and IBM (international Business Machines Corporation), Netscape Communications Corporation based in California.

7. **Presence modern transport and communication network** involving railway, road, air and water transport. USA has the densest railway and road networks in the world, many airlines and aircraft manufacture. The most important waterway the St. Lawrence sea way shared by the Canada and USA; and all these promote the movement of raw materials, workers and finished goods.
8. **Availability of a large market for industrial goods both local and foreign**. USA has a population of over 300million people for domestic market. The Great lakes region and New York are some of the most highly populated regions. Still the US goods are exported to Europe, Asia and Africa due to high quality and USA's reputation/influence in other countries. USA greatly influences the WTO, World Bank, and IMF—hence a growing world market, which continuously promotes the expansion of industry (like textiles, machinery).

   There is also industrial linkage with some industries providing inputs or market for other industries. For example, the iron and steel industry promotes the engineering industry, electronics, and automobile. In addition, car assembling in the Detroit region is associated with other branches of industries like tyre-making, electrical wire, batteries, spare parts, and glass.
9. **Inter-state competition in USA** has also promoted large-scale manufacturing industries. Due to competition, some states have tended to monopolize certain industries for example the southern states in the Air space industry, while the Great lakes are monopolizing the motor vehicle industry. Still many states of USA have diversified industrial production for example southern New England has engaged in armaments, aircraft, electronics, musical instruments, and industrial machinery.
10. **Availability of extensive land for industrial development** such as for the large manufacturing industries in the Great lakes region. Some industries require large land area and hence availability of cheap land becomes important. For example the Ford Automobile plant at Dagerham—Essex (New Ark city) covers over 200 hectares of cheap non-agricultural land. This eventually increases industrial production.

11. **Supportive government policies towards industrialization** such as encouraging export promotion industries such as electronics, computers, coaches, textiles, and chemical industries in Chicago, Detroit, and Cleveland. It has also developed transport infrastructure; carried out sound financial and economic planning to maintain USA's supremacy in the world as a "super power"—hence great industrialization.
12. **Strategic location of industrial zones** such as coastal ports-Los Angeles, New York and Boston which are trans-shipment points for oil products either to other parts of USA or imports from abroad. Therefore, they are natural sites for oil refining and chemical industries. The ports are also centres for smelting imported ores and using other imported raw materials such as rubber, cotton, maize and timber. The industries in the Great lakes and along the St. Lawrence Sea way are also strategically located.
13. **Initiative by a number of local businessmen** who include ***Bill Gates*** who co-founded with ***Paul Allen***—the Microsoft Corporation, which is the leading computer software company in USA; ***Henryford*** who founded the Ford Motor Company *(one of the world's largest automobile compoanies based in Detroit region).* Others are ***Andrew Carnegie*** *(founder of the iron and steel industry in the US)* and **Walter Chrysler** *(an American automobile manufacturer)*. These invested large sums capital, carried out technological research and set pace for industrial development.
14. **Highly developed industrial research** for example, Microsoft Corporation based in Washington is the world's largest company creating computer software products like Word processor, Access, Spreadsheet. Many industrialists have invested in automation, production of synthetics and adopted labour-saving technology. There is also research into the elimination or minimizing of chemical, biological or physical hazards in the industries in many states of USA.
15. **Political stability of the country** for over 250 years which has enabled the establishment and maintenance of industrial infrastructure and motivated many local and foreign investors to invest in US industry such as in food processing and printing and publishing in New York.
16. **Availability of large water supply for industrial use**. Certain industries such as iron and steel, aluminum smelting, power generation, timber pulping use large

quantities of water for cooling machines or as a raw material. Many industries are located along rivers, by-lakes, along the coast such as in New York, Boston, Los Angeles, Chicago, Detroit, Houston; or where piped water supply is available.

17. **Industrial inertia, where by** the recent types of industries such as electronics and petro-chemical industries are located in areas where old industries like iron and steel exist to easily acquire inputs. Industries that were once started due to advantages of raw materials, market or fuel have tended to persist in such areas due to inertia or the momentum of early start, despite changes in locational advantages.
18. **US influence in many countries and its military supremacy taken as a role model** which has meant easy acquisition of imported raw materials and expansion of market for industrial output. This supremacy is added to the industrial threat from other nations like China, Taiwan, North Korea, and Switzerland –which threat has forced US to greatly industrialize in attempt to maintain its position.

SOUTH AFRICA

South Africa is the industrial giant of Africa. Before 1930, South Africa was a major raw material supplier and a major importer of manufactured goods. However after the 2nd world war the situation changed and many industries were established in South Africa. Today industries contribute a large percentage of South Africa's national income and employ millions of people.

Distribution of industries in South Africa

1. The Rand (Witwatersrand)

The heart of South African industry today lies on the Rand (Witwatersrand) –a gold strip in southern Transvaal. This is the most important region having over half of South Africa's industries and about half of the manufactured output. The major manufacturing centres of the rand include:

a) Johannesburg

The main industries here include iron and steel industry, manufacture of railway wagons, mining machinery, farm machinery, electrical, chemicals, furniture, textiles, paper and printing, and food processing.

b) Pretoria

This is the administrative capital of South Africa. The major industries include iron and steel industry; railway wagon manufacture, glass, cement, metal working, chemical, engineering, and food processing

c) Vereeniging

This is a major coal mining, engineering and iron and steel centre. There is a tinplate industry, manufacture of alloys.

d) Germiston

This is a home of the Rand's gold refinery. It produces metal goods/machinery, chemicals, railroad equipment, textiles.

e) Springs

This is a major gold and coal-mining centre. It has steel industry, mining machinery, electricals, bicycles, printing machinery, paper, glassware, and canned foods

f) Other centres on the rand are Kimberley, Bloemfontein, Benoni, Krugersdorp, and Vanderbijl Park.

2. Cape town

The major industries include oil refining, shipbuilding, and repair, diamond cutting, printing, chemicals, leather goods, textiles, paper, food processing, and vehicle assembly.

3. Port Elizabeth

The major industries are vehicle assembly, tyre manufacture, metal and wood products, chemical, and food processing.

4. East London

Industries include soft drinks, furniture, building materials, textiles, vehicle assembly.

5. Durban

This port is a major importer of raw materials and manufactured goods. The industries include machinery, railroad repair workshops, oil refinery, soap, paint, fertilizer, textile, light engineering, and vehicle assembly.

A sketch map showing industrial distribution in South Africa

Factors which have influenced the location/ distribution of industries in South Africa

1. **Presence of various mineral resources** such as large deposits of coal, iron ore, gold, and copper which are the major industrial minerals. Industries are located near the mining centres due to cheap mineral supply. For example Johannesburg has a variety of steel and cement manufacturing industries, machinery and chemical industries due to iron ore, coal and cement in the surrounding area. Germiston is also a major centre of gold refinery due to the large deposits of gold on the Rand.
2. **Presence of various sources of power** such as coal which is a major source of power for industries in South Africa. The biggest coal-burning power station in the southern hemisphere is the Klip power station at Vereeniging. Industries are therefore concentrated in the main coal producing regions such as machinery, electricals, and steel works in Vereeniging, and springs. There is also hydroelectric power generated from the Vaal and orange rivers; nuclear power from uranium, and imported oil/ petroleum for power supply.
3. **Availability of a variety of other raw materials**. Industries have been distributed following the distribution of raw materials. In Natal, the sugarcane mills are located within the sugarcane belt (such as Durban and Huletts). In SouthWestern cape, the fruit canning industries are within the fruit belt. Industries using imported raw materials are located at the coast such as oil refinery, shipbuilding, chemical, vehicle assembly and textiles industries at Cape Town, Port Elizabeth, East London, and Durban.
4. **Presence of a ready/ large market** for industrial output. Many industries are concentrated in the major cities and ports for example Johannesburg, Durban, and Cape Town, which have over 3 million people each—hence offering a large market and the industries include oil refinery, chemical, textile and food processing. Still many industries are located at the coast to easily access foreign markets such as industries in Cape Town, Durban, East London and Port Elizabeth. South Africa has obtained a large market in the Far East (Japan, Taiwan, and Singapore) in addition to Europe.

Note: South Africa has got trade links with the rest of Africa, given that it is nearer to the African states than other significant industrial countries.

5. **Availability of large supply of skilled and unskilled labour**. Most industries have been set up in highly populated areas. Johannesburg for example has over 3 million people. Also the large black towns of Soweto and Alexandria lie within the Johannesburg metropolitan area providing cheap labour for the industries in the region (such as iron and steel, mining machinery, chemical and food processing). Although some skilled labourers have fled the country, more skilled workers have immigrated to South Africa than they do emigrate.
   Still South Africa competes with major industrial countries due to careful training of local workers to make them efficient especially in the main industrial centres of Pretoria, Germiston, Vereeniging and Kimberley.
6. **Presence of efficient transport system** such as water, railway, and road to move finished goods to markets and easily access to raw materials. For example, Southern Transvaal area (the Rand) is well favoured for the gold mines which have roads and railways. This partly explains the presence of many industries in the Rand (such as Johannesburg, Pretoria, springs, Germiston). Some industries are located along the coast to take advantage of the cheap sea transport such as oil refineries and vehicle assembly at Cape Town and Durban.
7. **Ready water supply**. Increased industrialization has taken place strategically near water sources, since water is required as a raw material, cooling and cleaning machines. Witwatersrand which is the main industrial area draws water from Vaal River to support the iron and steel industries in Vereeniging and Johannesburg. Durban and East London are fairly supplied with water from rivers and the ocean. Water supply greatly determines the location and expansion of big future industries in South Africa.
8. **Availability of adequate capital**. Much of South Africa's industry is concentrated on the Witwatersrand and this is greatly because of the capital generated from the gold sales. Gold accounts for a large percentage of South Africa's exports and with a variety of other minerals when exported, more capital has been generated which is used to invest in industry especially in the Rand. Still many industrialists/investors have settled in the major industrial zones of the country such as the Rand, Cape Town, east London, Port Elizabeth and Durban.

9. **Industrial inertia** where by old industries fail to move from an area to another when the location advantages change. This is explained by the 'momentum of early start' and results into the concentration of both primary and secondary industries in an area. For example the supplies of iron and steel in Vereeniging have attracted other manufacturing industries like agricultural machinery, pipes, wind mills, chains, cables, bicycles on the Rand.
10. **High level of technology and research**. South African industrialists in the main industrial regions (such as Rand, cape town, Durban) have emulated/adopted certain technologies from the East (especially Japan), Europe and North America; and also continuously undertake research in industrial products especially in the secondary industries such engineering, agricultural machinery, food processing.
11. **Political stability** is a major factor attracting the location of industries in areas such as the Witwatersrand. The stability has boosted the confidence of both local and foreign investors and hence enabled long-term investment in the industrial sector in such areas like Pretoria, Vereeniging, Germiston and Kimberley.
12. **The strategic location of industrial centres** for example Vereeniging has an advantage of a central position in relation to the three provinces of Transvaal, Orange Free State and Durban which means easy access market in all directions. It is also about 150km from Orange Free State gold fields. Also the industries located at the coast have a strategic advantage of easily accessing markets overseas and also imported raw materials.
13. **Availability of vast/ extensive land to set up industries**. Industries which require vast land are located in sparsely populated areas where land is readily available and cheap. More so, South Africa has many unrestricted sites for industrial development in the zones of Rand, Durban among others –which has encouraged both local and foreign investors to such area/zones.
14. **Favourable /supportive government policy of industrialization** such earmarking several industrial sites in certain areas, hence influencing industrial location/ distribution. The industrialists have further benefited from import control and the imposition of certain taxes to cut down the stiff competition from overseas industries. The government also promotes quality control and finances basic industries such as iron and steel industry, electricity generation. It also

greatly spends on improving and extending the communication routes in various parts of the country, a factor that attracts industrial location.

Guiding questions

1) Assess the contribution of manufacturing industries to the development of either Japan or Republic of South Africa.
2) With reference to either Germany or Nigeria, examine the impact of industrialization on the environment.
3) To what extent has the presence of market contributed to the concentration of industries in either Manchuria region of china or the Greatlakes region of USA?
4) To what extent has the presence of raw materials influenced industrial distribution in the Republic of South Africa?
5) Examine the factors which have influenced industrial development in the Greatlakes region of USA.
6) To what extent has the presence of power and energy influenced the distribution of industries in USA?
7) To what extent has the presence of mineral resources contributed to industrial development in either Germany or the Republic of South Africa?
8) Assess the significance of natural resources as a basis for industrial development in either USA or Switzerland.
9) To what extent has the presence of minerals influenced the location of industries in Germany?
10) Account for the distribution of manufacturing industries in USA.
11) To what extent are natural resources a basis for industrial development in republic of South Africa?

- Identify the various natural resources in South Africa and show their contribution to industrial development.
- Mineral resources such as gold, iron ore, coal, limestone, phosphates, diamonds, copper etc
- Minerals act as raw materials such as phosphates in fertilizer industry, limestone for cement, iron ore for iron and steel industry—engineering at Johannesburg etc
- Source of power such as coal, oil derived from coal at Vereeniging, provides power in petro-chemical industries.

- Gold and other valuable minerals generate large sums of capital for industrial development when exported.
- Other energy sources such as rivers from which HEP is generated such as Vaal and Orange rivers.
- Water resources –the country has one of the most developed fishing industries in Africa. This has led to the development of fish canning , fish meal, fertilizer etc
- Forests—though not well endowed. Sawmills, furniture making, paper making.
- Soils and agricultural resources
- Discuss the role of other factors in industrial development apart from natural resources such as capital, market, technology etc

INDUSTRIALIZATION IN TROPICAL COUNTRIES

Industry is still underdeveloped in tropical countries with many people engaged in agriculture and obtaining most industrial products from export of agricultural raw materials and certain mineral resources. It should however be recognized that today a number of tropical countries (Africa, Asia, Latin America) are paying good attention to industrial development so as to realize its benefits.

An account for the low level of industrial development in tropical countries

1. **Power and energy problems.**

- Tropical countries have the major world's H.E.P potential, given the many waterfalls along rivers, old and firm rocks for dam construction, high rainfall facilitating rivers, and high temperatures which prevents water freezing with rivers always flowing. Despite this however, tropical countries account for a very small part of the world's H.E.P supply and this is a big limiting factor to industrial development, yet industries require large quantities of power.
- Power supply is limited /absent in many parts of tropical countries with particular reference to hydroelectric power. Generally, there is low voltage and hence supplied to only few places-which limits industrial development.

- The power supply is intermittent characterized by frequent load shedding in some countries which hinders industrial development. The operational costs for HEP are very high, and this limits the quantity of power produced for industrial use.
- Limitedness of other significant power sources such as coal deposits, oil/petroleum inmost tropical countries, which cannot sustain big industrial establishments. Still some deposits of sources like coal are of poor quality, and thus not harnessed for power supply.
- Most of these countries import petroleum/oil to use as power, which is unreliable and very expensive; and this limits industrial development.

2. **Low quality and quantity of basic mineral resources** such as petroleum, coal, iron ore, diamond, uranium. High mineral potential is a vital engine for industrial growth as evidenced in Western Europe and North America. As such in tropical countries heavy industries cannot be established due to inadequate basic minerals/ raw materials since even most of them are uneconomical to exploit.

   The grade of the minerals is also low for many mineral types such as copper losing over half of the ores to be of productive value. This undermines exploitation and hence limited industrial development.
3. **Shortage of capital** to invest in industry. Basic industrial machinery is very costly to acquire and service and yet large amounts of capital are needed to build industries. However in most tropical countries most people are generally poor and hence capital is limited. This is due to the low level of domestic savings and yet it is difficult to acquire loans from financial institutions due high interest rates. Still many tropical countries have limited incentives to attract foreign investors (capital inflow) and yet over dependence on foreign countries for capital and loans is also problematic such as loans failing to be given as promised.
4. **Shortage of skilled labour**.

- This is partly attributed to poor education and training, and this leads to very low productivity of labour. For example, there are few tropical engineers and technicians.
- Most tropical countries have to use imported expatriates to run the industries and this raises management costs of manufactured goods higher than in Europe and North America.

- Still due to inadequate skills, there are limited entrepreneurial skills, with the majority engaged in rural activities. This is worsened by the continuous brain drain.

5. **Small size of the markets/limited market**.

- Most tropical countries have generally small populations which limit the available domestic market for manufactured goods and this makes many potential investors reluctant.
- In addition, most people in tropical counties earn very low incomes and hence low per capita income. This implies low purchasing power of most people. This limits the development of large-scale manufacturing industries.
- External markets are also difficult to access, since most manufactured goods in the tropical countries cannot readily compete with goods manufactured by the already established developed/industrial countries, given the lower quality and higher price. More so, the developed countries protect their home industries by imposing high tariffs on imported manufactured goods from tropical countries.
- Weak regional cooperation/ integration among tropical countries. Many tropical countries violate the terms of integration by trading more with outside countries.

6. **Underdeveloped transport and communication networks** for example poor roads (main and feeder roads), poor railway network and poor water transport facilities. This limits access to the necessary raw materials and distribution of manufactured goods. As such, transport becomes expensive and it is rarely trusted by both local and foreign industrialists. The railway system has not been upgraded since the colonial days in most tropical countries.
7. **Political instabilities in many parts of tropical countries** since independence such as Uganda, DRC, CAR, Liberia, Ivory Coast, and Sudan. This discourages many potential local and foreign investors /industrialists, as the safety of their industrial establishments is not assured. In addition, the governments of many tropical countries end up diverting the funds from industry to military warfare.
8. **Low levels of technology** partly evidenced by depreciated machinery in many existing industries. The tropical countries often consult developed countries when they intend to develop industries, since they rarely invent their own machinery, and the modern technologies are too costly to acquire.

9. **Long distance from the sea/ landlockedness of** most tropical countries such as Uganda, Malawi, Zambia, and Chad and this means that they cannot favorably compete with the neighbors with sea ports. They incur high costs in transport of imported raw materials and to export manufactured goods. There are also unnecessary delays in getting raw materials, machinery spare parts.
10. **Under developed industrial research** which limits product development, innovation and invention, and adoption of appropriate technology. More so most industries in tropical countries suffer from dependence on depreciated machinery. There is also limited proper prospecting and research in the natural resource potential such as minerals.
11. **Foreign sabotage (colonial policies)**. Colonial countries over exploited the tropical countries during the colonial era by tapping some of the strategic resources such as mineral. The colonial governments restricted tropical countries to the supply of primary products such as agricultural raw materials for their home industries. It is for this reason that processing rather than manufacturing industries were encouraged in the tropical countries. This colonial legacy persists up to today and some tropical countries still export raw materials to UK, France, and Germany.
12. **Unfavourable government policy towards industrialization** evidenced in delays/bureaucracy in licensing of industrialists. There also other hindrances such as short tax holidays, high taxation.
13. **Corruption and embezzlement** limiting the funds for investment in the industrial sector.
14. **Weak linkage between the industrial sector and other sectors** of the economy in tropical countries.
15. **Competition with other sectors for government funding**. In most tropical countries, many sectors exist and given greater importance ahead of industry, most especially agriculture which is taken to be a backbone of most economies.
16. **Over dependence on the primary sectors like agriculture, fishing and lumbering** also hinders industrialization since most people do not have the desire to add value to produced output apart from satisfying immediate cash needs.

<u>Assignment</u>

Qn. Suggest the measures that should be taken in order to attain high levels of industrialization in tropical Africa

Guiding questions

1) To what extent is power responsible for low level of industrial development in tropical Africa?
2) Discuss the view that it is not lack of power that is responsible for low development of industry in tropical Africa.
3) To what is limited market responsible for the low level of industrial development in developing countries?
4) "In developing countries it is not lack physical resources which is primarily responsible for the low level of industrial development." Discuss.
5) Discuss the problems hindering industrial development in **any one** developing country.

TOURISM IN THE WORLD

Tourism refers to an invisible trade where people move in search of pleasure, curiosity and study. The movement can be categorized into as:

a) *Domestic tourism*-which involves movement in search of curiosity, pleasure, and study within the boundaries of a country. This mainly includes holidaymakers, students and others.

b) *Foreign (international) tourism*—which involves foreigners from different countries of origin moving to another country in search of pleasure, study and curiosity.

Tourism potentials: These things attract tourists to a specific place or country. These are both physical and man-made. Physical tourism potentials unique natural phenomena that tend to attract tourists like relief features, water bodies, vegetation, and wild animals, climate etc

Man-made tourist potentials include cultures (dressing, marriage, dances), historical sites, traditional burial sites, archeological sites, industrialization, mining, farmlands etc

General role of tourism in economic development

1. Tourism generates foreign exchange to the economy because it is an invisible export. The tourists bring in foreign currency when they spend on travel, hotel resort accommodation, entertainment, shopping local items and crafts. The foreign currency is used to purchase foreign technology, payment of expatriates, which helps in the development process.
2. Tourism leads to international recognition and respect of the country. For example, today Switzerland is recognized worldwide based on the developed tourism industry. It is for this reason that many head quarters of international organizations are located in Switzerland such as FIFA, Red cross etc
   More so tourism promotes international relationship / cooperation, which can be expanded economically. This arises from free movement and interaction of the foreign visitors and the host population, which acts as a basis of economic contacts and trade between the respective countries. It also encourages the inflow of investors.
3. Conservation of natural beauty/ the environment of the country. Tourism helps in the conservation and preservation of the natural environment for future generations such as the temperate forest species, tropical vegetation, animals (fauna) etc
4. Facilitates the development of other sectors such as the service sector. Increased flow of tourists increases the demand for institutions to convert currency such as banks, forex bureaux, shopping services, transport services which are always upgraded to international standards to cater for tourists needs. More so tourism stimulates the construction industry due to hotels, resorts etc. The tourists provide market for local goods such as food items for tourists, art and craft; hence improving the general standard of living.
5. The tourism sector generates employment opportunities to the people such as tour guides, hotel operators, tour and travel agencies, game rangers, instructors etc. This is because tourism has a range of interconnected activities, in which direct and indirect employment is created. The people earn wages and salaries which they use to improve their standards of living.
6. Tourism leads to innovation and invention of technology due to the need to increase the standards such as accessibility. Facilities like electrified railway

systems, cable cars, ski-lifts, satellite telephone, aerial photographing, remote sensing which are continuously upgraded.

7. Facilitates the development of transport infrastructure such as electrified railway in Switzerland, South Africa, and USA. It also facilitates the development of runways and airports to cater for tourist arrivals and departures. These transport networks are also used to develop other economic activities such as trade and commerce, agriculture.
8. Tourism promotes urbanization in the country, that is , the development of urban centres. These develop as tour resorts but have attracted population concentration as the tourist activities increase. These urban centres develop with accompanying services such as health, accommodation, education, shopping facilities etc
9. Promotes diversification of the economy since tourism acts as an alternative income earner to the respective countries instead of over depending on a few sectors like agriculture, mining. More so tourism leads to the development of many related activities such as trade and commerce; which helps to stabilize incomes and the general economy.
10. Tourism generates government revenue though taxing the tour operators and the workers' incomes. the revenue generated is used to develop the social services like health, education, power supply, recreation services etc
11. Promotes cultural exchange and diffusion of ideas. The tourists bring their cultures and traditions such as way of construction, language, and way of dressing, which are incorporated into the host country. This enhances transformation of society.

Shortcomings / negative effects of tourism

1. Pollution of the environment such as air and water pollution. Tourism reduces the quality of air and water through sewage disposal from hotels, restaurants, lodges, camping sites. Also the powered boats used or boat racing cause water pollution through fuel spillage. Much of this damage is caused by increased number of tourist arrivals at particular destinations.

2. Destruction of vegetation cover due to increased tourism activities. Natural vegetation is destroyed in order to set up accommodation facilities and recreation facilities for the tourists. This also leads to environmental degradation.
3. Displacement of other activities /occupies land that would be used for other economic activities such as agriculture, industry, etc. the conservationist and preservationist theory of tourism conflicts with economic development.
4. Displacement of people which normally occurs when the local community is shifted to provide room for national parks, game reserves and sanctuaries or any form of protection. Many people lose their settlement areas and sometimes they are not compensated.
5. Results into urban-related problems such as increased crime, congestion, alcoholism, prostitution , high cost of living and other social evils. Tourism accelerates criminal tendencies since the tourists are normally associated with wealth/ money of which the idlers take advantage such through highway robbery.
6. Results into cultural degeneration due to the commercialization of tourism. It leads to the removal of charity with tourism becoming a business. There is total distortion of culture to encourage tourism audience for example by turning the traditional mud and grass-thatched huts into brick huts. More so it leads to the adoption of foreign cultural and evil activities such as poor dress code, drug trafficking, distorted language –hence eroding the cultural heritage.
7. Results into spread of diseases due to the influx of foreigners into the host country such as STDs; which eventually reduce labor productivity and life expectancy in the country.
8. Political –related problems because some people disguise as tourists but are political spies or terrorists who are likely to carry deadly bombs and even plotting coups. This explains why today there is a limit on international travels and tourism in some developed countries.

TOURISM IN KENYA

In Kenya tourism is the second most important foreign exchange earner after the agricultural sector and it is a fast growing sector**.** Tourist arrivals are mainly from Europe and North America.

Major attraction centres and potentials

1. **Nairobi.** Nairobi itself is an attraction and a focal point of many tourists. It has a higher altitude giving it pleasant weather and it is the largest city in East Africa. Many tourists spend their holidays here and equip themselves ready for safari to the other areas such as interior Kenya, Uganda, and Tanzania.
2. **Nairobi National Park**-in the heart of the city enables residents and business tourist who lack enough time to make a quick tour through it. It has animals like gazelles, lions, zebras, giraffes, buffalos, cheetahs, leopards, rhinos.
3. **Tsavo Park (West Tsavo and East Tsavo).** It is the largest park in Kenya and divided into two by the main road to Mombasa. It is famous for big games like lions, elephants (red elephants), giraffe, and rhinos.
4. **Aberdare Park.** This is famous for its treetops hotel –which view point enables the tourists to watch hundreds of elephants, buffalos, and rhinos which visit the rift valley floor that the hotel overlooks.
5. **Lake Nakuru Park.** This is famous for millions of flamingos which provide an exciting unique attraction and other attractions.
6. **Other National Parks and Reserves of importance include**: Amboseli NP, Malindi and Watamu marine NP, Sibiloi NP, Meru NP, Fort Jesus park, Marsabit park, Masai Mara national Park , Mt. Kenya NP, Simba hills reserve, Amboseli reserve, and Rahole reserve
7. **Relief features.** There are many mountain ranges which include: Mt. Kenya (with glacial features)—the second highest mountain in Africa (*after Kilimanjaro),* Mt. Elgon on the western border. In addition, the eastern arm of the Great Rift Valley appears in Kenya.
8. **Drainage features.** These include: the warm beautiful beaches at Mombasa for sun bathing, coastal features (like caves, stacks, arches, cliffs at Mombasa and Malindi). The famous beaches include: Nyali, Kikambala, and Shanzu. Lakes include: Lake Turkana—Kenya's largest lake, Lake Victoria (Victoria Nyanza),Lake Baringo, Lake Nakuru, Lake Magadi, Lake Bogoria among others . Rivers include: Tana, Athi, and Nyando. These lakes and rivers have creatures like fish, crocodiles, hippopotamus—which attract tourists.
9. **Vegetation.** Kenya has diverse plant life. This includes savanna vegetation consisting of grassland and tree species like Baobab, Euphorbia and Acacia; Tropical rainforests, Mangrove forests and palm trees along the coast; some

temperate forests on the higher levels of highlands (above 3000m); Desert and Semi-desert vegetation. All these attract tourists.

10. **Historical and cultural attractions.** Historical sites include: Fort Jesus at Mombasa (built by the Portuguese in the 1590s), Fort Gedi near Malindi, the national museum of Nairobi, Kariandus, Olorgesailie (showing conditions of early Stone Age).

    One culture is that of the Maasai –which centres on their cattle for food, prestige and wealth. They believe that they own all cattle in the world. Other groups / tribes include Kikuyu, Luhya, Luo, Kalenjins, and Nandi.

Factors responsible for the development of the tourism industry in Kenya

The tourism industry of Kenya is more developed than other east African countries. This is explained by the following factors:

1. **Availability of various fauna potentials in the country** for example Kenya is endowed with the largest and richest animal species in the world such as giraffes, antelopes, lions, elephants, zebras, buffalos, leopards; plus ostriches, flamingo birds and vultures conserved in various national parks and wildlife reserves such as Nairobi NP, Tsavo NP, Lake Nakuru NP, and Maasai-Mara. This promotes sport hunting and animal/bird viewing. Kenya's major parks are also near Nairobi and Mombasa which minimizes inconveniences to tourists and encourages more return visits.
2. **Varied vegetation types** which include savanna vegetation consisting of grasslands and tree species like baobab, acacia and euphorbia; tropical rain forests, mangrove forests (along the coast), desert and semi-desert vegetation. Therefore, many people who live in the large urban centres/ conurbations of Europe and North America where nature has been destroyed are attracted to the large stretches of natural vegetation in Kenya for study, relaxation and adventure.
3. **The magnificent / beautiful landform scenery that attracts tourists** including Mt. Kenya with glacial features (like arêtes, cirques, and pyramidal peaks), Mt. Elgon, Mt. Longonot, Machakos Ranges, Mathew range. There is also the Great Rift Valley and associated features (such as escarpments). This encourages mountaineering, rift valley viewing and thus attracting many tourists for pleasure and study.

4. **Presence of many attractive drainage features**/Water bodies such as L. Turkana, L. Nakuru, L. Natron, L. Naivasha, Nyando River, Galana River, Tana River, Athi River, and the Indian Ocean. These water bodies do promote swimming, boat racing, rafting which activities attract tourists. More so coastal ports and beaches have developed such as on Malindi island, Pate and Lamu islands; important for tourism such as for sun bathing. This attracts a large number of tourists.
5. **Presence of varied climatic types for tourism**. Kenya's climate contrasts with other parts of the world and varies within Kenya itself. For example the cool to cold Kenya highlands and the warm to hot Mombasa coast. The tourists in need of cool conditions go to the Kenya highlands. The Mombasa coast attracts tourists from the cold regions at the time of winter in countries like USA, European countries and Asia to enjoy the warm tropical sunny conditions at the coast for sunbathing . The northern part has a semi –arid climate which also attracts many tourists for study and adventure.
6. **Geographical location near the coast (proximity to the coast)** which promotes easy movement and accessibility of visitors into the country (unlike the big Tanzania and landlocked Uganda). Therefore, Kenya experiences more tourist arrivals and return visits since inconvenience to tourists is minimized. This also explains why Kenya's tourist industry is more developed in the region.
7. **Availability of large sums of capital to invest in the tourist industry** provided by foreigners from Europe and Asia, prosperous Kenyans as well as government. This has been invested in developing and maintaining parks and reserves , developing accommodation facilities , tours and agencies to the required standards. This in turn increases the number of tourist arrivals.
8. **Improved transport network** including road and railway networks, and a more efficient air transport responding to the required tourism standards. The Air ports include Jomo Kenyatta international air port which is linked to many international airlines, and hence Kenya is an entry point for tourists from far origins into the region. Others are Moi and Nairobi international Air ports. There are also smaller but improved Airports/ Air strips in strategic locations such as Kisumu and Malindi –transporting many tourists each year.

9. **Rapidly developing accommodation facilities** for example Kenya has the best hotels in the region, more in number and on international standards. These include: ***Hilton hotel, Serevo Stanley hotel, Hotel Diplomate, Intercontinental hotel, Ambassadors hotel, Fairview hotel, and Tiwi travelers beach hotel***. These provide good accommodation, local and western foods, entertainment to tourists. It is impossible to view the skyline of Nairobi without being impressed by the number of hotels, symbolic of modern developments in tourism.
10. **Presence of skilled and semi-skilled labour** recruited by the tourism agencies as Tour guides, game rangers, receptionists in hotels and lodges, hotel managers, chefs/professional cooks, supervisors among others. These have been trained to cope with international tourism standards—hence attracting more tourists.
11. **Relatively stable political atmosphere for a long period of time**. Remember that tourists are easily discouraged by an atmosphere of unrest/insecurity. But since independence Kenya has been relatively stable which has boosted the confidence of tourists and also promoted the development of the required infrastructure such as modern roads in Nairobi. This in turn has encouraged tourist arrivals in the country.
12. **Efficient tourism management** and this was spearheaded by the Kenya Tourist Development Corporation established in 1965. Today there is the Kenya Wildlife Authority controlling/ managing the wildlife attraction areas, many Tours and Travel agencies which are linked to many international companies which offer attractive tour packages to tourists. This also leads to increase in the number of tourists.
13. **Effective and increasing publicity/ advertising, both locally and internationally** such use of local and international newspapers, magazines, DSTV, internet, brochures, and stickers. Such informative and persuasive adverts have opened Kenya's tourist potentials to the outside world, hence its development.
14. **Hospitality of the Kenyans/ long presence of foreigners in Kenya**. The Kenyan coast was earlier settled by the Arabs and the Portuguese who influenced the early developments. Kenya was also a British colony and many Europeans settled especially on the Kenya highlands. The European presence has continued

to create an impression that Kenya is a friendly country, hence boosting the confidence of many tourists visiting Kenya, implying more tourist arrivals.

15. **The cultural diversity of the country** with various ethnic sites and cultures attracting many tourists such as the **Maasai** with their pastoral culture and the way of housing, the **Kikuyu**—the largest tribal group in Kenya**, Luhya, Luo**, **Kalenjins, Kamba, Kisii**. This relates to the way of living, homesteads, dressing, food eaten, and cultural dances. Besides, there are many historical sites especially related to the Portuguese and the Arab settlement on the coast like Fort Jesus mosques. This increases the inflow of tourists especially adventurers and education-oriented tourists.
16. **Favourable government policy for tourism** for example encouraging economic diversification to reduce over reliance on the agricultural sector. The government also supports tourism through maintaining good international relations with many western countries; carrying out publicity campaigns abroad. It has also established tourist promotion offices in all the major tourist markets such as Paris, Newyork, London, and Tokyo. This has motivated the tourists and thus increased tourist arrivals.
17. **Increasing research in the tourist industry** for example the department of zoology—University of Nairobi, Tsavo ecological research centre—conducting research in eco-systems to maintain natural settings, improve wild life ecology. This has controlled the destruction of tourist potentials and continuous attraction of tourists from various parts of the world for study, pleasure and adventure.
18. **Development / growth of package tour flights in Europe and North America** –from which Kenya has benefited. Many people are given the opportunity to visit various parts of the world especially during winter when there are very few activities going on. This explains the increased number of tourists during this time of the year in countries like Kenya.

Problems facing the tourism industry in kenya

1. ***Poaching*** which is the illegal hunting and killing of animals in national parks and game reserves –for meat, hides etc. The white rhinos are now almost extinct. Other threatened animals are elephants, buffalo, and chimpanzee. This reduces the tourist potentials in East Africa.

2. ***Population pressure****/ rapidly* Increasing population leads to increased demand for land for both settlement and farming such as in Tsavo Park in Kenya, and Kibale Park in Uganda –hence reducing the biodiversity and hence reducing the number of tourist arrivals.
3. ***Political instability/ insecurity in some areas*** which makes tourism both difficult and expensive such as in parts of northern Uganda (like Gulu district) and western Uganda (in Bundibugyo and Kasese) which have experienced insurgency for a long time. In the past rebels also attacked tourists in Bwindi impenetrable national park and of recent there has been terrorist attacks in some parts of Kenya. This is discouraging tourists and thus reduced income from the tourism sector.
4. ***Poorly developed transport net work/ remoteness of some tourist attractions*** far from the main cities of Mombasa, Nairobi, Dar es Salaam, and Kampala. For example Marsabit wildlife reserve in northern Kenya, Sibiloi national park in northern Kenya, Serengeti national park in northern Tanzania, Katavi plain reserve in Western Tanzania, Kidepo national park in north eastern Uganda. Poor road net work, lack of railway facilities and airstrips in many tourist attraction areas limit tourist visits. In East Africa, many roads are not up to standard which increases the costs and inconvenience to tourists and hence discourages return visits.
5. ***Less developed accommodation facilities*** for example very few hotels , lodges, camping sites and resorts to accommodate tourists ; and many of these existing facilities do not much to international standards and hence limiting on the number of foreign tourists .There are limited /no hotel facilities in some areas with tourist attractions such as Northern Kenya, North eastern Uganda and South western Uganda. This also limits the number of tourist arrivals.
6. ***Limited skilled man power***/professional labour to manage the tourism industry such as managers and guides in hotels, tours and travel agency workers who can perform to international standards. This explains the poor management standards in many cases /areas in East Africa. This leads to a bad image and discourages many tourists.
7. ***Limited capital to invest in tourism*** which limits the setting up of tourist facilities such better hotels because it requires large capital investment. The alternative

source of funds is borrowing, and yet tourists may not come in large numbers to cover costs and pay debts. This limits the growth of the tourism sector.

8. ***Low level of advertisement***/ Inadequate publicity which limits awareness about the existence of some attractions and hence limiting the number of tourists visiting the areas. In East Africa it is Kenya which has performed better in international advertisement of the tourism potentials.
9. ***Competition from other countries*** such as South Africa, Egypt, morocco, Switzerland, Mexico —which countries have even better facilities. There is also competition among the East African countries due to the general similarity of tourist attractions such as wild animals and wild birds. This limits the benefits from the tourism sector as some areas receive a small number of tourists per year.
10. ***Presence of hostile tribes*** to foreigners in their land who they at times suspect to have intentions of stealing their property especially grabbing land and animals. Such tribes include Karamajong of northeastern Uganda, the Turkana of northern Kenya, and the Maasai of Kenya rift valley. This also discourages the coming of many tourists and thus low tourism income.
11. ***Negative attitude/lack of a strong tourism spirit among local people in East Africa***. Most people do not treasure wild life and other tourist attractions. And thus few local people tour within the region even when the charges are lower for local tourists. Therefore, the over reliance on foreign tourists undermines the development of the tourism industry in East Africa.
12. ***Low income levels among the local people*** and the majority spend their limited incomes on basic necessities such as food , clothing and shelter; instead of spending on travels for tourism. This factor also discourages local tourism and limits tourism revenue.
13. ***Language barrier between local people and foreign tourists*** due to limited use of international languages in many parts of East Africa, but a multiplicity of local languages. This limits communication with the tourists and hence few tourist arrivals. The main international languages are English and to some extent Kiswahili.
14. ***Geographical location*** far from areas where international tourists come from such as USA, Europe and parts of Asia. This has meant increased costs to foreign tourists and therefore many of them choose to visit neighboring countries such as

the tourists from USA visiting more the Caribbean countries and parts of West Africa instead of visiting distanced countries of East Africa.

15. ***Seasonality of tourism activities***/International tourists are seasonal and tend to come during the harsh winters in their homelands (that is, North America, Europe and Asia). This implies that East Africa doesn't receive large numbers of tourists throughout the year; and this undermines the development of the tourism industry.
16. ***Tropical pests and diseases*** which include tsetse flies causing sleeping sickness, mosquitoes causing malaria. This scares away many international tourists from visiting countries in the tropics including East Africa.
17. ***Pollution*** is becoming a major threat in some areas. For example Lake Nakuru and Lake Victoria is threatened by pollution from the various chemicals and oils from industries, vessels and farmlands. This makes such places less attractive to tourists and thus reduces the tourist arrivals.
18. ***Seasonal migration of wild animals*** to neighboring countries due to weather changes and other reasons. This implies seasonal reduction /lack of the attractions in certain tourism centres. This discourages return visits.
19. ***Poor management of some tourist attractions/tourism facilities*** for example uncontrolled tourism which has resulted into damaging of the environment. In some cases the tourists congest in specific areas, and in other cases the wild animals congest in particular areas—hence over straining the natural habitat.
20. ***Fires*** have destroyed some parts of parks, wild life reserves and forest reserves. The fires are either intentional or accidental caused by cultivators, hunters or careless smokers near or in the wild life conservation areas. This undermines the tourism potential in East Africa.
21. ***Unfavourable government policy towards tourism sector*** for example the government has given out some potential attraction areas to investors to carry out plantation farming such as parts of Ssese islands given out for oil palm growing. Many swampy areas/wetlands have been turned into industrial sites –hence limiting the tourist potentials and thus reduced number of tourists. The government also imposes high taxes on hoteliers and tours agencies which discourages some of them.

Steps being taken to solve the above problems

1. Regular patrols and setting up anti-poaching units to minimize poaching of wild animals, hence maintaining tourist potentials.
2. Eviction of encroachers and reduction of the human population within the surroundings of national parks, forest and wild life reserves.
3. New national parks have been opened up in various parts of East Africa purposely to protect the rare species such as gorillas, baboons, Chimpanzee, and Impala. This also increases the tourist potentials.
4. Diversifying the tourist products. This involves providing various tourist attractions apart from the traditional wild life attractions such as cultural, historical attractions and entertainment parks, in turn increasing the torust arrivals.
5. Using population control measures to reduce population pressure on conservation areas.
6. Resettling of people to avoid encroachment on the tourist attraction areas.
7. Restoration of political stability through peace talks and democratic governance, to raise the confidence of tourists.
8. Improving accessibility to the tourist attraction centres by rehabilitating roads and constructing airstrips.
9. Building more hotels and other accommodation facilities and also renovating the existing facilities to the required standards.
10. Educating and sensitization of the local people about the values of wild life conservation through the media, wild life clubs, and educational centres. There is also massive sensitization aimed at increasing the number of local tourists. Community participation is being encouraged to reduce poaching and encroachment on conservation areas.
11. Training manpower both locally and abroad to carry out work in the tourist industry such as tour guides, travel agents, and managers.
12. Attraction of local and foreign investors to invest in the tourist industry such as by constructing hotels, lodges, camps, travel agencies. Currently private investors have been allowed to construct hotels and develop other attractions such as amusement parks.

13. Increasing the advertisement of the tourist attractions / potentials through the media, stickers, and brochures, to raise awareness both locally and abroad; and hence increase the number of tourists.
14. Hostile tribes are being disarmed such as the Karamajong, and they are also being sensitized about the value of tourism.
15. Discouraging the burning and clearing of vegetation in areas surrounding parks and game reserves.

Guiding questions

1) Account for the growth and development of the tourist industry in Kenya.
2) The development of the tourist industry in Kenya is mainly attributed to physical factors. Discuss.
3) Examine the factors that have hindered the development of tourism in Sub-Saharan Africa.
4) (a) Identify the major tourist potentials of East Africa.

   (b) Discuss the problems facing the tourist industry in East Africa.

   © What steps are being undertaken to develop the tourist industry in the East African region?

Tourism in South Africa

South Africa is located in the southern part of the African continent. Tourism has expanded greatly in South Africa providing a great potential for job opportunities and foreign exchange.

During the apartheid years, the tourism potential could not be realized because of the country's negative image and perceived political instability. However, since 1994 the industry has expanded dramatically, with the number of overseas visitors greatly increased. Generally, the country receives over 3 million tourists per annum).

Tourist attractions

1) **Relief landforms.**
   The scenic beauty of the cape mountain ranges region, the Drakensburg, Mpumalanga Mountains and the Highveld plateau mountain Aux sources near Lesotho is a major tourist mountain.

2) **Drainage features**

The rivers include Orange River, Vaal River and Limpopo River. Other shorter rivers include Great fish, Tugela, Umfolosi, Umgeni, UMzimkhulu and Umkuse. South Africa's notable lakes are artificial and include those created by Vaal dam and Gariep dam on the Orange River. Other attractions are the Atlantic and Indian Ocean beaches. Notable coastal beaches are at Cape Town, East London, Durban, Port Shepstone, Mosselbaai, Cape Agulhas, and Cape of Good Hope.

3) **Vegetation types**

Grassland covering most plateau areas, resembling a prairie on the nearly treeless Highveld. The Bushveld is characterized with scattered trees like baobab in the Limpopo province. There are coarse desert grasses in the semi-desert Northern Cape. The extreme southwest has Mediterranean vegetation. There are also flowers of Cape Town.

4) **National parks and national reserves.**

The national parks include Kruger national park (the largest and oldest reserve) with nearly every species of indigenous wildlife such as impala, small black rhinos, elephant, baboons, lions, leopards, zebras, giraffe, and antelopes. Other parks are Kgalagadi Transformer Park (shared with Botswana) in the northwest, Addo Elephant national park near Port Elizabeth, Mountain Zebra national park, Tanka-Karoo national park, west coast national park, Bontebok national park, Zuurberg national park, St.Lucia park.

The game reserves include Maputo elephant reserve, Giant Castle reserve, Umfolosi reserve, Mala Mala reserve, Mkambati reserve.

5) **Historical sites, libraries and cultural attractions.**

There are many large museums and the most notable include National Museum in Bloemfontein, Museum Africa in Johannesburg, South African National Gallery in Cape Town, and South African Cultural History Museum in Cape Town. These have ancient collections like archaeology, paleontology and anthropology collections; as well as the history of South Africa. The libraries include Johannesburg public library, South African library in Cape Town, state library in Pretoria, and university libraries.

There are also historical monuments such as Blood River monument in the east, Voortrekker fort north of Pretoria. Rock paintings and caves such as east of Mt. Aux sources, Kango caves near Bontebok national park are also attractions to tourists.

There are cultural attractions in Zulu land such as Zulu wood carvings, basket work and stone carvings.

6) **Recreation attractions**.
Sports are a major activity in South Africa. South Africa's rugby and cricket teams are among the world's best. Rugby is most popular among Afrikaners and cricket among the English speakers. Rugby and cricket taught in many schools and hence other groups of people are taking up the games. Swimming and water sports, tennis and golf are also popular in the white community.

7) **Mineral resources and associated industry**.
Gold fields on the Witwatersrand, diamond fields in Pretoria, Bultfontein and other areas. Other minerals are coal, tin and iron ore. There are many industries set up on the rand such as in Kimberley, Pretoria, Johannesburg, and Witbank.

8) Major fishing ports
These include: Port Cape Town, port Nolloth, Saldanha port—all on the western coast.

9) Farming systems/areas.
This includes Sugar cane growing in Natal region, Vine growing in Cape region, sheep rearing and cattle rearing especially ranching.

10) Climate

Factors which have favoured the development of the tourism industry in South Africa

1. ***Varied climatic types***. South Africa enjoys a generally warm temperate climate. Most of the country experiences light rainfall and long hours of sunshine. There is semi-desert climate in the north west of the country with desert features which attract tourists. The extreme southwest has a Mediterranean climate. There is a striking difference between temperatures on the east coast and west coast. The east coast has higher temperatures due to the warm Mozambique /Agulhas current while the west coast is cooler due to the cold Benguela current. This therefore attracts tourists of different interests.
2. ***Varied vegetation types*** which includes grasslands covering most of the plateau areas of the Highveld, savanna vegetation with scattered trees like baobab in the Limpopo province, coarse desert grasses in the semi-desert Northern Cape, and Mediterranean vegetation in the extreme southwest. There are also planted

coniferous pines from Europe and North America –to provide timber and wood pulp. All these attract many tourists interested in study and adventure.

3. ***Presence of many/ a variety of fauna potentials*** which include large mammals like Lions, Elephants, Zebras, Leopards, cheetah, Baboons, Hippopotamuses, Rhinos, and Antelopes. These are conserved in the national parks and reserves like Kruger national park, Kgalagadi Transformer Park, Addo Elephant Park, Mountain Zebra national park. The various birds like Ostrich, Francolin, Quail, Guinea fowl, Grouse, and Cape sugarbird. This also attracts tourists for study, adventure and leisure.
4. ***Beautiful landform scenery*** which includes mountains like Cape Ranges, Drakensburg, and Mpumalanga Mountains. These attract many tourists for mountain climbing and mountain viewing. There are also many coastal beaches such as at Port Elizabeth, East London, Saldanha bay, Durban, and Cape Town which attract many tourists to the sea activities like sun bathing, and boat racing.
5. ***Presence of attractive drainage features/water bodies*** which include the Atlantic and Indian Ocean, rivers (like Vaal, orange and Limpopo). These water bodies help in transporting tourists to various tourist destinations, and in other tourist activities like sport fishing, and boat racing. Besides the oceans offer beautiful beaches which attract more tourists for leisure activities.
6. ***Developed economic activities*** such as mining, industry, farming, trade and commerce. The miningof gold on the Rand, iron ore, coal, diamonds, and platinum attracts many tourists. South Africa is the most industrialized country on the continent with many industries concentrated on the Rand. Many people are attracted to these economic activities especially the scale of operation and the technologies involved—hence increasing the number of tourist arrivals.
7. ***Variety of heritage sites, monuments and historical sites in the country*** such as large museums—National Museum in Bloemfontein, Museum Africa in Johannesburg. Another unique museum is the Kimberley Mine Museum (to see the world famous diamonds). The historical monuments include Blood River monument in the east, Voortrekker fort north of Pretoria, rock paintings and caves. These attract many tourists who are interested in study and adventure in South Africa.

8. ***Presence of diverse cultures*** due to various ethnic groups in South Africa with different lifestyles such as dressing, dances, music, and cultural events. Each ethnic group has its own eating customs and etiquette. The groups include the whites, Afrikaners, the Zulu, Swazi, Xhosa, Sotho, and Tswana. Whereas the urban people tend to adopt western patterns, the rural people tend preserve the traditional cultures. All these cultures offer interesting attractions to the tourists.
9. ***Strategic coastal location of South Africa*** which enables South Africa to receive tourists from all parts of the world such as North America, South America, Europe, Asia and Australia. This location makes it easily accessible by tourists since transport costs are reduced, and this increases the number of tourist arrivals.
10. ***Presence of developed accommodation facilities*** catering for all needs and classes of tourists such as Hotels, Rest houses, camping sites; coupled with entertainment facilities and dishes in various parts of the country. The national parks have lodges such as Kruger National Park with African-style huts. This increases the number of tourist arrivals. Examples of hotels in South Africa include: Cape Town Blouberg Beach Hotel, Haga Haga Hotel in East London, Trans—Karoo Hotel south of Kimberley, Mountain Peak Hotel and Holiday resort in Kwazulu Natal and Cathedral Peak Hotel in Kwazulu Natal.
11. ***Presence of modern/developed transport facilities*** with railways, roads and air lines comparable to Western Europe and North America. As such the tourists travel to and from South Africa quickly, easily and relatively inexpensive, and more so comfortably. More so the transport facilities themselves provide another attraction such as the electrified railway. This increases the number of tourists.
12. ***Hospitality of the South Africans***/they are welcoming people given the long presence of whites in the country. More so, the end of apartheid changed the attitudes of many people of South Africa towards foreigners, hence accommodating all sorts of people from different parts of the world. This has increased the number of tourists in the country per year.
13. ***The diversity of languages spoken*** which adds to their ability to handle various categories of tourists regardless of social and political consideration. The languages include Afrikaner, English, Kiswahili, Dutch, Zulu, Tswana, and Xhosa. Many tourists have therefore been encouraged to visit South Africa due to easy and comfortable communication.

14. ***Presence of skilled labour to manage tourism*** such as game rangers, receptionists, chefs, tour guides, managers, supervisors in hotels, tours and travel agencies, tour resorts in various parts of South Africa. These have been trained to cope with the world tourism standards, and hence attracting more tourist arrivals from different parts of the world.
15. ***Efficient tourism management standards*** such as by developed Tours and Travel Agencies with experienced management and many of them are liked to international companies which offer attractive tour packages. South Africa has some of the best beach hotels on the continent such as Cape Town to Durban with developed beach tourism that measures to world standards-hence attracting many tourists.
16. ***Availability of adequate capital to develop the tourism sector*** provided by the government, local and foreign investors. More capital is also generated from mining, industry and farming. This has enabled the modernization of accommodation facilities, developing of more tourist attractions, payment of labour and doing more research in the tourism industry. this attracts more tourist arrivals.
17. ***Improved communication and advertisement*** (developed local and international publicity), with increased use of local and international news papers , magazines , journals; use of the internet , use of DSTV system. This has increased the number of local and international tourists, since more information is given about the tourist potentials that South Africa has to offer.
18. ***Relative political stability of the country*** unlike other African countries, which has enabled tourism investment. More so, since the end of apartheid the tourism industry has greatly expanded with the number of overseas visitors increasing by a large percentage. This is because of the improved international image and increased confidence of tourists of South Africa.
19. ***Supportive government policy towards tourism development*** such as by gazetting national parks and wild life reserves such as Kruger National park, Maputo Elephant reserve; encouraging local and foreign investors in the tourist industry to develop accommodation facilities and in the tours and travel companies. It has also developed road and railway net work. This has modernized the tourism sector.

20. ***Good international relationship between South Africa and other countries*** due to developed import and export trade such as the Rest of Africa, Asia, North America, and South America. There are also many foreign investors in South Africa. Therefore, many people have links with the country and encourage their colleagues to do business, study and adventure in South African tourism.
21. ***Participation in international organizations***. With the end of apartheid, South Africa resumed participation in international organizations from which it was excluded for many years for example the United Nations in 1994 and it also became a member of the Common Wealth in the same year. South Africa is also a member of the African Union and the Southern African Development Community. The delegates pass on information about tourist potentials, hence increasing the inflow of many tourists.
22. ***High level of technology employed***
23. ***Developed research in the tourism sector***
24. Historical factor.

Note: ***rafting***—an outdoor leisure pursuit of floating on a lake or river in a raft

Tourism in Switzerland

Switzerland has one of the most developed tourist sector in the world and tourism is the leading source of foreign exchange and a dominant employer. Switzerland's tourism started way back in the 18th century when Europeans admired and described the diversity of scenery and beauty of the Alps. The first were the British who discovered Switzerland as a holiday resort, followed by German visitors. In the last 80 years, the Swiss tourist industry has witnessed a complete revolution to the extent that today it commands a global image.

Tourist attractions and tourist resorts

1) **The Alps**—a magnificent mountain scenery which is also snow-capped with many glacial features such as hanging valleys, U-shaped valleys, pyramidal peaks, arêtes, corries/cirques, cirque lakes/tarns.
2) **Water bodies**. The Alps are dissected by rivers such as the Rhine River (one of Europe's major rivers), Rhone River, Ticino River, and River Inn. Lakes include Lucerne, Geneva, Constance (Bodensee), Lugano, Maggiore, Neuchatel and Lake Zurich.

3) **Wild life** including plant and animal life. In the cooler more northerly parts , there is a mix of deciduous trees and coniferous trees—which are carefully managed to prevent any net loss of woodlands , preserving water quality and scenic beauty. The forests contain animal species such as the deer, fox, graceful chamois, ibex (wild goat); and many bird species such as wood pecker, peregrine falcons, golden eagles, and jay.
4) **Industrial centres and urban centres**. Due to the traditional policy of neutrality, many Swiss cities retain their good image such as Zurich, Basel, Bern, Geneva, Blenna, Vevey, Interlaken, St.Moritz, Le Locle, and St.Gallen among others. The main industries are: engineering, watch making, textiles, and chemical industries.
5) **Culture and traditions**. Swiss culture especially paintings, music and architecture are of great interest to tourists. There are many roman monuments in the towns of Martigny and Windisch; numerous cathedrals. The Swiss museums found in most towns contain thousands of old and rare works that date from the 8th century. The national museum in Zurich houses many historical collections.
   Note: ***A Tourist resort*** is a place which attracts large numbers of holiday makers and having special facilities to look after them. In summer, the greatest activity is in the towns of the Swiss plateau such as Lausanne, Geneva, Bern, Zurich and the shores of Lake Lucerne. In winter the well known resorts are Grindelwald, Kandersteg, Murren, and St.Moritz. St.Moritz has the second largest number of hotels to Geneva.

Factors favouring the development of the Swiss tourist industry

Physical

1. ***Magnificent landform scenery*** which includes the Alps Mountain ranges dissected by many rivers and also glaciated with snowcapped peaks and features like U-shaped valleys *(e.g. Brunnen valley)*, hanging valleys, cirques and pyramidal peaks. The Swiss Jura is also a lower mountain found in the north west of the country and the ranges are separated by valleys and having limestone features. Many people are attracted to mountaineering and mountain viewing.
2. **Varied drainage features** for example Switzerland is the source of four major rivers of Europe, which have their sources from the heavy water precipitation and glacial melt waters of the Alps. ***Rhine River*** is the biggest river covering the

central—northern part. Other rivers are ***Rhone*** flowing into Lake Geneva, ***Ticino*** flowing into Lake Maggiore, Inn flowing north east to join Danube River into the Black sea. Lakes include Geneva, Constance, Zurich, and Neuchâtel; which water bodies promote tourism activities like swimming, sun bathing, boat racing, blue water viewing, and sport fishing.

3. **Varied vegetation types** such as a mix of deciduous and coniferous trees which dominate in the cooler northerly parts. The most common deciduous trees include oak, beech, maple, and chestnut. Coniferous trees include spruce, pines and firs. There are also alpine flowers which attract tourists. The vegetation promotes forest walk, flower viewing, and hence a holiday resort for adventurers and study tourists.
4. ***Presence of many fauna potentials*** such as Chamois, marmot and ibex inhabit the Alpine region as well as the golden eagle and vulture. The forests contain animal species like the deer, fox; and many species of birds like the wood pecker, pheasant, peregrine falcons, and jay. All these promote animal and bird viewing and study tours, hence attracting large numbers of tourist arrivals.
5. ***Ideal climate for tourism*** and this has given Switzerland an opportunity throughout the year. In summer, the warm sunny days enable tourists to view the magnificent scenery of the snow capped peaks, clear blue lakes, and cascading waterfalls. In addition there is swimming, sun bathing, and boat racing among other activities. During winter, the big attraction is the abundance of snow on mountain slopes enabling ice skiing and ice skating.
6. ***Limited viable natural resources*** such as due to the rugged relief of the Jura and Alpine regions discouraging other economic activities such as crop growing due to the rocky soils and problems of mechanization. The Swiss Jura is also composed of limestone soils, which are highly permeable and thus not good for farming. Switzerland has limited viable mineral resources. All this has meant that tourism is the best alternative economic activity alongside industry.
7. ***Strategic geographical location in the centre of Europe and the link to the Rhine River*** which has enabled Switzerland to have a wide market of the rich nations with many people capable of making holiday tours from all directions. About 70% of the tourists approximately come from European countries like

Germany, France, Britain, Austria, Belgium, and USA. The remaining 30% are Swiss guests. This implies that the country receives very many tourists per year.

Human factors/ other factors

8. ***Presence of large sums of capital to invest in tourism sector*** provided by the developed banking sector *(with a network of over 4400 bank offices covering the whole country)*. Many nations and wealth personalities have accounts in Swiss banks. This has facilitated easy converting of currency and provision of the required capital to develop various tourist facilities in form of loans. Many of the bank customers are also tourism investors.
9. ***Developed accommodation facilities*** such as hotels which are built to keep pace with the tourist demands. Originally, these were small inns and turbans to cater for travelers. Also chalets and camping sites to keep pace with the demand of holiday accommodation have been set up. These accommodation facilities occupy areas like Geneva, Montreux, Martigny, Zurich and St. Moritz. St.Moritz has the second largest number of hotels to Geneva.
10. ***Modernization of transport facilities*** such as the electrification of the railway system with modern tracks and locomotives to transport millions of visitors each year to various destinations in the country. About 99% of the Swiss railway is electrified. There are also cable cars and ski-lifts to ferry tourists to the higher grounds. The improved accessibility has meant lowered transport costs and saving time since the means are relatively quick, safe and comfortable.
11. ***High level of technology used in tourism*** which has enabled the development of cable cars, ski-lifts, and electrified trains. There are hundreds of finely engineered tunnels and bridges across the country's rugged terrain (Trans-Alpine tunnels that permit travel through the Alps). This increases efficiency in the tourism and encourages more tourist arrivals.
12. ***Hospitality of the Swiss people***/ the Swiss are very welcoming people , whose culture of hospitality results from the fact that Switzerland is composed of diverse people in language , religion and culture ; yet they have stayed together for over 7 centuries. The Swiss are very friendly and always willing to serve the tourists regardless of political and social consideration.

13. ***The diversity of international languages spoken by the Swiss people*** such as German, Italian, Spanish, English, French, Rhato-Romania; and this has helped the natives to comfortably communicate with the tourists regardless of origin. In fact many people are bilingual and with English being the first language to be taught in school , many people become trilingual which has positively influenced service delivery in the tourism industry.
14. ***Efficient publicity and advertisement of the tourism sector*** such as using internet (*a computer-based global information system*) via which millions of tourists can access information about the Swiss tourist industry. The tourist industry is also well advertised worldwide through newspapers, magazines, televisions, brochures and this has greatly widened the market for the Swiss tourism sector, hence more tourist arrivals.
15. ***Highly skilled labour to manage the tourist industry*** since tourism has been a tradition for long. This tradition dates back in the 18th century when the Europeans admired and described the diversity of scenery and beauty of the Alps. Many people have been trained as hotel managers, supervisors, accountants, tour guides, chefs, and drivers. This has increased the quality of service delivery and encouraged more tourist arrivals.
16. ***Efficient tourism management standards*** catering for the particular needs of tourists like entertainment and food in relation to modern standards. The Swiss have a genuine art in hotel management with a classic worldwide example. There are many tours and travel agencies which organize tour packages on a very large scale such as air, coach travel, train travel, and arrange accommodation for the tourists in various attraction areas.
17. ***Switzerland's policy of neutrality*** which dates back since the 16th century with the Swiss confederation not being involved in any war. This has made the country politically stable so as to save the resources available for promotion of tourism, unlike other countries which spend their resources on military warfare. A stable political history has also made Switzerland a holiday resort for many people from various parts of the globe.
18. ***Switzerland is the headquarters of many international organizations*** such as the International Labour Organization (**ILO**) in Geneva, World Health Organization (**WHO**) based in Geneva, International Committee of Red Cross

(**ICRC**), and Federation of International Football Association (**FIFA**) in Zurich. This attracts many delegates who are either tourists or even tourism investors.

19. ***The developed industrial sector of Switzerland*** for example it is the world's leading watch making country based in the Swiss Jura region. The country exports over 97% of her watches and satisfies a large percentage of the world demand. Other major industries include engineering, textiles, chemical and precision instrument industries. Many tourists are attracted to see the advancements in technology in the industrial sector.
20. ***Supportive / positive government policy towards tourism*** such as large capital investment in the sector, regulated tourism standards through policy, spearheaded and encouraged tourism research to modernize the attractions as well as private investment in the tourist industry. This is due to the need to protect the global image of Switzerland.

Problems facing the tourism industry in Switzerland

- ***Competition from other tourist countries which reduces the number of tourist arrivals.*** The countries include USA, Italy, South Africa, and Mexico—which countries have many facilities. Some countries like Italy have some similar tourist attractions such as glaciers, wild animals and wild birds. This limits the benefits from the tourism sector by limiting the number of tourists per year.
- ***Seasonal nature of tourism which leads to fluctuation in incomes from tourism.*** There is a variation in the number of tourists depending on seasons of winter, spring, summer and autumn because the tourists have different interests. For example, some tourists do not want to visit the country during harsh winters. Therefore, the country doesn't receive large numbers of tourists throughout the year; and this undermines the development of the tourism industry.
- Harsh winters which limits the movement of tourists, hence limiting tourist arrivals.
- ***Rugged / mountainous landscape in some areas making them less accessible to tourist***. For example, some parts of the Alps are not easily accessible by tourists due to rugged landscape. This limits the tourist from fully experience the tourist potentials. The use of cable cars increases the costs to the tourists.

- ***Language barrier in some cases which limits the number of tourist arrivals .*** There is a Language barrier between local people and foreign tourists due to some tourists are not familiar with the international languages in many parts, which limits communication with the tourists and hence few tourist arrivals.
- ***The threat of deadly diseases today in some parts of the world*** such as *ebola*, which limits the number of tourists visiting the country. Deadly diseases break out in various parts of the world such as *ebola* which broke out in many parts of West Africa in 2014. Accordingly, the various countries including Switzerland restricted on the number of people coming from Africa to control the spread of the disease, hence limiting on the number of tourists and hence reduced tourist incomes. Still some tourists just fear to move around the world to reduce risks of interacting with infected people.
- ***Poaching of wild animals which reduces the tourist potentials in the country***. Poaching is the illegal hunting and killing of animals in national parks and wildlife reserves –for meat, hides etc. Some of the animals and birds are threatening extinction and this reduces the tourist potentials.
- ***Wild fires such as in the coniferous forests which also reduces the tourist potentials*.** Fires sometimes destroy some parts of national parks and forest reserves in some areas. The fires are either intentional or accidental caused by hunters or careless smokers near or in the wild life conservation / tourism potential areas. This undermines the tourism potential and thus limiting the incomes from the sector.
- ***Pollution of the environment such as water and air pollution*** due to disposal of wastes and emission of dangerous gases which destroys tourism potentials. Pollution is becoming a major threat in some areas with many industries such as the Swiss Plateau. This makes such places less attractive to tourists and thus limiting incomes from tourism.
- ***Shortage of labour*** to manage the tourism industry. This is because some people prefer to work in other sectors with better payment, and this limits efficiency.
- ***Population pressure*** *in some areas which* leads to increased demand for land for both settlement and other activities, hence reducing the biodiversity and hence reducing the number of tourist arrivals.

- Restrictions in the giving of visas, deportation of some people, which limits the number of tourist arrivals.
- World economic recession which has reduced world incomes and therefore reducing the numbers of tourists.
- Terrorism threat in the world today which limits the number of tourist arrivals/ which scares away tourists.
- Accidents due to avalanches, and melting ice which leads to the death of tourists, hence scares some other potential tourists.

Tourism in USA

USA is part of North America and the country has a well developed tourism industry which plays an important role in the development of the country.

Major tourist attractions

a) Drainage features

These include the St. Lawrence Seaway which connects the Greatlakes region to the Atlantic seaboard. It has several locks, canals and dams. The Greatlakes (lake superior, lake Michigan, lake Huron, lake Erie, and Lake Ontario). Rivers such as Mississippi river, Tennessee river, river Ohio, river Colorado , river san Joaquin and river Sacramento. Waterfalls such as Niagara Falls (known as a natural wonder)

b) Relief features

These include the Appalachian Mountains in the east (states of North Carolina, West Virginia and Virginia). The Appalachian mountain system is nearly parallel with the Atlantic coast extends up to 2400 long. The Rocky mountain system in the west, the Sierra Nevada Mountains in California.

c) Varied climatic types

This ranges from cool temperate, warm temperate to arid climate. The arid climate of southern California with plenty of sunshine is a major tourist attraction. In winter season (Nov—Feb.) the tourists engage in skiing and ice skating while in summer the tourists enjoy sun bathing , boat racing and swimming.

d) Wild life

The varied vegetation types include coniferous forests, Mediterranean vegetation, desert vegetation, sub-tropical forests. Most tropical vegetation and

animals exist in the southern sunny states of USA. Also yellow stone national park is famous for geysers and cascading waterfalls.

e) Historical sites and cultural attractions

USA has several museums such as Newyork international museum; Croker Art Museum in Sacramento, the Oakland Museum of California. The Statue of liberty in Newyork city, the famous Golden Gate Bridge in San Francisco. Mt.Rushmore National Memorial (in the Black hills of Dokota) with magnificent carvings of America's past presidents (like Washington, Jefferson, Lincoln and Roosevelt).

USA has many cultures ranging from blacks, Red Indians, Spanish, Italians, Dutch and mixed races; with varying ways of life including dressing, dances etc

f) **Industrial establishments** such as in the Greatlakes region, Newyork, Boston, Pittsburgh, San Francisco, Los Angeles. The industries include: iron and steel, chemical, motor vehicle, food processing, and the unique film industry in California State.

g) **Water management schemes** which include Tennessee valley project, the delta Mendota scheme in California, Shasta dam and Friant dam in California.

h) **Mineral resource areas**. These include the Rocky mountain region, Appalachian region, and the Great lakes region. The minerals include iron ore, gold, coal, copper, petroleum, and natural gas.

Factors favouring the development of tourism in USA

1. ***The varied climate types*** from region to region. The winter season occurs between November and February; spring follows between February and April; summer (April to August) and autumn (September to November). In summer the tourists enjoy sun-bathing, boat racing and swimming while in winter they engage in skiing and ice skating. New York area has an attractive sub-tropical (warm temperate) climate. California is an example of a semi-arid especially the southern part (with associated desert features). This leads to large numbers of tourists with varying interests.
2. ***The magnificent landform scenery*** for example the western highlands (Rocky Mountains) running from Mexico to Alaska for 4800km parallel to the coast. The eastern highlands (Appalachian Mountains) running from the end of the St.Lawrence river to the Gulf of Mexico and parallel to the coast. USA also has beautiful beaches on both the eastern and western coasts conducive to

accommodate tourists such as Newyork, Boston, and Santa Monica beach on the coast of California. Many people are attracted to mountaineering and coastal activities.

3. ***Presence of varied drainage features*** like Niagara falls, St. Lawrence, the Greatlakes, Mississippi River, Tennessee, Colorado, San Joaquin. Such water bodies are tourist attractions and also help in transporting tourists and other tourist activities like boat racing.
4. ***Presence of varied vegetation types*** which include coniferous forests, warm temperate vegetation and desert vegetation. For example the temperate grassland on the interior plateau towards the prairies attracts many study tourists. There are also a variety of flowers and infact Georgia and Carolinas are famous to be 'homes of flowers'. These attract many tourists for pleasure, curiosity and study tours.
5. ***The varied fauna potentials*** for example most tropical animals and birds exist in the sunny southern states of USA. The conservation of wildlife is done in national parks, reserves and research centres. The national parks include Rocky Mountains national park, Zion national park and Bryce canyon national park, Grand Teton national park in Salt Lake City, Yellow stone national park. The western states boast of having the most spectacular national parks in North America. USA has bird species like California condor, bald eagle, parrots. All these attract many tourists for curiosity, adventure and educational tours.
6. ***Availability of large sums of capital to invest in the tourism sector*** provided by the banking sector, wealthy local businessmen, and government and foreign investors.
7. ***Well- developed accommodation facilities such as hotels, lodges, holiday apartments, and camping sites.*** The luxurious hotels attract high-class and middle class tourists especially on the coastal seaboard (Newyork, Boston, Halifax, Los Angeles, San Francisco). Hotels include Hilton in Newyork, California Holister beach hotels, and Miami Beach hotels in Florida.
8. ***Efficient transport and communication system*** with the most dense railway and road network in the world. USA also has the greatest air traffic in the world and world standard airports such as new ark airport and john f Kennedy airport in Newyork, Los Angeles international airport and San Francisco airport. Other

transport systems include the St. Lawrence Seaway, pacific and Atlantic Ocean transport. This facilitates easy movement of tourists to various attraction centres and yet they are attractions themselves.

9. ***Efficient publicity and advertisement for the tourist industry***.

10. ***USA'sposition as the head quarters of many international organizations*** which include United Nations Organization (UNO) in New York, IBRD (World Bank), international monetary fund (IMF).
11. ***USA has been politically stable*** for a long time and not been directly affected by major wars since even the world wars were fought off the continent of North America. The peace and stability has enabled the continuous improvement of the tourism attractions, and also gives confidence to the tourists.
12. ***Presence of many people in the affluent class (many rich people)*** and the country has a high per capita income. This factor avails more local tourists in USA and the development of package tours. The high population of USA further enhances tourism development.
13. ***Historical factor and cultural heritage*** for example USA is made up of people of various origins such as blacks, Spanish, red Indians, Chinese, and Dutch with diverse cultures. There are also many historical centres/sites.
14. ***Presence of skilled manpower to manage tourism.***
15. ***The hospitality of the Americans***
16. ***The diversity of international languages used***, which include Arabic, Jewish, Spanish, Afrikaner, English, German, Latin, French, etc
17. ***Presence of a developed economic activities such as mining, industrial sector, trade , farming etc***
18. ***Advancement in technology in the tourism sector.***
19. ***Rapidly growing research to promote the tourism sector.***
20. ***Favourable government policy towards the tourism sector. The federal governments fund tourism development.***
21. ***Strategic geographical location of USA*** bordered by the Atlantic and Pacific oceans.

*[**Note**: **The tourist activities** include: picnics, educational and scientific research, forest viewing, forest walk, animal viewing, flower viewing, sun bathing, boat racing, rafting, mountaineering / mountain climbing, ice skiing, ice skating, etc.*

***Tourism industry** involves development and conservation of tourist potentials like conservation of nature; transportation of tourists, tour guides and operators, hotel management etc.]*

Guiding questions:

1) Assess the contribution of the tourist industry to the economic development of either developed or a developing country.
2) To what extent are physical factors responsible for the development of tourism in either Switzerland or Egypt?
3) Examine the factors that have contributed to the development of tourism in Switzerland.
4) Account for the growth and development of the tourist industry in either republic of South Africa or USA.

FORESTRY IN THE WORLD

A forest is a large tract of land covered extensively by trees.

Forestry is a scientific process of planting, exploitation, and conservation of forests. It is concerned with managing forests on a sustainable basis, balancing exploitation and conservation.

In the world there are almost 40 million km^2 of forests with roughly half found in the tropics. Forests once covered about 60% of the earth's surface but have greatly reduced by clearance for settlement and farming or during the exploitation process. About 25% of the earth's surface is today covered with forests and the world demand for timber is increasing leading to over cutting of forests. On the other hand, some people are realizing the need of maintaining timber supplies and have planted forests / established forests farms.

The major forests of the world are found in the more humid temperate and tropical areas. The classification is based on climatic factors and the dominant type of trees / wood they produce. The major types include:

1) Tropical hard wood forests

(a)Tropical evergreen forests / tropical rain forests/

Equatorial forests

(b) Tropical monsoon forests*

2) Temperate hard wood forests*
3) Coniferous forests/ temperate forests

TROPICAL HARDWOOD FORESTS

These are divided into two:

- Tropical evergreen forests/equatorial forests/ tropical rainforests.
- Tropical monsoon forests

TROPICAL EVER GREEN FORESTS/ TROPICAL RAIN FORESTS/ SELVA FORESTS/ EQUATORIAL FORESTS

These forests are located astride the equator extending approximately 10^0N and 10^0S of the equator. The largest expanse of tropical rain forests is in the Amazon basin of Brazil, extending from the Atlantic coast to the foothills of the Andes Mountains. These forests also occur on the pacific coast of Columbia and in Central America.

In Africa tropical rainforests occupy the Congo basin (former Zaire), low lands of West Africa such as Sierra Leone, Ghana, Cameroon, and Gabon. They also occur on the coastal plain of tropical East Africa.

In south Asia, tropical rainforests are found in Malaysia, Indonesia, Papua New Guinea, and in the coastal low lands of south and South-East Asia countries.

Equatorial forests mainly cover lowlands with heavy rainfall and hot temperatures all the year round, between 24^0c and 32^0c, which rarely follow below 21^0c.

Characteristics of tropical rainforests

1. They are thick forests and with much luxuriant foliage/leaves. This is due to heavy rainfall and hot temperatures.

2. The majority of the trees have broad leaves to release excess water through transpiration.
3. The forests are heterogeneous in nature—the trees do not appear in pure stands of a single species but valuable tree species are widely scattered/ mixed up with other trees.
4. The forests have distinct layers called canopies –the top layer, middle layer, and bottom layer.
    - The top layer mainly consists of tall trees (giant trees) with buttress roots – generally over 46m in height.
    - The middle layer mainly consists of clinging plants which cling on strong trees, tree ferns, lianas (thick stemmed creepers) and trees between 19 and 34 m tall.
    - The bottom layer consists of mainly under growth of ferns, herbaceous plants (herbs), with trees of upto17m tall.
5. The forests are dominated by hard wood trees and yield valuable hardwood timber(such as mahogany, rose wood, iron wood, ebony)
6. The tall trees are characterized by buttress roots extending for several metres above the ground (up to 10m) which support them and the trees have long straight trunks ideal for timber.
7. The forests have little or no under growth because the dense canopies shut out sunlight from the lower layers/ floor of the forests. The undergrowth becomes thick only in few areas where some trees have been destroyed.
8. There are a variety of climbers /lianas *(rope-like climbing plants),* creepers, and parasitic plants. Rain forests also have epiphytic plants (plants which grow on other plants but do not actually feed on them such as ferns, orchids, bromeliads.
9. Palm trees exist especially along shores or muddy coasts.
10. The trees are evergreen throughout the year because the areas receive rainfall throughout the year (shed at different times of the year/ never shed off all their leaves—most trees retain their leaves for most of the year so that the forest appears evergreen).
11. The trees have a long gestation/ maturity period; most trees take over 60 years to mature (Mvule takes over 70 years).

Examples of tree species in the tropical rain forests are: Mahogany, Iron wood, Red wood, Red heart, Green heart, Mvule, Ebony, Teak, African cedar among others.

TROPICAL MONSOON FORESTS

These mainly occur in south East Asia and the Indian sub-continent, with the major countries being India, Burma, Thailand and indo-china, northern Cambodia, northern Vietnam and northern Australia.

Characteristics of tropical monsoon forests

1. The monsoon forests are less luxuriant than equatorial forests because of seasonal drought (trees are not as close as in the evergreen forests).
2. They have thick under growth of shrubs and small trees and dense thickets of bamboo.
3. Forests shed their leaves during the dry season and do not grow new ones until the rains come (most trees are deciduous –shed their leaves seasonally).
4. Trees are not in pure stands (heterogeneous in nature).
5. Mainly hardwood species like iron wood, teak, sandal wood etc.
6. Some trees are associated with buttress roots and have broad leaves which are deciduous.

TEMPERATE HARDWOOD FORESTS

These forests are found between approximately 30^0 and 50^0 North and South where temperatures are moderate (but where the seasonality of the climate though marked is not as extreme as in the coniferous forest belt).

The major areas with temperate hardwood forests are: northern china (including Manchuria), Japan; west, south and central Europe; eastern North America. Some temperate hardwoods are also found in southern Australia, especially in Tasmania, and west Australia.

Characteristics of temperate hardwood forests

1. The trees are mostly deciduous, shedding off their leaves in autumn and remaining leafless throughout winter.
2. The trees yield a variety of hardwoods like oak, beech, camphor etc.

3. Like the tropical forests, the temperate hardwood forests have a variety of species scattered irregularly through the forests.
4. The forests also contain many shrubs and small plants. But neither the tall trees nor the undergrowth are as luxuriant as those in the tropics.

Note: The hardwood while being very durable and strong is not usually as heavy or as difficult to work as are tropical hard woods. But it is more difficult to extract than softwoods.

The main commercial species are: Oak, Ash, Beech, Poplar, Mongol trees, Camphor, Walnut, and Elm.

TEMPERATE (*softwood*) FORESTS/ BOREAL FORESTS/ CONIFEROUS

Coniferous forests cover a broad belt of land in both North America and Eurasia (to the north of the temperate hardwood forest belt). They extensively cover the high latitude areas and high altitude areas (uplands and mountains). Coniferous forests are mainly located in the northern hemisphere in a belt between 50^0 and 70^0 N (though there are some conifers in the southern hemisphere)

The major regions with coniferous forests include:

- Western North America, including northern California, Washington and Oregon in USA; British Columbia in Canada and southwest Alaska.
- Central and Eastern North America. It extends southwards around the Great lakes and into the Appalachian mountains.
- Southern USA –from Virginia to Texas.
- Northern Europe. This includes Scandinavian countries –Norway, Sweden and Finland; northern Russia, many uplands further south such as Britain, Germany, parts of Italy.
- Asiatic USSR—northern Siberia extending to the pacific coast.

Characteristics of coniferous forests

1. The conifers have tall straight trunks/ stems and they grow to a height of 30m or more depending on soil and climatic conditions.

2. The coniferous forests have evergreen trees (due to high adaptation to severe winter conditions). They do not shed their at once and maintain a green foliage throughout the year.
3. The trees have narrow needle-like leaves with small surfaces to prevent excessive loss of water by transpiration/ to limit transpiration.
4. The leaves of the trees have tough and thick skins/ barks to protect them from winter cold.
5. The trees have a short growing / maturity period (about 14 to 20 years).
6. Most coniferous trees are softwood (like hemlock, firs) and are light in weight which makes them easy to cut and transport.
7. The forests are homogeneous in nature-the trees usually occur in pure stands of a single species (a particular species like spruce occurs in a given area), and hence easily exploited.
8. The trees are cone-shaped and flexible to allow snow to slide off without breaking branches.
9. The forests have no under growth because of frozen ground, and yet the trees grow close together producing a heavy shed.
10. Coniferous forests are moderately dense and they become thinner in colder or drier regions(the most dense , luxuriant coniferous forests are found in western north America).
11. The trees often grow to a height of 30m or more (but do not have the wide buttress roots of tropical rainforests).
12. The trees have wide spread shallow roots to collect water from the top frozen ground.
13. There are no creepers and lianas.
14. Conifers bear and carry their fruits in form of tough cones; hence the name conifers.
15. There are few species unlike the tropical rainforests.
16. Towards the poles the conifers become shorter, more dispersed, stunned and merge with the tundra vegetation.

The major commercial tree species include:

- **The pines**—such as white pine, Scots pine, Lodgepole pine, Norwegian pine, jack pine, pitch pine, slash pine, ponderosa pine.
- **The firs**—such as Douglas fir, Balsam fir, Joint fir, Noble fir, Silver fir.
- **The spruces**—such as Norway spruce, red spruce, Sitka spruce.
- **Cedars**—such as Red cedar, Cedar of Lebanon, Cyprus cedar, Deodar.

- ✓ ***Hemlock***—such as eastern hemlock(N.E USA and eastern Canada); western hemlock(along pacific coast from Alaska to central California);Japanese hemlock etc.
- ✓ ***Larches* –** such as American larch (tamarack), subalpine larch, and European larch.
- ✓ ***Californian red woods*** (sequoias)

General importance of forests

1. **Provision of industrial raw materials** for example the major product timber which is used to produce many items such as used in the construction and boat making, furniture making, manufacture of synthetic textiles (like rayon), production of cellulose.
2. **Provision of medicine** for certain diseases such as quinine extracted from cinchona tree, cocaine got from the coca shrub, camphor –an oil distilled from the camphor tree and today used in making cosmetics, soaps and ointments.
3. **Forests provide food and fruits** collected from the tropical rain forests such as ivory nuts, Brazil nuts, and betel fruits. Many societies obtain gums from forests—used in the making of chewing gum. Also palm oil like in Brazil for extracting cooking oil and other products. There are also mushrooms and yams.
4. **Water catchment function of forests / protection of water resources** because the canopies break the force of rain making it percolate/infiltrate slowly into the soil causing long run water storage hence development of rivers and rivers. In fact, the world's major rivers are characteristic of forested areas such as Amazon River, and Congo River.
5. **Modification of climate** through the evapo-transpiration process, by recharging atmospheric moisture which condenses into rain. In fact, many dense forests have the heaviest rainfall world over such as Congo and Amazon basins. This supports economic activities such as farming in the surrounding areas.

Rain forests also regulate climate by absorbing carbon dioxide and give off oxygen in the process of photosynthesis; hence lessening the impact of global warming.

6. **Soil conservation** since the forests reduce soil erosion frequency and intensity by facilitating infiltration/ percolation of rain water into the soil and therefore reduced runoff. The rainwater is intercepted by the tree branches and rolls off the trunks into the soil. The plant/tree roots also bind the soil particles together which factor also promotes slope stability.
7. **Habitat for wild life** in form of flora and fauna species. The animals and birds include: elephants, buffalo, chimpanzees, monkeys, gorillas, flamingos, falcons in tropical rain forests. In the temperate forests –bears, deer, gray owl, North American mink, lynx (wild cat), lemmings. There are also various plant and tree species in various forests. Eventually the forests act as laboratory for research and educational studies.
8. **Promotion of the tourism sector** because many forest areas have been gazetted as national parks and game reserves for example Okanda national park in Gabon, Amazonia Park in Brazil, and Galamba Park in Congo to conserve wild life. These act as places for recreation, and other tourist activities such as picnics, forest walking, camping, and viewing forest animals. The tourists bring in valuable foreign exchange and also provide market for the local products and services.
9. **Generates government revenue** through the sale of forest products such as timber, rubber, and medicinal products brings in revenue to government. The government also licenses and taxes the forest exploitation companies, workers, timber exports and other forest-related activities to get revenue that is re-invested in other sectors of the economy such as health and, education.
10. **Generates foreign exchange** through the exportation of forest products such as timber, sawn wood, plywood, fibre boards, rubber, gums, to outside countries. The foreign currency generated is used to settle foreign debts and encourage importation of foreign capital and consumer goods.
11. **Promotes development of urban centres** since the sawmills, pulp and paper industries have attracted a large population as workers and in turn associated

infrastructure such as roads, schools, banking, recreation centres—hence development of urban centres/towns.

12. **Provision of many employment** to the people such as lumber jacks, forest guards, fire fighters, supervisors, transporters, industrial workers. These earn incomes which they use to improve their standards of living.
13. **Diversification of the economy** since forestry industry acts as an alternative source of income for the respective countries instead of over depending on a few sectors like mining, agriculture. This expands the economic base and results into increased national income.
14. **Forestry is an economic use of land where other activities are limited** for example areas of little agricultural value –like the steep slopes, areas of thin soils, infertile stony or sandy soils, water logged areas, areas of a short growing season. Also very remote areas are more economically utilized for forests instead of farming.

Negative / shortcomings of forests

1. **Occupation of land that would be used for other economic activities** such as industry and agriculture. The forests are an obstacle by limiting land for arable farming especially with increased population pressure on land.
2. **Harbor dangerous wild animals** such as black mamba, cobras, python, chimpanzee, lions, buffalo etc which threaten human life and limit economic activities in the surrounding areas.
3. **Forests harbor disease causing vectors** such as mosquitoes and tsetse flies that are dangerous to the people living near them and their livestock, by causing malaria and sleeping sickness in people or nagana / trypanosomiasis in livestock and hence reduce the quality of life.
4. **Forests hinder development of transport and communication networks**. The vegetation grows so rapidly and associated with heavy rainfall that destroys the road networks. For example the Trans-African highway has problems in DRC due to high costs incurred to construct each kilometer of the road through the forest.
5. Some forests act **as hiding places for rebels** and other criminals, who disrupt peace/ bring about political instabilities and hence destroy social economic infrastructure.

6. Some forests have **few valuable tree species** and thus their exploitation is uneconomical. There are many trees with no present economic value.
7. **Industrial –related problems** such as pollution of the environment by the sawmills, pulp and paper industries due to the disposal of wastes into water sources and emitted gases into the atmosphere. This contributes to the environmental degradation.
8. **Urban-related problems** such as slums, alcoholism, and increased crime in the urban centres that have come up. These reduce the quality of life such as slums on the margins of the urban centres having poor structures and poor hygiene. The eradication of such problems is very to the government.
9. **Forestry leads to regional imbalance in development** especially where areas around processing centres are more developed in terms of infrastructure than the countryside /other areas.
10. Some forests act as **social and economic barriers** between people of the opposite sides. For example, it is difficult to connect the areas via transport routes since people have to move for longer distances outside the forest.

FORESTRY IN BRAZIL

Brazil is located in South America and it is the largest country in terms of area in South America (3.2m km ^{2}). The largest single area of tropical rain forests is in the Amazon basin. The westward extension of this forest is limited by the Andes Mountains. On the east coast of South America tropical forests extend as far south as 25^0s.

The tropical rain forests cover almost half of the country‘s total area mainly in the north and the area is called the Selvas/Amazon region. The forest has over 40,000 tree species such **as Mahogany, Ebony, Rosewood, Green heart, Ironwood, Teak, Palm trees**

The main districts covered by Amazon forests are: **Acre, Mato Grosso, Amazonas, Para, Rondonia, Ceara, and parts of Bahia.**

A sketch map of Brazil showing the major forested areas.

Factors which have hindered the development of the forestry industry in the Amazon basin / Brazil

Despite the abundance of forest resources in Brazil, the forest industry is still under developed in the Amazon region and this is explained by a number of factors:

1. Heterogeneous nature of forests/ the trees grow in impure stands.
2. Some densely forested areas are impenetrable.
3. Tropical hardwoods are bulky and too heavy to be floated on rivers like Amazon and its tributaries (such as Negro, Tapajos, Madeira)
4. The tropical forest trees have buttress roots
5. The long gestation / maturity period of most valuable tropical trees.
6. The harsh climatic conditions
7. The tropical rain forests harbor dangerous wild animals
8. Limited capital to invest in forest exploitation.
9. Low levels of technology
10. Shortage of labour both skilled and unskilled.
11. Political instability such as the military coup of 1964.
12. Unfavourable government policy
13. The government has also gazetted some areas as forest reserves like Amazonia, Raajon game parks.
14. Limited market for tropical hardwood.
15. Limited research and careless destruction of valuable tree species through charcoal burning, shifting cultivation, hunting and settlement.

DEMOCRATIC REPUBLIC OF CONGO

In Africa, the largest tropical rain forests occupy parts of the (Congo) Zaire basin. Although the forests are not as luxuriant and extensive as those in the Amazon basin, it is one of the worlds thickest. The main tree species include**: Mahogany, Ebony, Iron wood, Rose wood, Mvule, African cedar, Iroko, teak, Limba, Green heart**

The main forested areas are: Kasai area in the south, Equatuer, Bandundu, and Orientale provinces. The main lumbering forests are: **Ituri forests, Great Congo forests, pygmy forests, Stanley forest**. The Coastal region was the major production area at first but after exhaustion lumbering moved to the interior. The simba forests have been replaced by Eucalyptus forests.

A sketch map of DRC showing the major forested areas

Problems facing the exploitation of forest resources in the Congo basin

1. **Heterogeneous nature of forests/ the impure stands of the trees** in that, the valuable tree species are widely scattered such as iron wood, mahogany as noted in Ituri forest, pygmy among others. These are mixed up with trees of no present economic value. This makes selection, felling and removal of logs from the forest difficult –hence limiting the exploitation of forest resources.
2. **Some of the most densely forested areas are impenetrable** making accessibility difficult since many trees are entangled by creepers and plants like lianas, saprophytes and epiphytes. Therefore the commercial tree species cannot easily be reached in the Congo basin—hence complicated exploitation.
3. **Tropical hardwoods are bulky and too heavy –to be floated** on rivers like Congo River and its tributaries (like Lomami, Lualaba, Kasai, Uele) from the forested areas to processing centres.
4. **Most tropical trees** (such as mahogany and iron wood) **have buttress roots** extending outwards from the base of the trunk, which also makes the process of felling difficult. It requires working from a platform built around the trunk of the tree (at a height of 3-5 m from the ground) which is tedious and time consuming. affecting lumbering
5. **Long maturity period of tropical hardwood trees** such as Ebony, Green heart, Mvule and Mahogany which affects supply. They mature in a period ranging from 60 to 100 years, which does not match with the available demand. This complicates the process of exploitation and quickens depletion of forest species since the rate of cutting is far more than the rate of growth. It is there fire difficult to maintain production on a sustainable basis.
6. **The harsh climatic conditions**/ these tropical rain forests have hot humid weather throughout the year with temperatures ranging between 27 and 32^0c, which is too hot for the lumbermen. The areas also receive heavy rainfall between 3000 t0 4000mm per annum, which makes the ground damp and impassable / transport difficult. These conditions also favour the breeding of mosquitoes causing malaria –which reduces labour supply to exploit the forests.
7. **The tropical rain forests harbor dangerous wild animals** for example lions, chimpanzees, cobras, black mambas, which pose great danger to lumbermen and forest rangers in the forests of Ituri and Stanley among others.

8. **Poor transport routes in the forested areas affecting marketing**. Many areas in the Congo basin with the best timber are not accessible due to lack of good roads and railways. The roads are difficult to construct but still even when built they are difficult to maintain due to rapid re-growth of vegetation. The roads become impassable during heavy rains. The rugged relief in some areas also further limits the setting up of transport networks-hence limiting exploitation of forests.

   Besides some rivers/ streams are less navigable due to problems of waterfalls, rapids, shallowness and floating vegetation among others. They are therefore hard to use to float logs.
9. **Inadequate/limited capital to exploit forests**/ to invest in the forest sector such as to develop infrastructure, purchase modern machinery and set up processing centres. This has led to continued use of rudimentary tools (like axes handsaws) and dependence of poor infrastructure in many forested areas of the Congo.
10. **Low levels of technology**/ Rudimentary tools are still being used in the exploitation of forests in some parts of Ituri, Bunia, Lisala and Stanley forests. This involves the use of handsaws, axes, and pangas among others. These are ineffective, time consuming and wasteful. These lead to low quantity and quality of timber and other products. Although the use of power driven saws is increasing, it is still on small scale.
11. **Shortage of labour both skilled and unskilled** since the densely forested areas such as Bunia, Ituri, Stanley, Great Congo and pygmy forests are sparsely populated, so that obtaining labour is a problem. The unskilled labour in such areas uses rudimentary tools which are wasteful. The inadequate skilled labor force also implies production of poor quality timber, which cannot compete favourably on the world market.
12. **Political instability in many parts of the Congo forests** for a long time such as a series of civil wars and unrests. For example the Katanga rebels from Angola in the period 1977-78, the Allied Democratic Front of Laurent Kabila in 1997 to over throw the government and others instabilities caused by invading forces from Rwanda and Uganda , in addition to the current Congo rebels. This has affected forest exploitation by scaring away workers and investors, since the forests are taken as war-zones.

13. **Unfavourable government policy / limited government support** since the government does not give priority to the forestry industry in favour of other important sectors such as mining of copper and gold in the Shaba province, and agriculture. This therefore undermines investment in the forest sector --hence limiting the purchase of modern machinery, developing necessary infrastructure and carrying out research among others.

    The government has also gazetted some forest areas for wild life conservation –national parks, such as Galamba national park, Salonga national park, okapi national park, and Maiko national park—hence limiting the area available for forest exploitation.
14. **Limited market for tropical hardwood, both local and foreign**. The local market is limited by the location of the forests in sparsely populated areas/ remote areas of the Congo. Basin. More so tropical hard woods compete with coniferous forests (softwoods) in other parts of the world such as British Columbia (Canada), Sweden, Russia, among other areas—with a variety of uses of economic value. This further limits the market since lower prices are often offered for tropical hardwood; a factor which also discourages exploitation.
15. **Limited research** and careless destruction of valuable tree species through charcoal burning, shifting cultivation, hunting and settlement**.**
16. **Many accidents occur** during the felling and transportation of timber, leading to death of workers.
17. **Over exploitation of forests** for example the coastal region was the major production area at first but these forests were exhausted and lumbering moved to the interior –hence affecting future supplies. More so many areas cleared of their original forests have been replanted with other fast growing trees such as the simba forests replaced with eucalyptus trees, and this in the long run makes the forests less valuable.
18. Population encroachment on forest areas.
19. Limited power supply
20. Hostile tribes like pygmies
21. Competition from other wood producing countries like Sweden, Sweden, Norway, Finland, Ghana, Gabon.

FORESTRY IN GABON

Gabon is one country located in the equatorial region of Africa and its economy greatly depends on the exploitation of forests. Gabon is largely covered by dense tropical rain forests (equatorial forests).

The major tree species include: **Okoume (**used for making plywood**), Mahogany, Ebony, Kevazingo, Rose wood, Azobe, Ozigo, Iron wood, Kavaninga, and Green heart**.

The main lumbering areas include: **the coastal strip along the coast of the Atlantic ocean** running from cocoa Beech north of Libreville to Sette-cama in the south, **along Ogooue river, Owendo, Okonja, Moanda, Mekambo, Makokou, Koula -Moutou, and Kango**. The characteristics include; trees have broad leaves, have canopies, grow in impure stands, have hard wood, and long gestation period among others.

In Gabon large companies were given concessions for systematic forest operations. Operations have necessitated the construction of a railway line and a new port at Owendo. There are over 15 saw mills mainly located at the coast. The largest and one of the biggest exporters of plywood in the world lies at Port Gentil.

Note: Lumbering especially along the coastal strip is almost ended due to exhaustion of forests and today most lumbering takes place in the interior and along the Ogooue River.

A sketch map showing forest areas in Gabon

Factors which have favoured commercial forest exploitation in Gabon

1. **The equatorial climate** characterized by heavy rainfall of over 1500mm and which is well distributed throughout the year and hot temperatures of 26^0c and above—which conditions have encouraged the growth and maturity of trees species like Okoume, Ebony and Mahogany. This in turn promotes wood production.
2. **Presence of many valuable tree species**. Gabon has a virtual monopoly of Okoume in the world—which provides valuable plywood, and competes favourably with softwood of the temperate forests. Gabon also has valuable hardwood trees species like mahogany, ebony, Ozigo, red wood in the forest areas like parts of the coast, Lambarene, Makokou, Mekambo and Franceville. These provide more valuable timber for construction and furniture making.

3. **The sparse population/ low population density** which has favoured continued existence of forests. The population density is about 6 people per sq km and this means that vast areas of natural forests have not been encroached on by people for settlement, agriculture, fuel wood, and illegal timber harvesting. The country therefore has large reserves of forests especially in the interior and along Ogooue River for commercial exploitation.
4. **Presence of various rivers** like Ogowe/ Ogooue and its tributaries (Como, Nyanga, and Offoe). These have enabled the transportation of light logs using Tug-boats to factories at the coast and inland workshops. This increases the supply of wood and wood products.
5. **The relatively flat nature of the landscape** which facilitated the construction of transport routes particularly road network and railway—which connect lumbering centres to processing centres at the coast. This ensures continuous supply of wood and wood products likw timber.
6. **The fairly fertile soils** which have supported the growth of various tree species like Okoume, and Ebony—in turn favouring the supply of wood and thus encouraging lumbering in Gabon.
7. **The presence of hydro-electric power** generated from the rivers which helps to run machines in the saw mills and other factories. This increases efficiency in the wood processing factories and thus steady supply of wood products.
8. **Availability of large sums of capital for commercial exploitation** provided by large companies from Europe (particularly France), which the government has given concessions/ contracts to exploit tropical wood. These companies compliment government in providing the necessary capital to purchase modern machinery, setting up processing facilities, payment of labour and carrying out research. This increases forestry production.
9. **The use of improved technology in the forest sector** which involves selective felling of trees using powered saws for feeling trees, trimmed and hauled using tractors to collecting centres. The factory technology has also been improved to increase efficiency in the forestry industry.
10. **Presence of skilled labour** / highly skilled and specialized manpower especially the French plus local people –used in tree selection, felling, trimming, hauling and timber processing. There is also division of labour where the forest area is

sub-divided and each portion allocated to a team under a supervisor. This ensures that quality and quantity output is realized and thus more investment in the sector.

11. **Cheap labour** provided by the local people from the nearby area to work at certain stages of the forestry industry such as in tree felling, loading and unloading.
12. **The improved transport network** such as the Trans—Gabon railway (from Libreville at the coast to Franceville in the interior), and roads connecting the forested areas to the processing centres. The railway has opened up large areas of the forests previously inaccessible. This also increases the supply of logs to the factories and thus more supply og wood products to the market.
13. **Presence of a large market** for the forest products both local and foreign. The Okoume tree commands a large market in Asia (like china, Japan), Israel, and the Rest of Africa especially Morocco. China is the largest importer of Gabonese timber products today like plywood, furniture, tanning materials. This has encouraged invesement in the forestry sector so as to satisfy the demand.
14. **Favourable/supportive government policy** towards the forest sector since 1960s to date. It signed concessions with large timber companies to carry out efficient forest exploitation. It constructed the transport infrastructure like the railway lines connecting lumbering areas and sawmills at the coast. The government has also invested in giant sawmills (such as at Kango). This in turn increases the quality and quantity of wood production.
15. **The development of forest-based industries** such as at port Gentil, Libreville, cocoa beach, Kango-including sawmills, plywood factories, furniture workshops and boat making factories. These add value to forest output and hence provide immediate market. This encourages wood production.

Problems facing the forestry industry in Gabon

1. **Over exploitation leading to exhaustion of forests near the coast**. Mismanagement has led to over exploitation without appropriate conservation efforts. Presently exploitation is further inland and has necessitated construction of a railway line. Besides the revenue from forestry has been declining due to exhaustion of valuable timber at the coast.

2. **Transport problems to the interior/ poorly developed transport routes** making some forest areas inaccessible. The transport network to the interior is not good, although the 320km railway was constructed to Pointre Noire and another 700km railway across the country to Mekambo. It was very expensive since many bridges had to be put up. It is also hard to maintain roads and railway due heavy rainfall, quick re-growth of forest vegetation.
3. **Long maturity period of the hardwood trees** such as Mahogany, Ebony, taking over 60 years to mature. The trees cut down are difficult to replace and this limits sustainable forest exploitation.
4. **The heterogeneous nature of trees species** / the trees do not occur in pure stands of a single species, but scattered and mixed up with other currently useless tree species. This makes selection and removal of valuable species difficult, hence discouraging exploitation.
5. **Accidents occur** during the felling of trees, leading to destruction of equipment and loss of lives of the workers**.**
6. **The forests harbor dangerous wild animals** such as cobra snakes, black mamba snakes, lions, which scare away the people working in the forestry sector, hence limiting effective commercial forest exploitation.
7. **Pests and diseases** which affect the trees and negatively affect the quality of timber.
8. **Poor methods of exploitation in some parts of the forests / low levels of technology**. The poor tools used waste wood such as pangas, axes, hand saws etc. this limits the production of high quality and quantity timber.
9. **Competition for market from other forest product exporters** mainly West African countries like Ghana, Cameroon, and Nigeria. This limits the market and discourages further investment in the forestry sector.
10. Limited market for hardwoods
11. Price fluctuations and marketing problems.
12. Profit repatriation by foreign –owned companies from Europe.
13. Limited capital affecting exploitation.
14. Limited skilled labour supply.
15. Buttress roots affecting lumbering.
16. Heavy rainfall affecting lumbering and transport.

17.Opposition from environmentalists/ conservation policies

Steps taken to solve the above problems

1. Exploitation of forests further inland due to exhaustion of forests near the coast.
2. Re-afforestation programmes in areas where forests have been depleted/exhausted.
3. Growing fast growing / maturing trees such as eucalyptus which have a gestation of 12--15 years.
4. Diversification of exports by the government and encouraging cash crop production like cocoa, coffee, ground nuts , rice to reduce over dependence on timber exports.
   The government has also emphasized mineral exploitation such as uranium, manganese, and iron ore, to reduce over dependence on timber exports.
5. Construction and rehabilitation of roads and railway lines to increase accessibility to forest/ lumbering areas.
6. Use of protective gear to guard against accidents when feeling trees
7. Spraying with chemicals to control pests and diseases.
8. Carrying market research to widen the external market for timber and timber products.
9. Attraction of foreign investors with enough capital and better technology.

FORESTRY IN CANADA

Canada is part of North America and forests cover about 60% of the land area. Canada is dominated by coniferous forests. Newsprint is the major timber product due to predominance of **Spruce** in the eastern forests and the country is also the largest newsprint producer in the world. The dominance of **Douglas fir** in the western forests also makes Canada a leading producer of sawn wood in the world, much of which is exported.

The major forested areas of Canada are:

- Eastern Canada
- Western Canada (British Columbia)

EASTERN CANADA

The forests stretch from the Rocky mountain slopes to the Atlantic Ocean. The major lumbering areas are in the Maritime Provinces and the St. Lawrence –Greatlakes region. But these forests in the east are not as valuable as those in the west since they are with smaller and less valuable trees due to harsher climate and poor soils. Main tree species are: **Red spruce** (good for pulp and paper), **Balsam fir** and **a variety of pines**.

Eastern Canada produces all types of Paper and also produces Sawn wood, Furniture and other timber products but still the most important is Newsprint. The Pulp industry is the major user of HEP in Canada. The main producing centres include: **Quebec, Montreal** and **Toronto**. Other are: **Ottawa, Cornwall on st. Lawrence Seaway, st. John, Corner Brook, Nova Scotia, Grand-Falls and Newfoundland.**

Market exits in N.E USA, Britain and the rest of Europe. There is a large British investment in Canadian forest industries. Pulp is also used in the st. Lawrence – Greatlakes industrial belt of Canada, northern USA and New England for making rayon (for textiles)

WESTERN CANADA (BRITISH COLUMBIA)

British Columbia is Canadian province found in the west. Its economy largely depends on the exploitation of natural resources. The province is largely covered by coniferous forests producing mainly softwood timber.

The major tree species in British Columbia include: **Douglas fir** (which is Canada's leading timber by value), **Spruce** (leading timber by volume), **Western hemlock, Balsam fir, Red cedar, Pines**. British Columbia produces Sawn wood, Plywood, Furniture, Pulp and Paper.

The main lumbering and processing centres include: **Vancouver, Prince George, Kitmat, Prince Rupert, Kamloops, New Westminster, Chilliwack, Nelson, Alberni, and Gold River.**

Factors responsible for the development of forestry in British Columbia (Canada)

Physical

1. **Rugged /mountainous nature of the landscape** consisting of the Coastal ranges and Rocky Mountains—which prevented other land uses like crop growing and settlement. Glaciation is also responsible for this rugged landscape and which removes fertile soils making the land less supportive to crop farming. All this created room for forests as an alternative land use, thus more forest cover and more wood production.
2. **The temperate climate** with warm summers and mild winters which is ideal for the growth of coniferous forests and which allows forestry to go on throughout the year. The heavy rains on the slopes of the Rocky Mountains also facilitate the rapid growth and maturity of the tree species like Sitka Spruce, Western Hemlock, and Douglas fir. This leads to increased production of forest resources.
3. **The infertile and thin soils** which prevent crop growing and are also responsible for the sparse population, and this allowed a large area of the province to be left for forest growth. Only about 3% of the total land area in British Columbia is agricultural land, forcing many people to seek a livelihood from forests resources.
4. **Availability of extensive forestland** with over 60% of the British Columbia forested. This is partly explained by the low population density of about 4 people per square kilometer—which has left large land area to be left for forests. This in turn leads increased lumbering activities.
5. **Presence of many valuable/commercial tree species** commanding high demand on the world market due to a variety of uses. The most important species are **Douglas fir** –for plywood production, **Spruce** for pulp and paper production, **western Hemlock**, **western Red cedar**, **Balsam fir**, **Pines (like Lodge pole pine).** Softwood is also used to make furniture, paperboards, newsprint, and tiles. All these ensure a constant supply of mainly soft wood, hence encouraging forestry investors.
6. **The homogeneous nature of the forests**(the trees exist in pure stands of a single species) –that is a particular species like Douglas fir exists in a given area. This leads to easier location, selection, felling and hauling the logs out of the forests –hence facilitating easy exploitation of the coniferous forests. This leads to increased development and exploitation of the forests.

7. **The coniferous logs are light in weight** and therefore easy to transport. They are easy to float on water from the lumbering sites to the sawmills on rivers like Fraser, Skeena, Nass, Kootenay, Columbia, and Stikine River. The logs are moved to booming grounds on special boats (barges) on frozen rivers. This ensures ready supply of wood to processing centres and thus continuous production of timber products.
8. **The short gestation / maturity period of the softwood tree species** like Lodge pole pine, spruce, and red cedar which mature in a period of about 14 to 22 years which facilitates planned exploitation of the forests. This has enabled sustainable exploitation of forests in British Columbia(Canada).
9. **Presence of many fast flowing rivers** which help in transporting logs and yet rivers like Peace, Nechako, and Columbia have dams which are also used to generate hydro- electric power—which is used to run machinery in the saw mills, pulp and paper industries. Therefore power increases efficiency and effectiveness of exploitation of forest resources.

Human factors

1. **Availability of adequate capital to invest in forestry sector** and the initial capital was brought in by US and British farmers. They also brought in the technology and lumber jacks- to cut down, to collect and load on the trucks skillfully. The government and the private individuals also provided capital used in the purchase of power saws, helicopters, payment of labour and carrying out research training –leading to effective and efficient exploitation of forest resources.
2. **Presence of skilled labourforce** which is relevant to modern forestry operations. It is easier and quicker to work with the telescopic observers, water bombers and chain wheeled trucks. There are experienced and specialized lumberjacks who use power saws to fell trees, firefighters use water bombers and helicopters, and professional botanists who research on fast maturing and high yielding timber. This increases the quality and quantity of forest produce especially timber.

3. **Availability of modern technology** which promotes extensive and intensive mechanization of the forestry sector, with use of tractors to haul logs, bull dozers for quick exploitation, power driven saws to fell trees, fire fighters (telescopic observers, binoculars and water bombers), and chain wheeled trucks to move up and down the steep slopes. The technology improves efficiency and reduces wastage when exploiting wood.
4. **Presence of a large market for softwood products both local and foreign**. It supplies Canadian demands for sawn wood and other timber products, and also a ready market in western USA, Britain and the rest of Europe. There is increased demand for paper in printing books, newsprint, magazines, and paper bags. In turn, there is increased investment in forest plantations and their exploitation in order to satisfy the large market.
5. **Well developed transport system by road, railway and water** connecting the forested areas to the sawmills , pulp and paper industries; and also connected to the coastal ports like **Churchill, Vancouver, prince Rupert**, and **Victoria** to facilitate the exportation of forest products . The railway system is largely electrified which increases efficiency in transportation. This leads to ready supply of wood to factories and increase in the volume of wood products exported.
6. **Favourable/Supportive government policy** for example the Forests are under the control of the Canadian government which minimizes careless and wasteful exploitation the forests. The government also facilitates /encourages research, encourages private companies, construction of the required infrastructure (like railway), and opening international markets for timber and timber products. This facilitates further investment in forestry industry.
7. **Intensive research carried out in the forest sector** to develop fast maturing, high yielding and disease resistant tree species. The trees are planted at regular intervals, thinned, protected against pests and diseases, and with regular inspection. This practice ensures high quality and quantity output from the forestry sector, leading to increased production.
8. **Political stability of the country/the continent** for a very long period of time which has enabled long-term investment in the forestry sector . This is by increasing the area under forest cover, setting up modern wood processing

facilities, and attracting more investors and professional workers. This explains the continuous forest planting, exploitation and conservation.

Problems facing the forestry industry in British Columbia (Canada)

1. **Fire outbreak** especially during summer destroying large areas of forests. It is caused by holidaymakers and people on picnics who often leave fires burning in the camps or careless smokers who drop cigarettes. (*The fires are also caused by sparks from power saws and saw mills. conifers have a high pitch content and can easily be gutted by fire).*
2. **Over exploitation of forests** such near Alberni Port and Vancouver areas. Trees are cut down without replacement, leading to depletion of forests in such areas. Rapid exploitation of forests has been due to the discovery of new uses of wood products in the recent years, hence reduced forest cover.
3. **Rugged mountainous landscape** which makes large forested areas not easily accessible as they are far beyond the reach of roads and railway. This increases the costs of exploiatation.
4. **Pests and diseases** which attack the trees and destroy them, leads to poor quality timber.
5. **Heavy rainfall** which makes the roads muddy and transport complicated since some trucks stick in the mud. This also leads to inefficiency in production.
6. **Fluctuations in labour force.** The available labour is inadequate considering the fact that British Columbia is sparsely populated. During the dry months of the year, the population is engaged in other activities such as tourism-hence limiting the manpower available for the forestry industry. In winter because other sectors are not vibrant, then labour is easily available. This fluctuation in labour supply affects the supply of logs to saw mills.
7. **Log jamming in rivers due to congestion**, that is at certain points of the rivers the logs get stuck leading to inefficiency in production.
8. **Accidents** occur when felling trees leading to death of workers. The forests are sometimes faced with strong winds also causing accidents of falling trees. This discourages potential workers.
9. **Lumbering is difficult during winter** especially in the higher latitudes where snow is very common. The felling trees is difficult and it is equally difficult to

keep the roads open. Likewise the rivers get frozen and movement of logs difficult. This limits winter lumbering.

10. **Competition from other producing areas of timber products** such as Sweden, Finland, Norway, USSR, and Gabon among others. This limits the available market for Canadian wood and wood products.
11. Government conservation policies / opposition from environmentalists.
12. Presence of dangerous wild animals such as bears, snakes, wild fox which scare away workers.
13. Competition from substitute items on the world market such as plastics, metals.

Solutions to the problems facing forestry in British Columbia

1. Forest fires are controlled using:
   a) Watch towers high above the trees where fireguards are able to see far and detect fire out breaks.
   b) Regular patrols using helicopters to detect fire outbreaks.
   c) Use of mobile fire fighters and water bombers which run very fast and spread water to stop fires.
2. Over exploitation is partly solved by forest farming, a long range harvesting programme, re-a forestation, selective cutting etc. This is to ensure sustainable forest exploitation.
3. Introduction of quick/fast maturing and disease-resistant tree species to increase the area under forest cover.
4. The government also restricts the cutting of trees by imposing high taxes on the forest exploiters and complicated licensing process.
5. Spraying with chemicals to control pests and diseases that attack the trees. This is to increase the quality of wood.
6. Use of chain- wheeled trucks which can move up and down the steep slopes which are slippery –these do not stick in the mud. This makes movement of logs to saw mills easier.
7. Intensive and extensive mechanization to minimize the problem of labour shortage.
8. The use of trained men to remove the jam logs across streams /rivers to ensure steady supply of logs to the factories.

9. To avoid accidents, the fellers carry out the work carefully by checking the positions of their colleagues before each tree falls. The workers also use brightly colored steel helmets.
10. To avoid problems of lumbering during winter, they are **using "log high" and "log low" system**. Areas of higher cooler latitudes are logged during summer when forests are free from ice and snow. Winter logging is carried out in the lower latitudes where roads can be kept open.
11. Competition is being controlled by producing high quality products.

[Note: Pulp—a soft wood used to make paper
Plywood –construction material consisting of thin sheets of wood glued together.
Sawn wood –wood in planks (long flat pieces of wood) or board from saw mills].

FORESTRY IN SWEDEN

Sweden is one of the Scandinavian countries together with Finland and Norway. In Sweden about 50% of the total land area is covered by forests especially in **the central-northern parts** of the country. Most of the trees are coniferous and the most important commercial species is **Spruce** (like Norway spruce**,** Red spruce**)**. Other species are: **Pines (like Scotch pine, Norwegian pine), Larch, Firs, birch** --which can withstand the climatic conditions.

Silvi-culture is a practice taken on in Sweden for over 100 years. It involves trees of the same species, age, and quality that are planted, transplanted easier, sprayed against pests and diseases, thinned and harvested at regular intervals. It also involves regular inspection of the forests.

Today forests are a major source of wealth and make up a large percentage of Sweden's exports. Timber is transported to saw mills by road, railway and rivers (like **Torne, Ume, Oster, Dal, Pite, Angerman, Trysileva, Skellefte, Lule, Ljungan, and Ljusman).** The tree species in Sweden are exploited for the **pulp industry (the most important),** sawn wood, paper, among others**.**

The main wood processing centres in Sweden are **Harnosand** and **Sundsvall**. Other important centres include: **Jonkoping** (important for matches**), Orebro** (paper), **Karlstad, Norrkoping**, and **Trollhattan**.

****A sketch map of Sweden showing forest distribution****

Factors which have favoured the development of the forestry industry in Sweden

1. **The rugged nature of relief** partly explained by glaciation which affected the highland interior and the northern parts of the country, making soils thin and infertile, and this limits the land for cultivation –hence forcing people to turn to other land uses especially forestry. In turn, there is a large area under forests, which increases softwood production. The limited arable farming has also released labour to forestry activities.
2. **The cool temperate climate** with rainfall received throughout the year and the heaviest rains in the late summers. The warm summer temperatures ($12\text{-}22^0$c) help in the faster growth / maturing of the trees species like pines, and spruce.— hence continuous supply of softwood. The cold winter with frozen ground favours trees felling and hauling of logs on the snow into the rivers to the saw mills.
3. **Presence of many commercial/ valuable tree species** that is coniferous tree species such as spruce (Norway spruce, Red spruce), pines (Scots pine, Norwegian pine), larch, birch. These tree species have a variety of uses such as for plywood, pulp, sawn wood, paper, paperboards, matches, furniture; hence commanding a large market in Europe and other parts of the world. This has encouraged investment in forestry in Sweden.
4. **The homogeneous nature of the forests,** that is, a close nature of valuable single tree species like spruce in a given part of the forest. This makes exploitation easier and systematic due to easy selection /searching of tree species; yet even removal of logs from the forests is easier since there is clear-cutting in a given area. This favours continuous / sustainable supply of wood and timber products.
5. **The coniferous logs/ wood are light in weight** and this makes them easy to transport by floating on rivers like Oster, Dal, and Angerman. Remember that floatation is the cheapest way of transporting logs to sawmills and pulp factories. This ensures steady supply of wood, which increases production of wood products for both domestic and foreign market.
6. **The short maturity period of softwood tree species** like Scots pine, Norway spruce, firs, birch and larch. These trees take about 14-20 years to mature, and

this enables planned/ sustainable exploitation of the forests, since the forest trees are easy to replace once cut down. This encourages forestry investment.

7. **Presence of many fast flowing rivers** for example such as Oster, Dal, Ljungan, Torne, Angerman, Lule, Ume, Pite, Ljusman; which are used as float ways carrying logs to pulp and paper industries or saw mills along the Baltic sea coast. Still many canals (such Gota Canal) have been constructed to link the forests to the processing centres. Sweden has more than 35,000km of public float ways. This leads to continuity in supply of logs and hence more timber and timber product production.

   Besides the rivers provide a ready source of hydro –electricity due to the dams constructed such as Angerman, Dal, Trysileva, Ume, and Torne; and the power is used in running machines in the saw mills , pulp and paper industries , ship building , and furniture workshops. This increases the quality and quantity of output.
8. **The sparse population of the country/ availability of extensive forest land** due to the low population density *(of about 22 people per km^{2})* and most people live in the urban areas of the south. In the forested north (Norrland and Lapland) the population density is much lower. There is limited encroachment on forests for settlement, agriculture and infrastructure. Therefore, there is a large area under forest cover and hence increase in the quantity of wood production.
9. **Availability of large sums of capital** invested in the forestry industry provided by the government, private companies and individual forest growers. The capital is invested in purchase of modern machinery, setting up processing facilities, development of transport infrastructure like railway, carrying out forestry research, and payment of labour. This favours large scale management of forest resources.
10. **Presence of a large market both local and foreign.** For example in the urban areas of Sweden like Stockholm and Goteborg. There is great demand for timber, pulp and paper in the industrialized countries to the south such as Britain, Germany, France, Holland, and Denmark. Sweden produces pulp, plywood, furniture, cellulose, and matches are also exported to USA, and Japan. There is increased production in the forestry sector to satisfy the ready market.
11. **Presence of highly skilled and specialized labourforce** to work in the forest sector such as forest rangers, lumber jacks, fire fighters, industrial workers,

transporters, and botanists. The lumberjacks cut trees with less timber wastage and destruction of young trees. The fire fighters work to stop fires from destroying forests, while the botanists carry out research to improve the quality of tree species. This leads to high quality and quantity of forest products.

12. Sweden has one of the most **developed transport system** in Scandinavia including road and railway networks. For example the Swedish railway running from the south to the north which provides accessibility processing centres like sawmills, pulp and paper industries, and to urban markets. This favours continued supply of wood to factories and ready supply of wood products to the markets.
13. **Presence of modern technology** employed in forestry such as the use of power driven saws for felling and logging , fire fighting technology (such as use of helicopters and water bombers),tractors for hauling logs, bulldozers for quick exploitation, industrial processing technology. The botanists also use modern laboratory equipment in experimenting trees species. This increases the quality and quantity of wood and wood products, thus increased investment in the forestry sector.
14. **Highly developed research in the forestry sector** promoted by the government and private companies. ***Silvi-culture*** is practiced and involves planting trees of the same species and quality, protecting them against pests and diseases, thinning, regular inspection, harvesting at regular intervals, and replanted at regular intervals. this ensures that fast maturing and disease resistant tree species are realized. This ensures high quality and quantity of forestry output; and ensures sustainable forest development.
15. **Favourable / supportive government policy** such as setting up the necessary infrastructure such the railway network and port facilities to transport wood products, encouraging private companies and individuals to invest in the forest sector since most of the land is not suitable for crop farming and encouraging forestry research to ensure quality output. The government also controls the forest sector to ensure sustainable forest development.
16. **Political stability of the country** for a long period of time which has enabled long-term investment in the forestry industry such as planting large areas of forests, extraction of wood, logging, transportation and setting processing facilities-since security of investments is assured. This has encouraged more

investors and thus continued supply of softwood and associated products like pulp.

Contribution of forestry to the economy of Sweden

1. **Promotion of industrial development** by providing raw materials such wood used in sawn wood, pulp and paper, and plywood industries. The pulp industry remains the most important and the main processing centres are Sundsvall, Harnosand, Karlstad and Trollhattan. Paper production is greatly noted at Orebro; and the production of matches is especially at Jonkoping. Remember that Sweden is world's main producer of matches. This increases the national income of Sweden.
2. **Promoted development of urban centres** and ports along the Baltic coast and in the central lakes area. The major urban centres are Karlstad, Trollhattan, Stockholm, Sundsvall, Harnosand, Norrkoping, Jonkoping, Malmo, Uppsala, Linkoping, Orebro, and Halmstad. These are centres of saw mills , pulp and paper industries , furniture workshops which have attracted population concentration as workers and in turn associated infrastructure like banking, schools, health facilities and recreation facilities.
3. **Generation of foreign exchange** through the exportation of forest products such as sawn wood, pulp, paper, plywood, and furniture, cellulose, to other countries like Britain, Germany, Norway, France, Denmark, and USA. The foreign currency generated is used to obtain foreign technology, consumer goods and paying expatriates.
4. **Generation of many employment opportunities** such as lumber jacks /fellers who sort and cut trees, botanists who research on the tree species, forest rangers/ forest officers, engineers in pulp industries, transporters and export handling workers. The forest sector employs a large percentage of the total working population. These people earn incomes which helps to improve their standards of living.
5. **Encouraged development of float ways** to promote transportation of logs to factories. The forest regions are very accessible due to a large number of rivers, lakes and canals which provide float ways. Sweden has about 35,000km of float ways. Besides forestry has led to development of transport networks such as road

network and the Swedish railway system. The transport system does not only facilitate forestry, but also several other activities such as industry, agriculture, tourism, trade and commerce—hence facilitating the general economic development.

6. **Forestry promotes Soil conservation** since the forests occur on the steep slopes of central to northern parts of the country. The forests have protected soils against soil erosion and the occurrence of landslides /avalanches by compact the soils together –hence promoting slope stability.
7. **Habitat for wild life and promote development of tourism**. The forests harbor wild animals like Reindeer *(with branching horns)*, Roe deer *(without b.h)*, Lemmings, Moose, Bears, Lynx *(wild cat)*, Wolves; and many wild birds; and yet the pure stands of the trees also attract many tourists. Both flora and fauna act as items for research and educational studies for the tourists. Tourism also generates foreign exchange and provides market for other locally made products like foodstuffs.
8. **Provision of other forest products f**or example fruits, nuts, spices, resin, tar, and tannin. Tannin is a substance found in the bark of certain trees used in conversion of raw hides to leather found in trees like hemlock, cedar, and oak. There are also synthetic textiles known as rayon (from spruce wood), materials for paint making, and making medicines. All these products when made improve the quality of life /standards of living of the people.
9. Promoted international cooperation/ relationship between Sweden and the importing countries.
10. Diversification of the economy.
11. Generation of government revenue.
12. Forests act as catchment areas for rivers.
13. Modification of climate.
14. Forests used for research and educational studies.
15. Utilization of the land that would otherwise be lying idle.—it utilizes areas that would be wastelands.

Negative /shortcomings

1. **Environmental pollution** such as the water ways are polluted with wastes containing bleach, lignin and fibres. Also the processing industries emit gases

and toxic substances which pollute the environment. This reduces the quality of life such as by causing deadly diseases.

2. Urban-related problems such as high crime rate and congestion.
3. Forests hinder transport and communication development.
4. Harbor dangerous wild animals such as wild fox, bear.
5. Occupation of land that would be used for other economic activities.
6. **Straining the government budget** due to the heavy investment in the forest sector which has meant that other sectors like agriculture have been largely underdeveloped.
7. Some forests act as social and economic barriers between people of the opposite sides.
8. ***Results into regional imbalance in development** because the areas where processing centres exist are more developed in terms of infrastructure than the countryside.

FORESTRY IN NORWAY

Norway is a less important lumbering country compared to Sweden and Finland. About 35% of the land area is under forest cover, and as in other Scandinavian countries the forests are owned mostly by farmers. Approximately 80% of the forests are owned by families/farmers who manage their forests in combination with farming. The rest of the forests are owned by the state, community and private companies.

Silvi—culture and forest improvement are important and new species have been introduced from Alaska and British Columbia in a forestation schemes. The major species of commercial value are: **Norway spruce, Scots pine**, and **birch**. Others include: firs, larch, and other pines.

These softwoods have been used to produce soft boards, furniture, pulp, paper, paint, rayon, and cellulose.

The main centres are: **Trondheim**—an exporting centre as well as having timber industries, **Honefoss**—a saw milling centre, **Kristiansand** and **Skien** have pulp and paper mills, **Drammen** has a wide range of timber processing industries. Rivers like Glomma are used for floating logs.

Note: the factors for forestry development are similar to Sweden.

FORESTRY IN FINLAND

Finland is also a Scandinavian country. Like Sweden, much of the original forest cover remains and there is a practice of Silvi—culture which has been practiced for over 100 years. Forest production has been enhanced by the introduction of trees from other countries that give a higher yield of timber. Many farmers have been encouraged to turn their land over to forest to increase forest area and therefore boost timber output.

The major commercial tree species include: **Scots pine, Norway spruce, Firs and larch**—which are exploited for Sawn wood, Pulp and Paper, Rayon, Furniture among other products.

The main rivers for floating logs and producing HEP are: Oulu, Kemijoki, Muonio, and Tornio (Torne).

In Finland there are timber industries at the coastal ports of **Vaasa, Oulu, and Pori**—which also export timber and timber products. The main centre is **Tampere**. Sawn wood, pulp, paper, furniture and other wood working industries are all important. In addition Finland has important engineering industry manufacturing wood-processing machinery both for the local and foreign market.

Finland supplies about 4.5% of the world's pulp much of which is exported to Britain and other European countries with small local timber resources. Finland is also a major exporter of sawn wood.

Note: factors for the development of forestry are similar to Sweden.

Causes of forest depletion in Africa

Deforestation refers to the gradual removal / destruction of forested lands to be converted into other uses. There is continued decline of forest cover in Africa greatly by clearance for settlement, agriculture or during exploitation process. The causes of forest depletion in Africa include:

1. ***Rapid population growth*** which increases the need for settlement and cultivation land thereby encroaching on the forests. For example the population growth rate of Nigeria is 3%, Malawi- 2.8%, DRC-3.1%, and Cameroon-2.4%. In effort to divert land to farming, large areas of forests have been destroyed such as parts of

Congo forests, southern Ghana and Cameroon where crop plantations have been established.

2. ***Increasing demand for timber and timber products*** such as making plywood, furniture, construction, boat-building among others. There is also increasing demand for fuel wood and charcoal for smoking fish (like in West Africa), curing tobacco (such as in Zimbabwe), and domestic cooking. This has also led to continued destruction of forests in Africa.
3. ***Careless felling of trees/ poor logging methods***. As people cut down trees for timber, charcoal, firewood they cut even the young trees and yet there is limited or no reforestation of the trees. Therefore each time a tree is cut down there is no replacement and where it has been encouraged it is still limited. This in turn has reduced the forest cover.
4. ***Poor farming methods*** like shifting cultivation practiced by the Bemba in northern Zambia, Azande in the Congo basin forests. Many farmers also carry out bush burning before cultivation-which ends up destroying large areas of forests.
5. ***Need for infrastructural development and industrialization*** involving roads, railways, schools, hospitals, and recreation centres ,which have been set up after destroying part of the existing forests. More so, the process of infrastructural development and industrialization requires large quantities of poles, timber and timber products. For example power transmission requires poles and timber—hence quickening forest destruction in Africa.
6. ***Effect of mining activities*** in large areas of forests which are destroyed to access the mineral ores especially with use of open cast mining such as copper mining in the Shaba province of Congo and the Zambian copper belt, diamond and gold mining in Ghana, and iron ore mining in Gabon. Many trees are destroyed and not replaced.
7. ***Low level of power and energy*** **development in Africa**/ ***lack of alternative sources of energy*** and this has led to continued cutting down of trees to get firewood and charcoal, since the people have limited or no alternative. This is compounded by the poverty in Africa with many people engaged in selling firewood and charcoal for survival.

8. ***Forest/wild fires*** especially during the dry season caused by careless smokers, hunters, or cultivators intentionally or accidentally-hence destroying large areas of forests.
9. ***Damage by wild animals*** such as elephants, giraffe in the national parks and reserves especially where many of such animals exist in a given area. For example in Tsavo park elephants destroyed the vegetation tending to create an "elephant desert".
10. ***Pests and diseases*** which also lead to continued destruction of forest trees such as aphids destroying soft wood trees. There is also cutting down of trees in order to control the pests and diseases. This in turn reduces the forest cover.
11. ***Political instabilities in many parts of Africa*** for example in the Congo basin forests where the rebel activities have existed for long, West African forests(like Nigeria, Togo, ivory coast, Liberia) where the forests have been bombed or cut down suspected to be hiding places for rebels. The continued violence makes the natural forests hard to maintain.
12. ***Government negligence to conserve forest resources*** such as lack of a comprehensive conservation policy and poor law enforcement against forest encroachers. There is also inadequate funding and high degree of corruption in the forest departments. This results into continued destruction of the forests.
13. ***Prolonged drought conditions*** for example the fact that the Sahara desert is extending southwards and thus declining forest cover. The northern parts of the Congo forests are turning into woodlands.

Effects of forest depletion in Africa

1. **Brings changes in local climate**. Forest depletion brings adverse effects on the climatic conditions by bringing low rainfall which is also irregular due to reduced evapo-transpiration. This leads to desert conditions.
2. **Decline in agricultural productivity** which leads to famine. Because most Africans are farmers they have been affected by increasing poverty due to declining crop and animal performance.
3. **Decrease in timber products** because of the long regeneration/ maturity period and the little reforestation. Therefore, Africa's future survival on timber products is not assured.

4. **Causes severe lack of fuel resources** especially in the areas of increasing populations such as southern Ghana and southern Nigeria. This is increasing difficulty in acquiring wood for fuel.
5. **Destruction of habitats for wild animals and birds** for example monkeys, buffalo, elephants, eagles, cranes—which also limits the tourist potentials in various parts of Africa.
6. **Leads to soil erosion and mass wasting** which affect the people in various areas. This leads to low crop yields due to reduce soil fertility and poverty due to reduced earnings from farming. Mass wasting (landslides) affect especially highland areas where forests have been cleared –leading to loss of life and property.
7. **Leads to increased incidence of economic refugees** since the areas facing environmental degradation are often struck by drought and famine making people to migrate to other areas that are productive. This strains the receiving areas.
8. **Increased government expenditure** due to the need to handle the situation when programs like reforestation and afforestation are put in place. There is also need to import food to feed the affected people, hence straining the government budget.
9. **Decline in revenue in form of foreign exchange** due to importation of forest products, which are some of the direct benefits from the forests. This in turn compromises other government activities like health and education service provision.
10. **Decline in water table because forests would act as bases for water streams and rivers**. The forests would allow water to infiltrate the soil hence increased water table, but the clearance of forests undermines this purpose.

Forest conservation

1. ***Afforestation*** which involves planting of trees in areas which have not been previously covered with forests. In some countries governments give incentives to farmers who turn their arable land to forest. It mostly involves panting quick maturing trees especially conifers—like pines.
2. ***Re-afforestation*** which involves replacing the trees which have been cut down. In some countries (such as Germany) every tree cut down must be replaced by

law. The new trees may or may not be the same as those removed. Conifers are preferred due to shorter gestation period and more useful such as pines, Cyprus.

3. ***Silvi-culture*** which is a system where logged areas are planted with more trees and they are properly cared for. It involves planting of trees of the same quality, age, and grade; replanted at regular intervals, protected against pests and diseases, thinned and harvested at regular intervals. It involves planting the trees in line and quick maturing species that readily meet market demand.
4. ***Improved tree cutting practices*** such as selective cutting of trees, the forests stand a better chance of regeneration and survival. It involves removing the mature trees or the diseased ones.
5. ***Forest protection*** for both the natural and planted forests from hazards such as pests or fires. This can involve a close system of inspection using towers and air patrols as can be seen in Scandinavia and North America.
6. ***Reducing wastage at the industrial level*** for example use of pulp which is not suitable for paper to make fibre and particle boards for the building industry. Also the re-use of waste paper in the production of newsprint and other inferior paper products. The greater use of plastics rather than paper for packaging purposes. It can also involve using trees more intensively to reduce cutting down of more trees.
7. ***Gazetting areas into forest reserves*** to reduce on the encroachment of people on forests for other activities like farming. There should also be eviction of encroachers by the forest department. This in turn increases the forest cover.
8. ***Encouraging use of alternative sources of energy*** such as biogas, agricultural wastes(coffee husks, sugarcane husks, banana peelings) , and the use of HEP. This in turn reduces the cutting down of forests.
9. ***Use of energy saving stoves*** which reduce on the demand for firewood and charcoal; and hence reduction in forest destruction.
10. ***Training labour force*** as forest rangers, and supervisors to manage the forests in various departments such as fighting against forest encroachers.
11. ***Government legislation*** against forest encroachment, regulating the issuing of licenses /permits to reduce careless cutting down of trees. It also calls for serious enforcement of the conservation laws.

12. ***Emphasizing Population control measures*** to reduce the cutting down of forests for settlement and cultivation in various areas.
13. ***Ensuring peace and stability*** in all areas to reduce forest destruction. This can be through peacetalks and promotion of international relationship with neighboring countries.
14. ***Education/sensitization of the masses*** about the value of forests and the need to conserve nature.

PLANTED/ ARTIFICIAL FORESTS

These are forests planted by man and not indigenous to an area. They are also called man-made forests. The world's hope in global wood requirements lies in planted forests. They are often of a singletree species.

Man –made forests Swaziland

Swaziland is a small country found in Southern Africa. Most of the forests are man-made / artificial coniferous forests which have been planted since the 1940s. Many years ago, Swaziland had many great forests which were unfortunately greatly destroyed for fuel and to create more farmland. Over grazing and heavy rainfall of the Drakensburg caused severe soil erosion.

However, since the 1940s much reafforestation and afforestation has taken place. Planted forests play a great role in the economy of Swaziland. There are now vast/ large coniferous forests in the hilly and mountainous region.

The major forested areas include:

a) **Sappi Usutu** (*formerly* **Great Usutu forest**)—further South near Mbabane exceeding 70,000ha. It is the largest man-made forest and covers about 4% of Swaziland's total area. It is situated at Bhunya near Mbabane, on either side of the great Usutu River. It was started in 1949 when 40,000 hectares were planted with exotic tree species such as Pinus Patula from Mexico and Pinus Taeda from USA. Today this forest covers over 70,000 hectares. It was financed by the common wealth development corporation.
b) **Mondi peak** (*formerly* **Piggs peak forest**)—North West of Swaziland covering about 32,000ha. This is the second major forest area and it is managed by the pigs timber company.

c) **Shiselweni** (*formerly* **Nhlangano forest)**—in the South West (which is the most recent).

Organization

The country has carefully planned a rotational system of afforestation to ensure that timber is maintained to support the economy. The forests mainly consist of pines, eucalyptus. The forests are scientifically managed with well-maintained access roads crossing from all directions. It has many divisions planted on a rotational basis to ensure steady and regular supply of wood to the processing factories. The trees mature within 15 to 20 years. Trees are cut using mechanical saws and tractors are used to drag the logs to the main service roads where they are loaded on to huge trucks for transport to the sawmills.

Forests such as the Great Usutu and Mondi peak have their own processing factories and saw mills. They produce pulp, sawn timber/wood, pit props, and telegraph poles, telephone poles, tanning materials, plywood, furniture, Paper etc

Many companies are involved in forests such as the Usutu pulp company produces pulp and the spring wood cellulose company does the marketing in Great Usutu. The Piggs timber company manages the Piggs peak forests.

Sketch map showing the major forests of Swaziland

Advantages of planted forests in Swaziland

1. They grow and mature very fast, taking about 15 years.
2. The trees occur in pure stands, which makes their exploitation easy.
3. They produce softwood, which has a variety of uses.
4. They lead to effective use of land that otherwise would be lying idle due to being rugged.
5. The forests conserve the environment by controlling soil erosion and protecting water catchment areas.
6. They yield valuable softwood products which have a variety of uses, hence generating revenue.
7. They modify the climate through evapo-transportation which favours rainfall formation.

8. The planted forests are used for research and educational purposes.

Factors/ conditions which have favoured forestry in Swaziland

1. **The sub-tropical climate** characterized by moderate to heavy rainfall ranging from 1000mm to 2200mm (tropical to sub-tropical climate) for quick maturing of softwood forests. This in turn favours extensive forest cover and thus increased supply of timber and timber products.
2. **Cool temperatures due to high altitude of over 1000m above sea level** which favours the growth of softwood species. This in turn encourages the establishment of more tree plantations and thus increasing the supply of softwood and softwood products in Swaziland.
3. **The mountainous/hilly and rugged nature of the landscape** in the western part of the country which cannot support settlement and crop cultivation, hence availability of extensive areas occupied by forests. This explains why most of the forests are located in the western parts of the country such as the Great Usutu forests in Bhunya. The extensive forests encourage wood production in Swaziland.
4. **The need to preserve hilly slopes** especially the Drakensburg Mountains from erosion and protect the water catchment areas by planting trees. This has resulted into large areas of forest cover and in therefore sustainable forest exploitation since there is always need to replace the trees cut down to protect the environment.
5. **Presence of valuable/ commercial tree species** which grow and mature very fast in a period of 15—20 years such as pines *(like Pinus Patula , Pinus Taeda*) favouring steady supply of softwood by planting the trees in intervals (rotational system) and hence sustainable forest exploitation. The soft wood trees also have a variety of uses such as furniture, sawn wood, pulp, paperboards, pit props, telegraph poles; which encourages production.
6. **The tree also occur in pure stands** which makes their exploitation/ harvesting easy. A single species exists in a given area making it easy to locate and cut down the trees. Clear cutting is majorly done in which all the trees are removed and

replaced at once. Easy exploitation increases the supply of timber and timber products.

7. **Availability of adequate/ large sums of capital** provided by Swaziland government, local and foreign investors *(the Common Wealth Development Corporation)* to invest in the forestry industry such as; establishment of large plantations (*like the Great Usutu and Piggs peak*), financing the pulp mills *(like at Bhunya)* , constructing transport routes, carrying out forest research to develop more fast maturing and disease resistant trees. This increases the forest area, the production and supply of wood.
8. Presence of skilled labour to work in the forestry industry such as carrying out research on tree species, careful selection and felling trees, transportation of logs to saw mills, timber processing in the factories, grading and exportation of wood products. This in turn increases the quality and quantity of timber production.
9. **Presence of a ready/ large local and foreign market** for the soft wood forest products such as pulp, plywood, sawn wood, and furniture. There is a large demand forest products in united kingdom, Switzerland, south Africa , Botswana, Namibia, Lesotho. This therefore encourages the establishment of more tree plantations to satisfy the large market.
10. **Developed / improved transport network by road, railway and water** linking to processing centres and markets. The planted forests such as the great Usutu have a network of roads linking to the main roads and railway leading to the factories and sawmills which encourages the supply of wood. The railroads are also connected to the ports like Maputo and Durban which increases the exportation of timber products.
11. **Advanced/ Improved technology used in the forestry sector** which has simplified the forestry activities such as in felling trees using mechanical saws, use of tractors to haul logs to the main service roads, also industrial processing machinery which increases the quality and quantity of output. This in turn encourages further investment in the forestry sector.
16. **The development of timber processing factories** such as at Mbabane that produce sawn timber, boards, pit props, furniture, pulp, telegraph poles. These provide immediate market for wood, and add value to forest output which commands high prices and in turn increasing the income from the forest sector.

12. **Favourable / positive government policy of afforestation and reafforestation** to ensure sustainable forest utilization. There was a government policy of attempting to use the land available in the most economical way because of being rugged and hence establishment of large tree plantations, leading increased timber production.
13. **Presence of ready supply of hydro-electric power** which is used in the processing of wood / timber in the factories, and hence encouraging further forestry investment.
14. **Increased scientific research and management of the forests**. The forests have a carefully planned rotation system of reafforestation that ensures continued existence of the large forest cover. The introduction of tree species especially pines, *and also wattle, eucalyptus* which have a short maturity period of about 15 –20 years and disease resistant is also based on research in other countries. This ensures steady supply of wood and thus sustainable exploitation.

Problems facing the forestry sector in Swaziland

1. Fire outbreaks destroying forests and thus limiting production.
2. Pests and diseases which destroy the trees and thus limit production.
3. Poor transport network due to the rugged nature of the landscape which limits accessibility to some forested areas.
4. Competition for market with other soft wood producing countries which limits export earnings.
5. Over dependence on foreign companies which repatriate the profits to their home countries.
6. Limited capital to invest in the forestry industry such as purchasing modern equipment and funding research.
7. Long distance to markets abroad, which increases the costs of production.
8. Shortage of skilled labour due to the small population in most areas which limits production.
9. Price fluctuations on the world market which discourages production/ leads to fluctuation in export earnings.
10. Competition from alternative raw materials in the industrialized countries such as plastics, metals; which reduces the demand for timber.

11. Rapid population increase which creates more land for settlement and farming, hence encroachment on forestland.

Guiding questions

1) Assess the role of the forestry sector to the economy of either Canada or Swaziland.
2) Examine the economic significance of the forestry industry to either British Columbia or Norway.
3) With reference to either British Columbia province of Canada or Gabon
   (a)Discuss the problems facing the forestry industry.
   (b)What steps are being taken to solve the above problems?
4) Account for the development and importance of the forest sector in either Scandinavia or North America.
5) With reference to a specific country in either North America or tropical Africa, discuss the problems involved in the exploitation of the forestry industry.
6) Describe the characteristics of tropical rain forests and discuss the problems associated with their exploitation.
7) Compare the characteristic features of equatorial forests with those of coniferous forests, and describe the strategies taken to improve the forestry industry in either a developing or a developed country.
8) (a) Compare the forests in the higher latitudes with those in the lower latitudes.
   (b)How are the forests in the lower latitudes an obstacle to their exploitation?
9) Explain the importance of forests to the economy of either Sweden or Ghana.
10) Account for the development of forestry in either Gabon or Norway.
11) To what extent have physical factors favoured the development of forestry in either Finland or Swaziland?
12) The effective utilization of equatorial forests/ tropical evergreen forests has been mainly limited by human factors. Discuss.
13) Examine the problems facing the utilization of forest resources in either the Amazon basin or Congo basin.

MINING IN THE WORLD

Mining refers to the process of exploitation of minerals from the earth's crust. The mining industry involves all activities related to the extraction, processing and trade in minerals. In the industrial sector, minerals are used as raw materials, as a source of power and contribute to the generation of capital when exported.

Minerals are classified into two categories: the metallic and the non-metallic minerals. The **metallic minerals** are the most important and valuable because they are hard and have a wide range of uses. These include iron ore, tin, copper, aluminium, chromium, gold, silver, platinum, uranium, manganese, cobalt etc. The **non-metallic minerals** are relatively soft and weaker such as salt, potash, nitrates,

sulphur, asbestos, certain precision stones e.g. diamonds. Minerals fuels are non-metallic minerals *(derived from vegetation remains)*. These include coal, oil and natural gas.

Methods of mining

The methods used to remove mineral ores from the ground depend on the nature of mineral, the depth at which it occurs and its marketing value. The most common methods include:

- **Open cast mining**
  This method is used when the mineral ore is near the surface. The top soil (over burden) is removed and the mineral ore is blasted using explosives. The ore is then crushed to reduce the size. It is then loaded into trucks and taken to the processing plants.
- **Shaft/ Adit/ underground mining**
  This is used when the mineral ores lie deep below the surface (the over burden is too thick to be removed by mechanical shovels). Vertical shafts are dug into the ground to appropriate levels. From these, horizontal tunnels leading to the ore body are constructed. Supporters are provided from the roof to the floor of the tunnels. The ore is then blasted using explosives causing shattering. The ores are crushed and loaded on small wagons and taken to the vertical shaft, and lifted to the surface, and taken to processing plants.
- **Placer or Alluvial mining**.
  This is used when minerals occur in alluvial deposits. In this method a steel dredge or a gravel pump is used to dig up the alluvial deposits (waterlogged alluvium). The alluvium is mixed with a great deal of water. The mixture is rotated and in the process the lighter particles (sand, mud, dust) are washed off, leaving the heavier ores (diamonds settled down.
- **Drilling methods such as for petroleum/oil.**
  Process of oil drilling
  The basic equipment for oil drilling is a derrick—which is a steel tower about 40m high. Exploration /prospecting/survey of the oil is done and installing of the derricks/oil rigs follows. The derrick carries a drill stem on which steel drilling pipes are screwed /attached, having a drilling bit. The drilling bit is used to drill into/cut through the rock strata/layers to reach the oil well below. Lubricating mud is pumped into drilling pipe to lubricate the bit and to bring up rock samples.

Once the bit reaches the oil stratum/layer, crude oil rushes out by natural pressure or pumped out to the surface using oil pumps if natural pressure is weak. The oil is then transported through pipes, fuel tankers, trucks to the refinery.

Factors limiting exploitation and use of tropical minerals

1) ***The small size of some mineral deposits*** that is, very small quantities not economically viable to exploit. A small deposit which can run out in a few years is uneconomical to exploit/ to install expensive machinery such as iron ore in Zimbabwe, Kenya, CAR; and Gold in Uganda, Kenya, Zimbabwe and Liberia. This discourages many investors in the mining industry.
2) ***The low grade of some minerals***/ low value for example copper which looses almost over half of the ores to become viable for productive value; yet it is deeply underlain/ occurs in deep layers such as in Zambia, and DRC (Shaba province). Because a large percentage of the mineral ore becomes waste material, copper mining attracts less investment. In Tanzania the quality of diamonds vary and some are of low grade, hence more uneconomical to mine.
3) ***The great depth of the mineral ores***. Most minerals exist at great depth underground and hence very expensive to exploit. They are subjected to a thick overlying burden (over burden) such as coal, diamonds, ironore and copper. This increases the cost of exploitation since it requires sophisticated technology such as the shaft/underground mining method and involves a lot of risks.
4) ***There are many risks involved in the mining sector***. The mining conditions are not appealing partly attributed to the deep overlying burden which can burry the miners/exploiters, high pollution levels involved (noise and air) which causes deadly diseases. All these scare away workers and investors from tropical mining.
5) ***Most tropical countries export their minerals as crude ores*** and this earns them less than if they had processed ores. As a result the high costs of production are not compensated by high value in terms of exported ores, which weakens and undermines tropical mining especially in tropical Africa. For example copper in democratic republic of Congo (DRC).
6) ***Remoteness of some mineral deposits, referring to the distance from the coast.*** The deposits occur in remote areas such as iron ore and coal in southern Tanzania, copper inland locked Zambia. Therefore the long distance travelled and the absence of viable transport infrastructure has limited mineral production and

trade in tropical countries despite having enormous mineral potential. Also the dense tropical rain forests such as in Congo basin make the development of transport systems more difficult.

7) ***Low level of technology*** used in extracting the mineral resources especially the underground minerals. This is the case with Africa and Latin America. More the small operations make mineral exploitation using modern technology unprofitable and very expensive. Yet even most countries cannot afford purchasing the modern equipment.
8) ***Inadequate capital to invest in the mining sector***. Capital is inadequate for economic exploitation of minerals such as bauxite which needs large amounts of electricity for the final production of aluminium itself (such as in Ghana, guinea and Sierra Leone). Also the delayed exploitation of oil in Lake Albert in Uganda has been mainly due to inadequate capital. The purchase of mining equipment, building smelting/processing plants and associated infrastructure are all expensive.
9) ***Limited skilled labour to work in the mining sector***. Tropical countries do not have many competent engineers, geologists, and other scientists to develop and manage mineral exploitation economically. This is also attributed to the poorly developed training in mineral exploitation and the general education system in tropical countries. This also explains why these countries continue relying on foreign expatriate personnel.
10) ***Price fluctuations on the world market***. The prices of some tropical minerals have fluctuated more in the recent past, leading to uncertain incomes. For example the prices of copper declined more in the 1980s such that even earnings from it reduced tremendously such as for Zambia, and former Zaire causing unfavourable terms of trade, hence limiting further investment in mining.
11) ***Limited market for tropical minerals***. Many other countries that would import tropical minerals have large deposits of their own minerals/Reserves with better mining cost reducing technology for example copper greatly exists in USA, USSR, Canada; yet coal occurs in USSR, USA, china, Germany; which further reduces the market for tropical minerals. Still some tropical minerals have low market value such as lead and zinc.

12) ***Political instability in many tropical countries*** which also limits the success of mining. Countries like DRC, Liberia, Sierra Leone, CAR, Angola, Venezuela, Zambia, Gabon, Nigeria, Venezuela etc have for a long time been locked up in wars and civil strifes which negatively affects the mining activities. The mineral wealth in Angola (e.g. diamonds and uranium, iron ore, copper and manganese) has not brought maximum benefit to the country because rebels have been selling the minerals cheaply to American and European companies in order to get many to buy arms.

13) ***Unfavourable government policy towards the mining sector***. In many countries government efforts are directed to many other sectors and providing social services but limited investment done in the mining sector, after all some countries have less economic potential currently in terms of minerals or their known reserves. Some governments also discourage foreign investors through high taxes and failure to maintain transport and other infrastructure.

14) ***Power and energy problems in many tropical countries***. The exploitation and processing of some minerals requires colossal/large amounts of electricity. However many potential power generation plants have not been established and the existing ones have low voltage; which further undermines the performance of the mining sector in tropical countries.

15) ***Low level of research in the mining sector***. There is inadequate mineral exploration to discover new mineral potentials, partly attributed to inadequate funding and limited expert manpower. Therefore many minerals are not known to exist and thus low level of mineral development.

16) ***Exhaustion of some mineral deposits*** due to high rate of exploitation, and thus many mineral deposits are exhausted or threatening exhaustion. For example some of the Zambian copper deposits are already exhausted. The copper deposits in Kilembe in Uganda are also exhausted. This also discourages many investors in the mining sector.

MINING IN SOUTH AFRICA

South Africa is gifted /blessed with plenty of mineral resources and the country has the most developed mining sector in Africa.

Gold mining

South Africa has the world's largest known reserves of gold. Gold mining takes place on the Rand (Witwatersrand) covering parts of the Orange Free State and Transvaal. The main gold fields of the Rand include Johannesburg, Springs, Krugersdorp, Klerksdorp, Vierfontein, and Odendalsrus.

Diamond mining

South Africa is also a major producer of diamonds. In South Africa diamond has the greatest deposits in **Kimberley** and **Hope town** in the Rand. Other mines include the Premier mine near Pretoria, Bultfontein, Jagersfontein, Koffiefontein, Rustenburg and Bloemfontein.

Most industries connected with diamonds are found in Johannesburg—with most of the diamond cutting factories plus diamond research centre.

Note**: Diamonds are formed beneath the ground by great heat of volcanic activity and occur in rocks called **kimberlite.

Coal mining

South Africa has large reserves of coal and produces about 6% of the world's output. *Coal is also used to generate electricity alongside other sources of power]*. Southern Transvaal is the leading coal producing state in South Africa. Huge deposits occur at Witbank, Vereeniging and Middleburg.

Iron ore mining

The most important African iron ore producer is South Africa and the country has its own iron and steel industry. In South Africa, large deposits occur in Pretoria, Middleburg, Waterburg and northwestern Cape.

Other important minerals in South Africa include platinum (world's leading producer), tin, manganese, chromium, asbestos, copper, nickel, zinc, and limestone.

Factors which have favoured the development of the mining industry in South Africa

1) ***Presence of a wide range of minerals and large deposits***, which encourages investment in the mining sector due to being economically viable. The country has the largest known reserves of gold concentrated in the Witwatersrand. It has large reserves of coal such as in Middleburg and Vereeniging; and it is a major

producer of diamonds such as in Kimberley. These large deposits have attracted government funding and various local and foreign mining companies.

2) ***High quality/value of the minerals*** produced such as gold and diamonds. Gold commands high demand since it is a very precious metal used as international currency and used for decoration. Diamonds are used in industry for cutting and polishing, and making jewellery. The high grade of most of South Africa's deposits attracts many companies /encourages mining investment.
3) ***Presence of labour both skilled and unskilled employed in the mining sector***. Cheap labour to work in the mines is provided by the black local people and migrants from neighboring countries like Lesotho, Namibia, Botswana, Mozambique and Malawi. South Africa pays better wages than other countries. The foreign companies brought in many skilled workers and trained local people to acquire the necessary skills such as geologists who carry out mineral exploration, mining engineers, and supervisors.
4) ***Presence of adequate capital to invest in the mining sector*** provided by the government, foreign and local companies. These are investing in the exploration/ survey, exploitation and processing of minerals such as coal, gold, diamonds and platinum. For example the Anglo-American corporation is engaged in gold mining. This promotes the growth of the mining sector.
5) ***Availability of large quantities of power/energy supply*** such as coal used for smelting and refining gold, platinum, and chromium. There is also hydro electricity generated at Vaal dam and Handrick Verwoed dam on River Orange. Uranium near Johannesburg generates nuclear power. This in turn attracts various mining companies.
6) ***High level of technology used*** partly due to foreign companies. This involves the use of earthmovers, caterpillars, bulldozers, and cranes. Most mines began as open cast mines but of today underground mining is also used by deep-level miners. There is also alluvial /placer mining such as for alluvial diamond deposits. Modern mineral processing technology is used and all this turn increases quality and quantity of mineral production.
7) ***Presence of a large market both internally and internationally***. Gold as an international currency has a ready market especially in industrialized countries in Europe, Asia and North America. South Africa also exports mineral and mineral

products to African countries. Besides the Rand is the major industrial region of South Africa and yet the minerals are concentrated there, hence offering immediate market. This promotes more investment in the mining sector.

8) ***South Africa has the most developed transport system in Africa*** and directly comparable with those in North America and Europe. This includes road and railway network such as the Cape—St. Lucia via Johannesburg and the Pretoria rand –Kimberley Railway lines. These facilitate the movement of mineral ores to processing centres, and minerals and mineral products to the export ports like Cape Town and Durban. This increases mining investment.

9) ***Large water supply, from both underground and surface sources*** such as Vaal and orange rivers; necessary for refining some minerals such as diamonds. The water is also used for domestic use in the labour camps. This also encourages further investment in the mining industry.

10) ***The development of the industrial sector*** such as in Witwatersrand using the minerals as raw materials. For example the iron and steel industries using iron ore as a raw material in Pretoria, Witbank and Vereeniging. Other industries are engineering and electronics. This enhances mineral exploitation and processing due to the available immediate market in the various industries.

11) ***Favourable/supportive government policy towards the mining sector***. Due to apartheid in the past, South Africa was isolated by economic sanctions and this gave the country a chance to develop most sectors of the economy to promote self-reliance including the mining sector. The government has set up the necessary transport infrastructure, creation of markets and economic liberalization, which has allowed many private companies into the mining industry (*since the end of apartheid).*

12) ***Increased research and discovery of more valuable mineral deposits in South Africa***. Research is undertaken by geologists, engineers in areas of mineral exploration, exploitation and processing. This also in turn promotes the quality and quantity of mineral production.

13) ***Political stability of South Africa***. Since the end of apartheid the country has remained stable which has encouraged many local and foreign investors in mineral exploration, extraction and processing as well as encouraging trade in minerals and mineral products since security of investment is assured.

Contribution of mining to the economy of South Africa

1. **Generation of foreign exchange** because South Africa is the world's leading producer of gold, the world's largest exporter of platinum, a major exporter of coal, diamond. All these minerals and mineral products are exported to Europe (UK, Germany, Belgium); North America, South America, Asia, and the rest of Africa. The foreign currency generated helps to import foreign goods not produced locally, and foreign technology.
2. **Promotion of industrial development** such as gold refining and diamond cutting industries in the Rand region. The large deposits of iron ore are responsible for iron and steel industries in Pretoria, Johannesburg, Witbank, and Vereeniging. These industries have led to development of secondary industries (such as electronics, machinery, jewelry) and provide jobs to many people.
3. **Generation of many employment opportunities** to many people at various stages such as mineral extraction, processing, refining, transportation, and exportation. Many people are employed by the gold mining, diamond mining, and coal mining companies. This improves the standards of living of the people such as through building better houses, accessing better education and health services.
4. **Source of power/ energy supply** such as the mining of coal in the Rand has supplied power for domestic and industrial use. Remember that South Africa is the leading producer of coal producer in Africa. This helps to supplement other sources of power like HEP and thermal power, hence contributing to the general development of the country.
5. **Promotion of urbanization/ development of urban centres** especially in the Rand such as Johannesburg, Pretoria, Germiston, springs, Witbank, and Kimberley. As population increases in these urban centres, a number of facilities come up such as banking, insurance, education, hospitals, recreation, entertainment, and research facilities.
6. **The mining sector facilitates capital accumulation** such as gold mining which boosts the GNP of South Africa. Also the strong linkage between mining and industry has increased the export earnings –hence raising valuable capital to invest in various sectors of the economy like industry, sugarcane growing and tourism.

7. **Generation of government revenue** from the taxation of gold, platinum, uranium, iron ore and coal mining companies. The government also taxes the incomes of workers employed in the mining sector and the related industry. The revenue realized is invested in various sectors like fisheries, manufacturing industry, and vine growing.
8. **Promotion of international relationship/cooperation between South Africa and other countries** such as the countries where the mining companies originate, countries importing the minerals and associated industrial products-and they include: UK, USA, Canada, Japan, other Asian countries, South America, and the Rest of Africa. This has increased trade and economic contacts with those countries—hence more capital inflow.
9. **Promoted development of transport infrastructure** for example today South Africa has the most advanced road and railway network in Africa comparable to that of Europe and North America. These routes were initially established to connect mining, processing centres and the export ports such as Cape town-Johannesburg—St.Lucia railway and Pretoria—Kimberley railway. These networks have not only supported the mining sector, but also other activities such as industry, farming, service sector.
10. **Diversification of the economy** due to the development of the mining sector and related industry which supplements on the number of economic activities. It has therefore reduced over dependence on few sectors like agriculture; thereby expanding the economic base and national income.
11. **Facilitation of technological development** and research in the country through the use of modern mining methods—like underground mining, and standardizing of the industrial processing technology to improve the quality of products like chemicals, electronics, jewelry, and diamonds.
12. **Promoted development of other sectors** like agriculture, trade and commerce, tourism—given the linkage with such sectors. For example, the mining sector provides market for the agricultural sector through buying food for the mining workers. This in turn increases the national income.

Negative effects/ short comings

1. **Disfiguring of the landscape/ destruction of the landscape**. The abandoned mines, ditches/ quarries and heaps of soil have created an ugly landscape and large areas of wasteland such as soil heaps from the gold mine near Johannesburg.
2. **Mining leads to pollution of the environment, that is, air, water and noise pollution**. For example coal mining destroys underground water and lakes. In addition, the dust from the various mines pollutes the air hence causing deadly diseases.
3. **Mining accidents** are associated within the sector for example the sinking of soils, patches of soil covering miners, collapsing roofs—leading to loss of life.
4. **Neglect of the agricultural sector** due to the movement of able-bodied people from the rural areas to get better paying jobs in the mining sector. This undermines food production.
5. **Displacement of people** from areas where mineral deposits occur (*especially due to large open cast mining*). Many people lose their areas with less or no compensation.
6. **Emergence of ghost towns** where minerals have been exhausted and this has forced people to move to other areas. Modern planned settlements at high cost have been abandoned such as in Johannesburg.
7. **Urban-related problems** in the mining towns such as slum growth, high crime rate, and poor structures. It is very costly for government to eradicate such problems.
8. **Discovery of minerals increased foreign influence**. Earlier the British and the Boers after discovering minerals displaced the blacks from their land. Today there are more whites in South Africa engaged in the exploitation and trade in minerals.
9. **Profit repatriation by the foreign—owned companies** such as those involved in gold and coal mining. This reduces the rate of re-investment in the economy.
10. **Leads to regional imbalance in development** since the mining zones have experienced more progress in terms of infrastructure than other areas. This in turn has led to rural—urban migration, hence creating more problems in the urban areas.

Problems facing the mining sector in South Africa

1. Shortage of labour to work in the mines and related industries, and this undermines production.
2. Shortage of water needed in processing of minerals especially in the Rand.
3. Price fluctuations of minerals on the world market leading to uncertain incomes.
4. Competition with other mineral producing countries like Ghana, DRC producing gold.
5. Long routes to the coast which increases the transport costs.
6. Labour unrest which often leads to strikes and hence affecting production. This is due to poor working conditions and racial segregation.
7. Accidents occur during mining leading to loss of life such as due to falling rocks.
8. Suffocation due to lack of fresh air and flooding of the mines.
9. High costs of mining due to increasing depth of the mines.
10. Exhaustion of some high grade mineral deposits due to over exploitation.

MINING IN NIGERIA

Nigeria is the largest producer of oil south of the Sahara. Large deposits of petroleum /oil occur under sedimentary rocks of the Niger delta and the neighbouring coastal plains/ off shore in the ocean.

Commercial oil production started in 1956. The first commercial oil well was at Oloibiri west of Port Harcourt and soon after others around Port Harcourt started production. Other oil reserves are found at Ughelli in Bendel state. Refineries exist at Port Harcourt, Warri, and Kaduna.

In Nigeria many companies both domestic and foreign are engaged in the oil industry such as shell—BP, Gulf, Mobil, Texaco, Elf, Nigerian national oil corporation. Most foreign companies originate from Britain, USA, France, Italy, Japan, and Germany.

Apart from oil/ petroleum, Nigeria produces natural gas, a cheap clean industrial fuel (*exploited together with oil*). Other important minerals in Nigeria include Iron ore at Enugu and Itakpe near Lakoja, Coal mined at Lafia and Enugu supplying power, Tin in Baunchi on Jos plateau.

A sketch map showing the distribution of minerals in Nigeria

Factors which have favoured the development of the mining sector in Nigeria

1) ***Presence of large reserves of minerals in the country*** for example large reserves of oil at Oloibiri, Port Harcourt and offshore deposits. Nigeria has got the largest oil reserves south of Sahara, making it economical to exploit the oil and this has encouraged many oil companies to invest in the oil industry.
2) ***Presence of adequate capital to invest in the mining sector*** provided by local and foreign companies such as shell BP, Texaco, Gulf, which were attracted by the large oil reserves in the country. Capital is also raised by the Nigerian national oil corporation. This has enabled the installation of oil derricks to drill the oil and building of oil refineries such as at Port Harcourt; hence expansion of the mining sector.
3) ***Presence of skilled manpower to work in the mining sector***. Nigeria is one of the African countries with high functional literacy levels and has trained many people as engineers, technicians, geologists, and managers. Workers are trained on the job to acquire the skills in oil drilling and processing. The skilled workers are also brought in by the foreign companies from their home countries. This increases the quality and quantity of oil production.
4) ***High level/improved technology employed in mining***. Since 1956 mining and processing has been progressing with advancing technology such as the drilling pipe technology attributed to the mining companies. Previously natural gas was simply lost but today it is extracted as oil is being refined. One method to increase production has been the construction and operation of offshore drilling rigs.
5) ***Presence of a large market, both domestic and foreign***. Nigeria has a big population over 130 million providing a big home market for oil and oil products. Nigeria mainly exports oil to USA, United Kingdom, Italy, France, and the rest of Africa to be used in a number of ways such as making chemical products and in the transport sector. Given the high grade of oil, the country supplies about half of its oil to USA and most of the other half to Europe. This has encouraged investment in Nigerian oil mining.
6) ***Efficient transport system*** since Nigeria is not landlocked and is lucky to have oil reserves at the coast which minimizes the transport costs to export markets. There is also an extensive system of pipelines laid down to transport oil from the fields to oil collecting terminals such as the pipeline from Oloibiri to port Harcourt, pipelines to Escravos terminal, Forcados terminal, Brass terminal, and

Bonny terminal. Port Harcourt handles most of Nigeria's oil exports while other facilities for export are at Bonny and Burutu.

7) ***Large quantities of power*** in form of hydro-electric power at Kainji dam on Niger River, oil and natural gas to support the mining industry such as oil drilling and refining. This promotes efficiency and hence large-scale oil mining.
8) ***The setting up of various processing industries*** such as the completion of the Port Harcourt refinery owned jointly by the Nigerian government and shell BP made it possible to process total output in part. Other oil refineries are at Warri, and Kaduna; to increase the quality of output, instead of exporting crude oil. In turn, this has increased the export earnings from oil mining.
9) ***Positive/ supportive government policy towards the mining sector*** such as the liberal policy since it has allowed many companies to invest in the mining sector. The government has encouraged many companies by granting them tax holidays and protecting them against competition. This in turn expands the mining sector.
10) ***Nigeria is also strategically located reasonably close to the markets*** in Western Europe, USA and South America. This enables easy access to the markets. Nigeria became a member of OPEC (Organization of petroleum exporting countries) in the late 1970s. Easy marketing encourages further investment in the mining sector.
11) Relative political stability.

MINING IN GERMANY

Germany is a country greatly endowed with mineral resources and has the second largest coal reserves in Western Europe after UK and its rapid industrial development was greatly based on the exploitation of coal. Today however other forms of energy are taking over from coal.

The most important /largest coalfield is the Ruhr coalfield which accounts for ¾ of Germany's output and about 90% of its reserves. The coalfield is divided into two; the exposed coalfields to the south in the Ruhr valley and the concealed coalfields in the north in areas of the areas of the Lippe valley and Emscher valley.

The exposed coalfields have the coal bearing rocks on the surface while the concealed coalfields have them buried underground. Open cast methods are used for exposed coal while Shaft or underground methods are used for concealed coal.

Note: The exposed coalfields are getting exhausted and work now is deep in the concealed coal fields which are difficult and expensive.

Other coalfields in Germany include Aachen coalfields (not very important today); and the Saar coalfields near the Germany—French border with good coking coal and easy to mine. There are also lignite coal deposits at cologne and in Bavaria which are mined to provide fuel for thermal electricity generation.

There are **other important minerals** in Germany such as potash, salt, iron ore, phosphates, copper, lead and zinc. [*The presence of certain minerals in large quantities such as potash and salt led to the development of chemical industry, including fertilizers and pharmaceuticals]*.

Factors which favoured the development of coal mining in Germany

1. ***Availability of large mineral deposits/ reserves*** for example the country has the second largest reserves in Western Europe after UK which meant that mining was cost effective. The largest coalfield is the Ruhr region which accounts for about ¾ of Germany's output. Other deposits are the Aachen and Saar coalfields. This has attracted large-scale investment in the coal mining industry.
2. ***Presence of different types of coal*** for example Anthracite coal containing a high percentage of carbon and burning with great heat—making it an important source of energy. Gas coal for domestic and industrial purposes. Coking coal especially valuable for the iron and steel industries and chemical industries. Mining was therefore necessary since the coal acted as a raw material and energy for industrial development.
3. ***Some coal deposits are near the surface and thus easy to mine***. At the beginning mining was concentrated in the exposed coal fields of the south and these could be mined by open cast method especially in the Ruhr valley. Still most of the deposits were in close proximity to one another, allowing convenient use of coal as fuel first to process the iron into steel and manufacture products from steel.
4. ***Presence of other forms of energy*** such as petroleum, natural gas and hydroelectric power has also supported mineral exploitation and processing. In the recent years, nuclear energy and hard coal which burn more cleanly than brown coal are gaining importance.

5. ***Well developed and cheap transport system*** provided by the Rhine River and its tributaries such as Ruhr, Lippe and Emscher. The Rhine water way is linked with a system of canals such as Dortmund Ems and Lippeseite canals, which improves its transportation capacity; to transport coal to industries and markets. The Ruhr region has railway and road networks to transport coal, iron ore and mineral products. This leads to expansion of the mining sector.
6. ***Large sums of capital to invest in coal mining*** which was first provided by the government but later private financiers joined, to provide the necessary capital for mineral exploration, extraction, setting up processing plants and related industries.
7. ***Development in technology in the mining sector*** such as open-cast mining for deposists near the surface. Large machines are used such as shovel wheels which can do a lot of work. There is intensive research in mining technology such as the use of cranes, and excavators to support exploitation. This increases the quality and quantity of mineral production.
8. ***Presence of skilled labour employed in mining*** because a body of skilled labour labour has been developed right from the time of the industrial revolution in mining sector such as geologists specializing in mineral exploration/research, mining engineers, machine operators, managers, and drivers. This has increased efficiency in the mining industry.
9. ***Presence of large market for minerals and mineral products***. Coal is used in the coking of iron, as a catalyst in blast furnaces and as a source of power. Of all the coal produced in the Ruhr , 40% is used there, 30% to other Germany areas and 30% exported to Scandinavia , France , Belgium ,Italy Switzerland and The Netherlands. Germany's potash industry ranks as one of the largest exporters of potash based on fertilizers in the world.
10. ***Political stability of the country*** since the Second World War. Germany has remained a peaceful country providing the necessary conditions for the rehabilitation of the mines that were destroyed during the war in the Ruhr, Saar and cologne areas. Political stability has increased the confidence of investors and hence enabled the establishment and maintenance of mineral processing plants.

11. ***Positive /supportive government policy towards the mining sector*** such as originally investing in the mining sector with powerful industries. Today the government has provided enabling policies and subsidies such that mining continues in the rather uneconomical concealed mines. This has attracted foreign investors from countries like USA and Britain.
12. ***High level of research in the mining sector*** which leads to the discovery of more mineral deposits, improve their quantity and quality. There is also research into mining technology and new uses of the minerals. This in turn expands the mining sector.

Importance of coal mining in Germany

1. **Promotion of industrialization** for example the iron and steel industries which use coal as a source of energy and as an ingredient in the refining process. Iron and steel producing areas include Hamburg, Bremen, Hannover, Wolfsburg, and Brunswick. Chemical industries use coal as a raw material centred at Bochum, Dortmund and Essen. This has increased national income.
2. **Has promoted urbanization in Germany**. Many towns started as mining areas but have grown into great cities such as Dortmund, Duisburg, Essen, and Bochum. The Ruhr conurbation has a number of towns which developed mainly due to the presence of coal which was used as power. Most of the industries of the Ruhr are linked together/ depend on each other. The concentration of population in the Ruhr region has attracted many urban facilities such as banking, insurance, and education facilities.
3. Generation of foreign exchange
4. Generation of many employment opportunities.
5. Promoted development of transport infrastructure.
6. Generation of government revenue.
7. Promotion of international relationships.
8. Diversification of the economy.
9. Modernization of other sectors of the economy.
10. Development of modern technology.

Negatives/ short comings

1. Pollution of the environment.
2. Urban-related problems.
3. The closing of some mines due to exhaustion of coal is leading to the under utilization of infrastructure put in the mining areas. This is especially in areas of exposed coal which is now exhausted like in Essen.
4. The use of open cast methods in the Ruhr, Aachen and Saar mines has led to destruction of the landscape, which has affected the otherwise viable agricultural land.
5. etc

Problems facing the mining sector in Germany

1) Exhaustion of coal in some areas because coal has been mined for many years especially in the exposed fields. These areas have redundant infrastructure.
2) Increasing costs of mining with increasing depth of the mines especially in the concealed coal deposits. It requires experts and a lot of facilities such as construction of shafts, lamps—hence costly.
3) The closing of mines has resulted into unemployment and pre-mature retirement of skilled manpower.
4) Coal is facing stiff competition from other sources of energy especially petroleum/ oil which is a less pollutant and today the Ruhr region receives a large quantity of petroleum moved in by pipeline and ocean-going vessels , which has seriously replaced coal as a major source of power.
5) Competition from other countries whose coal deposits are continuously being discovered and low cost producing countries such as Saudi Arabia, china, USSR, and Australia.
6) Decline in demand for coal in relation to other minerals due to improved technology which requires less inputs and costs. For example in the iron and steel industry the technological progress results into less and less coal demanded.
7) Price fluctuations on the world market.
8) The shared location of some mineral deposits such as coal with France.
9) The uneconomical deposits of some minerals in some areas.
10) Destruction of landscape and mining accidents.
11) Shortage of labour to work in mining activities.

12) Remoteness of some areas of mineral occurrence.

MINING IN USA

USA is endowed/ blessed with a variety of minerals. The most important minerals are iron ore, coal, gold, copper, petroleum/ oil and natural gas. Others are aluminium, lead and zinc, manganese, cobalt, and silver

IRON ORE

Iron ore is mined in four (4) major regions:

- **Lake Superior region**—the most important of which is the Mesabi Range. Other deposits occur in the vermillion Range, Cuyuna, Gogebic, Menominee and Marquette Range.
- **The northeastern region**. Mainly ores are mined in the Adirondacks region of Newyork and the Cornwall area of Pennsylvania. Here they have the advantage of location near the industrial cities of Newyork and Pittsburgh.
- **The southeastern region**. This region is centred at Birmingham –Alabama. It is favourably located near the coalfields of the southern Appalachians and serves the iron and steel industry at Birmingham.
- **The western region**. This includes many scattered fields in western USA in the states of Utah, Nevada, Wyoming, and California. The ores are transported to the steel works at San Francisco, Los Angeles, Puelo, Colorado and Provo, Utah.

COAL MINING IN USA

USA is the world's leading coal producer and it became the leading producer in the 20th century. However, the USSR has the largest coal reserves in the world.

The major coal areas of USA are:

- **The Eastern province**. This is the most productive region and has the greatest reserves. This includes four leading coal states: Pennsylvania, West Virginia, Kentucky and Ohio.

- **The Interior province**. This is the 2nd major producing region and it covers the shores of Lake Huron, Indiana, Illinois, Iowa, Missouri, Kansas, Oklahoma, and Arkansas.
- **The Gulf province**. It is a minor coal region including Texas, Alabama and Arkansas.
- **The Rocky mountain province**. This is America's greatest coal reserve but yet little exploited due to inaccessibility and distance from major markets. The major deposits are located in Utah, Colorado, Wyoming, Montana, and New Mexico.
- **The Pacific province**. This includes small coal deposits close to the pacific coast. The fields include Washington, Oregon, California and Alaska.

Factors which have favoured the success of coal mining in USA

1) **The existence of large coal deposits** spread over the Eastern, Interior, the Gulf, Rocky Mountains and the Pacific provinces. These large deposits have promoted exploitation and processing of coal for now over two (2) centuries. The remaining deposits will last for over several decades to support the industries in USA and the international market.
2) **Presence of high quality coal and of all types** such as anthracite, bituminous coal, lignite (brown) coal and graphite coal. Coking coal is a grade of bituminous coal used in the iron and steel smelting in blast furnaces. Anthracite coal is of the best quality usable for heating, boilers as well as in the manufacture of batteries. About 50% of the world's anthracite coal is found in USA and this has given USA dominance in its supply to countries like Canada, china, Russia, and India.
3) **The country's coal deposits are easy to mine and transport** because the coal is found in horizontal layers and many deposits are found near the surface. The extraction of coal is done at low cost sometimes-using open cast methods. Even in mountainous regions such as Appalachians, the coal seams/ layers are not very deep and thus easy to access and extract.
4) **Strong capital base to invest in mining** provided by rich coal mining companies and private individuals. The corporations which operate in the Eastern and Gulf provinces are some of the richest in the world of coal mining business. More so USA has a high GNP per capita therefore capital mobilized for the purchase of

modern machinery, setting up processing industries, training manpower, and carrying out mining research.

5) **Influence of many large foreign companies** from Britain and Germany due to the liberal economy of the US. These have brought in more capital, high technology and find it easy to market the coal abroad using their international reputation. The companies include the Peagody coal company and Kennecott company from Britain. Such companies have contacts in Europe and Asia which guarantees market for US coal.
6) **Presence of a large market both domestic and abroad**. Within USA the end user sectors for coal include electric utilities, coastal shipping, transcontinental railways and residential facilities. US coal is also exported to Canada, Japan, Italy, Netherlands, France, china and southeast Asia (like Malaysia, Indonesia). The economies of the newly industrialized countries continue to provide a large market for US coal. This promotes investment in the mining sector.
7) **Presence of efficient transport systems in USA** such as the country's highway system which is integrated with the railway system. The railway system is connected to almost all ports enabling easy transportation of machinery, manpower, the coal and coal products. The railway system if further integrated with the Canadian and Mexican railway systems. For purposes of export the US depends on the Atlantic and Pacific Ocean routes, which implies lower transportation costs compared to other coal producing countries.
8) **Availability of skilled/ hilghy trained labour to support coal mining** such as geologists, managers, engineers, marketeers, and accountants. The migrant workers from South America, Asia and Africa are also trained to acquire the needed skills. The coming of the multinational companies has increased the skilled labour and thus high quantity and quality of production.
9) **Advancement in technology** which facilitates easy extraction and processing of the coal. The extraction technology includes open cast methods (for seams near the surface), underground/ shaft mining (for deeper coal seams), and slope mining. The technology further has enabled the Americans to manufacture a wide range of products from coal greater than other nations.
10) **The growth of the industrial sector** also explains the success of coal mining. Previously coal was a major source of power for many industries (such as

chemical, engineering). Today coal is used in the smelting of iron and steel and used to make metallurgical coke used in the blast furnaces. Coal provides a number of raw materials for the chemical industry (such as the making of organic chemicals, plastics, detergents, disinfectants, synthetic fibres, explosives). This attracts more investment in coal mining.

11) **Political stability of the US for a long period** which has attracted foreign investors from Europe and Asia due to guaranteed security of investment. The financial, insurance and securities subsectors have been attracted to the US mining industry for a long time. This has boosted further the stock of capital invested in the coal mining industry.

12) **Availability of large quantities of power** required for Coal mining, processing and the making of coal-related products. This includes hydroelectric power and the leading dams are Hoover dam, Grand Coulee dam, Shasta dam, and the many dams in the Tennessee Valley Authority scheme. These together with thermal facilities produce large quantities of power to run the coalmines and processing factories.

13) **Favourable/ supportive government policy towards coal mining industry** such as creating a stable political and economic environment, encouraging local and foreign investors and financing large hydro electricity projects. There has also been economic liberalization policy aimed at boosting coal mining as well as giving preferential treatment to investors when securing loans.

14) **Intensive/ developed research in the mining sector** done by physicists, chemists, engineers, geologist—to explore the available quantity and quality of coal in a given area and extract it using the most appropriate technology. There is also research aimed at improving the mineral processing technology.

Impact of coal mining on the economy of USA

Positive impact

1. Promotion of industrial development for example iron and steel industry since it is used in smelting. Coal and oil have also led to the growth of chemical industries since they are used as raw materials to make various products like organic chemicals, plastics, detergents, perfumes, disinfectants, insecticides, fungicides, and pharmaceutical drugs.

2. Generation of employment opportunities to the people.
3. Generation of foreign exchange to USA.
4. Diversification of the economy of USA.
5. Mining has promoted the development of transport infrastructure.
6. Promotion of urban development.
7. It has led to further technological advancement.
8. Coal miners have acquired more skills due to constant training.
9. Generation of government revenue.
10. The country's international relations have been strengthened.
11. Promotion of research and scientific studies.

Negative impact

1. Exhaustion of minerals causes dereliction of the landscape.
2. The decline of mining and closure of mines is associated with problems of unemployment and declining industry.
3. Pollution and health hazards.
4. Mining accidents
5. Profits by the foreign owned companies
6. Displacement of people
7. Destruction of natural vegetation
8. Urban—related problems
9. Underdevelopment of some rural areas
10. Displacement of other economic activities like farming and industry and tourism.

Problems facing the mining sector in USA

1) ***Exhaustion of some high-grade minerals in some areas*** because coal has been mined for many years. For example the exhaustion of coking coal/ high grade bituminous coal in the Appalachians. In addition, many old oil fields are being exhausted which has made USA a major importer of oil/ petroleum and hence greatly affected by oil price rises since the 1970s.
2) ***Increasing/high costs of mining with increasing depth*** of the mines especially in the concealed coal deposits. This requires experts and a lot of facilities such as construction of shafts, miners' lamps—hence costly/ very expensive.

3) ***The closure of some mines has resulted into unemployment*** and pre-mature retirement of skilled manpower. It has also resulted into redundant infrastructure and unproductive land in terms of other activities such as agriculture.
4) ***Stiff competition between oil and coal as sources of energy***. Today oil is a major source of industrial power. Oil has largely replaced coal in the boilers and furnaces. For example the presence of major oil fields in the interior has negatively affected coal production and trade, since oil is mined more cheaply and is a more effluent fuel.

   On the other hand, coal is very bulky, which makes it difficult and costly to transport than either liquid petroleum carried by pipelines or tankers or electricity which is simply transmitted by wires and has no bulk at all.

   Note: Oil has also become a raw material in a wide range of chemical industries and in fact dominates the chemical industry. It is used in making synthetic textiles, dyes, solvents, detergents, plastics which have a wide range of industrial and domestic uses. Synthetic rubber is also extracted from oil.
5) ***Competition from other mineral producing countries*** whose deposits are continuously being discovered and which are low cost producing countries such as Saudi Arabia, china, USSR, and Australia which produce oil. Also USSR, china, UK, South Africa which produce coal. This in turn limits the export market of US minerals.
6) ***Remoteness of some areas of mineral occurrence*** for example in the Rocky Mountain region mining of oil is more difficult, more expensive and thus potential oil districts are inaccessible due to rugged terrain. There are high costs of transporting minerals from the interior to the coastal processing centres and export ports. The Alaskan region also has large reserves of oil and natural gas but it is expensive to produce and transport because of the cold tundra climate (the severe winter conditions) make mining difficult throughout the year.
7) ***The shared location of some mineral deposits such as coal and iron ore*** with Canada. For example iron ore mining in the Lake Superior region which at times causes conflicts as regards the control of certain deposits of minerals. This undermines the expansion of mining investment.
8) ***The uneconomical deposits of some minerals*** such as the many scattered fields of iron ore in the states of Utah, Nevada and California. The pacific province has very small deposits of coal only for local significance close to the pacific coast.

North America in general is markedly lacking in tin deposits, has limited deposits of zinc, chromium, and diamonds. This makes it rather uneconomical to exploit such minerals, hence discouraging investors.

9) ***Fluctuation of prices of some minerals on the world market*** such as for coal, oil and copper. For example, copper prices fluctuated more in the 1970s and 1980s which also negatively affected US production by discouraging some potential investors.

10) ***Destruction of the landscape and many mining accidents***. The exhaustion of some deposits has left a derelicted landscape—since mining operators are unwilling to spend money on rehabilitation, which will not give them direct financial return. This leads to waste of agricultural and industrial land; causes ugliness, health and accident hazards. Therefore, there is strong opposition from environmentalists on further expansion of mining.

11) ***Pollution of the environment*** for example by the oil industry through unintentional oil spillage from tankers and pipeline leaks as well as through dumping of oil processing waste. This negatively affects the habitats of birds and aquatic life. This also leads to strong opposition from the Authorities and especially environmentalists.

12) ***Shortage of labour to work in mining activities*** since many are attracted to other better paying and/ or less risky jobs in the country or outside. This limits the productivity of the mining sector.

13) ***Congestion at the ports*** which leads to delays in the exportation of the minerals and thus leading to inefficiency in the mining sector.

Guiding questions

1) To what extent have natural resources influenced the development of the mining sector in either Ruhr region of Germany or Zambia?
   Natural resources to the development of the mining sector

- Large deposits of minerals
- High grade of the minerals
- Relatively flat landscape
- Nearness of some ores to the surface
- Availability of land/ sparse population

- *Aridity of the area—alternative land use
- *Water supply

Other factors

- Cheap labour and skilled labour
- Developed transport system
- Adequate capital
- Etc

2) Account for the development of the mining sector in either Nigeria or USA.
3) Assess the role of the mining industry in the economy of either Zambia or Germany.
4) Examine the problems facing the mining sector in either Zambia/Ghana or USA
5) Using specific examples assess the significance of mineral resources as a basis for industrial development in either a developed or a developing country.
6) To what extent have mineral deposits led to the growth of towns in either republic of South Africa or France?
7) Assess the impact of mining on the environment in USA.
8) With reference to either DRC or Germany, discuss the problems facing the mining industry and suggest possible solutions to the problems.
9) Assess the contribution of the mining industry to the development of either Greatlakes region of North America or the Witwatersrand (Rand) region of the republic of South Africa.

POPULATION IN THE WORLD

Population refers to the number of people living in a given area at a particular time/ over a specific period of time.

The study of population characteristics like growth, density, distribution, and movement is known as demography.

To achieve development, proper national / international planning is seriously based on proper population statistics. The world population today is over 7 billion people.

Population concepts

1. **Population growth**
   Refers to the increase in the number of people in a given country/ region in a given period of time.
   This population growth is affected by:
   - birth rate and death rate
   - age structure
   - migrations
2. **Birth rate**
   Refers to the total number of children born alive per year per 1000 of the total population in a country / region.

$$\text{Birth rate} = \frac{\text{Total number of live births}}{\text{Total population}} \times 1000$$

3. **Death rate**
   Refers to the number of people who die per year per 1000 of the total population.

$$\text{Death rate} = \frac{\text{Number of deaths}}{\text{Total population}} \times 1000$$

4. **Population growth rate**
   Refers to the percentage ratio of the death rate to birth rate per 1000 of the population per year.

Or Refers to the rate at which the population of a country increases over a given period of time usually a year, expressed as a percentage.

$$\text{Population growth rate} = \frac{\text{Birth rate} - \text{Death rate}}{1000} \times 100$$

Examples: Kenya (2.9%), Uganda (3.5%), Somalia (3.0%), Nigeria (2.8%), Sweden (0.16%), USA (0.9%), Switzerland (0.4%).

5. **Fertility rate**

   Refers to the average number of children a woman is capable of producing / bearing throughout her reproductive life (15-49 years).

   High fertility rates of over 6 children per woman are experienced in many parts of Latin America, Africa and South East Asia.

6. **Infant mortality rate**

   Refers to the number of children who die before they are one year old per 1000 of the population in a given year.

$$\text{IMR} = \frac{\text{Number of deaths of children under 1 year}}{\text{Total number of live births}} \times 1000$$

7. **Dependency ratio**

   Refers to the proportion of economically unproductive population (0-14 yrs) and (65+ yrs) to the economically productive population (15-64 yrs).

$$\text{Dependence ratio} = \frac{\text{Children (0-14 yrs) and Elderly (over 65 yrs)}}{\text{Economically productive (15-64 yrs)}}$$

8. **Rapid population growth**

   This is a situation where the rate of population growth is higher than the rate of economic growth to meet the demands of the increasing population.

9. Population census

Refers to the actual counting of the number of people living in the country at a given time.

10. Population pressure

Refers to the human weight exerted on the available resources of an area in a given period of time. It is a situation where the existing resources can no longer sustain the increasing population.

11. Life expectancy

Refers to the average number of years which people live from birth to death.

Or average number of years a new born infant is expected to live (length of life).

Examples: Uganda -52 years, Malawi 43 years, Zimbabwe—40 years, Sweden—80 years, japan—81 years, germany—79 years, Switzerland—81 years, USA—78 years, Canada—80 years.

12. Population density

Refers to the average measure of the total number of people per unit area of land.

$$\text{Population density} = \frac{\text{Total Population}}{\text{Total Land Area}}$$

13. Migration

Refers to the movement of people from one place (origin) to another (destination). Population migration takes a longer span than say population mobility or tourism although they are interrelated. It is also sometimes temporary or permanent, internal or international.

14. Emigration

Refers to the movement of people out of a country. The people involved are called emigrants.

15. Immigrations

Refers to the movement of people into a country. The people involved are called immigrants.

16. Net migration

Refers to the difference between emigration and immigration.

17.Net migration gain

This is where the number of people coming into a country (immigrants) is more than the number of people leaving the country (emigrants).

18.Net migration loss

This is where the number of people leaving the country (emigrants) is more than the number of people coming into the country (immigrants).

Optimum population

Optimum population refers to the population size that provides labour force that is sufficient to combine with the existing co-operant factors of production leading to maximum output per worker/highest income per capita.

It is the population size that is just enough to fully exploit the available resources, resulting into highest aggregate demand and standard of living. Below this population size there is under utilization of resources while above it there is over utilization of resources.

Under population

This refers to the population size that provides insufficient labour force to combine with the existing co-operant factors/resources, resulting into under utilization of resources and low per capita income/low average output.

A situation where a country's population is less than enough required to fully exploit the available resources, leading to low average product and low standards of living. (This is noticed in countries like DRC, Gabon, Sudan, Venezuela, and Australia)

To increase output per capita, there is need to increase the size of the population.

Effects of under population

Positive

1. Resources are not over exploited.
2. There is a high potential for employment opportunities.
3. Reduced government expenditure especially on social services due to limited number of people.
4. The standards of living are easily increased by increasing resource exploitation.
5. Inflationary tendencies due to excess demand do not occur.

6. There are less social costs such as pollution.
7. Political and social instabilities are minimized.

Negative

1. Results into wastage/underutilization of resources such as mineral, forest, water due to the small population. DRC has rich deposits of gold and diamond , extensive tropical rain forests etc all of which remaining underutilized.
2. Results into limited market size for goods and services due to small population. This undermines agricultural and industrial development.
3. Leads to labour shortages due to the small population, hence low level of a development and industrial development.
4. High/increased social over head costs per head. It is very expensive for the government to develop infrastructure and other social facilities.
5. Results into low tax revenue due to the low tax base/ small population. This undermines the development of social and economic facilities.
6. Encourages rural-urban migration leading to under development of rural areas. Many people leave the remote countryside attracted to the few urban areas.
7. Leads to regional imbalance in development due to uneven population distribution. People tend to stay in the most favoured areas and hence infrastructure is also concentrated in those areas.
8. Results into dependence on other countries, in terms of labour supply, market, capital, and the supply of essential goods.

Possible solutions to the problems of under population

1. Providing incentives for large families such as free housing, free education.
2. Encourage people to settle in less populated areas such as by developing the necessary infrastructure.
3. Encourage foreign investors to finance development projects in various regions.
4. Gazette under populated areas into national parks and reserves as an alternative landuse.
5. Etc

Over population

Over population refers to the population size that provides more than sufficient labour force to combine with the existing co-operant factors, leading to low out/income per capita/worker and therefore low standards of living.

A situation where the country's population is more than enough required to fully utilize the available resources, leading to low average product and low standards of living. (This is seen in countries like India, Bangladesh, Indonesia, China, Rwanda, and Burundi)

The output per worker can be increased by reducing the size of the population.

Effects of over population

(Refer to rapid population growth)

Possible solutions to the problems of over population

1. Birth control practices to cut down the rate of population growth.
2. Development of more natural resources such as soils, power, forests to support the bigger numbers of people.
3. Ensure higher foods supplies /yields from the existing farmland such as through agricultural research, farm technology, swamp reclamation , desert irrigation etc
4. Encourage out-migration to relieve population pressure. However today fewer governments are prepared to accept immigrants.
5. Strengthen education to change traditional attitudes to reduce birthrates.
6. Exportation of labour force such as expatriates to other countries (export skilled labour which is unemployed).
7. Addressing poverty so as to improve income and general standards of living. This involves encouraging organizations with anti-poverty programmes.
8. Population control policies / legislations should be undertaken such as one child per family policy, marriage age legislation.
9. Women empowerment programmes should be undertaken such as enhancing their education, political and economic opportunities.

Population structure/ composition

Emphasis is placed on the age and sex structure. The population structure helps to show the effects of migration, age and sex of migrants , impacts of large scale wars, and major disease epidemics.

The population structure of developing countries greatly differs from that of developed countries because developed countries have a high life expectancy and a low rate of natural increase while the opposite is true for developing countries. The best way to describe the population structure is the use of an age –sex graph / population pyramid.

There are mainly/ majorly four (4) charactritic stages:

Stage I

Most developing countries fall in this stage such as Kenya , Malawi , Uganda , Mozambique. This stage is characterized by the following:

- High birth rates due to a large number of people under 15 years of age (having a broad base)
- High death rates due to rapid fall in age-groups upwards
- A short life expectancy since the top is very narrow , implying very people living beyond 65 years.
- High infant mortality rate –evidenced by a rapid fall from the broad base
- Generally females are moe than the males in all age groups

Reasons for the broad base

- Limited use of birth control measures suvh as fmiliy planning devices
- Most cultures encourage polygamy
- Influence of religion such as Catholicism and islam encouraging large families
- Social and cultural attachment to many children such as providing field labour.
- Low levels of education especially among women , making them to prefer large families
- Low desire for savings and investment among most people

Reasons for the narrow apex

- Rampant disease epidemics killing many people
- Poor medical services in many areas such as limited essential drugs, few doctors leading to high mortality
- Famine due to insufficient food supply in many areas
- Low life expectancy due to poor hygiene and malnutrition, with few people living beyond 50 years

Stage II

- This stage has a broad base due to high birth rates
- Relatively straight adged pyramid due to fall in death and increase in life expectancy.
- Due to reduced death rate/ moratality , a large useful population enters the production process to become economically active.
- India is seemingly at this stage , with 39% under 15 years, 3% over 65 years, and thus the remaining majority in the middle working age bracket.

Stage III

This stage is characterized by:

- Declining birth rate, young ones equal to those in the productive age bracket.
- As the death rate is much lower , more people are expected to live at an older age (top is convex shaped)
- Birth rates tend to be equal to death rates, and the population is said to be stagnant.
- Countries like argentina are at this stage and has about % 26 % under 15 years and 8% over 65 years.

Stage IV

Many developed countries are at this stage and the population structure is characterized by:

- Narrow base due to low birth rates i.e a small number in the pre-productive age groups
- Wider top/apex –a large population in the post-productive age groups due to increased life expectancy
- Low infant mortality and low death rates
- Wider productive age bracket (16-64 years)

Causes of the population structure of developed countries

- Increased family planning through the use of contraceptives
- Increased industrialization and mechanization implying limited need for labour
- Increased desire for savings and investment among the people, hence less demand for large families.
- Increased government prohibition of large families through legislation.
- Emancipation of women, enabling them to follow their professional careers rather than being child bearers.

Implications of the population structure in developing countries

Positive

1. Creates a big market potential for industrial and agricultural output, a large percentage of the population is below 60 years.
2. Increases the potential labour force since many people engage in productive activities.
3. Leads to optimal utilization of social and economic infrastructure in the country such as roads, railway, schools, hospitals, due to the rapidly increasing population.
4. Encourages hard work in order to sustain the predominantly dependant population. This implies that many young people become innovative leading to increased enterprise.
5. Leads to increase in tax potential, and thus increase in government revenue. This results from the increasing number of people and taxable activities in the country.
6. The government is awakened to its responsibility of providing necessary infrastructure and other social services. This leads to increased output in the long run.

7. Increases occupational and geographical mobility of the working population caused by the challenges facing them since they have to support a large number of dependants. Labour in turn becomes more productive.
8. Facilitates the utilization of natural resources such as water resources and minerals in order to support the rapidly growing population

Negative

1. Leads to increase in dependence burden on the working population. This is due to a big percentage of dependants and this results into low savings and low investment.
2. Results into a high level of unemployment and under employment. This is due to increased number of people looking for jobs as the population grows rapidly yet the jobs are limited.
3. Leads to external resource dependence such as on foreign man power and other forms of aid. This is because the population is dominated by the semi-skilled and unskilled people.
4. The available infrastructure is overstrained such as roads, schools, hospitals. This results into depreciation of such infrastructure and lowers the quality of service delivery.
5. Results into increase in social costs in form of pollution, congestion especially in the urban areas. This has negative health implications such as diseases.
6. Limits effective government planning to support the population, because of the rapidly increasing number of people against inadequate resources.
7. There is increase in government expenditure on provision of social services such as education, medical services.
8. Leads to high rates of rural-urban migration and its negative implications such as congestion, unemployment. This is because the young and the youth tend to move to urban areas in big numbers.
9. Results into brain drain i.e skilled/professional manpower leaving the country to look for better opportunities in other countries, and this limits domestic production.
10. Leads to low taxable capacity and low tax base resulting into low tax revenue due to small working population.

11. Over exploitation of natural resources such as through over fishing, deforestation to sustain the rapidly increasing population leading to quick depletion.
12. Increases income inequality, since many people cannot access resources to engage in economically productive activity.
13. etC

Implications of the population structure in developed countries

Positive

1. There is a large population of old people who act as a store of wisdom and advice on political , social and economic issues due to a high life expectancy
2. A large working population which facilitates industrial and agricultural development.
3. leads to geographical and occupational mobility of labour due to a high population in the productive age group
4. high spirit of enterprise and innovation due to a high population above 15 years
5. leads to high effective demand for goods and services since a large population is within the working age bracket.
6. Low government expenditure on social services due to a low rate of natural population increase.
7. Reduced dependence ratio and thus increase in savings due a small number of young dependants
8. Increases labour supply for economic development due to a large number in the productive/ working age group.

Negative

1. There is some dependence burden on the working population, due to a large number of ageing people who are unable to work.
2. As the population continues to be ageing , many people get out of the taxable age bracket.
3. Leads to a shift in the consumption patterns, since the old people create demand for different commodities which are not greatly demanded by the young or middle age.
4. Under utilization of social and economic infrastructure such as schools, hospitals.

5. Increase in government expenditure on pensions and health services plus homes of the elderly due to high life expectancy.
6. With small families and better opportunities in urban areas, the young are being attracted to urban areas , hence making rural areas depopulated.

Population pyramid

(Refer to statistics)

GENERAL CAUSES OF RAPID POPULATION GROWTH

Population growth refers to the change/ increase in the number of people in a given period of time. It is a result of natural population growth and net migration.

Rapid population growth is a situation where the rate of population growth is higher than the rate of economic growth to meet the demands of the increasing population.

The causes of rapid population growth include:

1. High fertility rates among women in developing countries, in that, many women produce more children in their child bearing years, yet on the other hand there is a decline in the death rate due to improved healthcare, causing high population growth rate.
2. Low levels of education. The less educated people prefer big families causing high birth rates. In developing countries there is a large number of school drop-outs leading to a long child-bearing period for girls.
3. Strong belief in traditions and culture (that prefer large families)/ social benefits attached to many children. Many people see children as a source of wealth and prestige or insurance in old age—, a source of labour in the field, dowry from girls –hence producing more children.
4. Early marriages in many developing countries. Many people marry before the age of 20 years and therefore a long child bearing period / which increases the incidence of teenage pregnancies causing a high population growth rate.
5. The prevalence of polygamy in many societies. This is also rooted in culture and promotes competition among the women who produce more children to please the husbands –leading to a high population growth rate.

6. Low levels of income/high level of poverty. Most people lack productive economic activities to occupy them and resort to producing many children—causing a high population growth rate. Studies show that the poorest people have low ambitions in life unlike the middle class who have great material aspirations in life and find large families as a burden to their achievement.
7. Low status of women in developing countries. Many women are poor, illiterate and many are full-time house wives lacking viable economic roles outside home, which causes high birth rates.
8. Strong influence/effect of religion. Some religions work against population control measures like family planning using contraceptives. This position is in line with the holly books. Still some religions encourage polygamy.
9. Limited use of family planning methods in developing countries. There is limited access to birth control devices partly due to being relatively expensive / unaffordable, limited sensitization and being urban-based. This explains why the family planning methods are mostly restricted to urban women and thus the high population growth rate.
10. Increasing rate of immigration. This is in form of increased number of refugees from neighboring countries attributed to wars, displacements and famine among other factors. This leads to high population growth rate in the recipient country.

IMPACT OF RAPID POPULATION GROWTH

Population as an asset / positive effects

1. Results into increase in market potential/demand for goods and services. The size of the market increases as the population increases.
2. Increases/ widens the labour force of the country. As the population increases more people enter the productive age bracket to enhance the production process.
3. Increases pressure on government to undertake development programmes. The government is encouraged to provide social and economic infrastructure like roads, schools, and hospitals to cater for the increasing population.
4. Encourages geographical and occupational labour mobility. Increasing population results into a big number of youths who are energetic and willing to

move from one geographical area or occupation to another since they have to support many dependants, hence increased exposure and labour supply.

5. Increase in population stimulates investment/setting up of more production units to cater for the requirements of the population. This in turn increases national income.
6. Promotes hard work among the population in the country. The individuals in the labour force are awakened to work harder in order to provide for the increasing population –hence more innovations and inventions such as through agricultural modernization—intensive farming methods
7. Results into increase in resource utilization especially natural resources such as minerals, water resources, forest resources in order to sustain the increasing population.
8. Reduces the social over head costs per person in the country. It becomes more economically viable/cheaper to provide social services since they are utilized by many
9. Increases the tax potential and thus increasing government revenue for development purposes such as providing health and education services. Due to population increase many people are engaged in productive activities which government taxes.
10. Encourages urbanization / development of towns as population increases. There is population concentration in some areas leading to the setting up of transport networks, medical facilities, banking facilities, recreation centres etc ; hence growth of towns.

Population as a liability/ Negative effects

1. It increases the dependence burden. Increase in population results into increased proportion of unproductive people to the small productive labour force hence straining them. There is increased expenditure on education, food, housing, medical care, clothing etc
2. Rapid population growth limits the rate of investment. As population increases the rate of savings also reduces and this reduces capital accumulation –hence reduced investment.

3. Strains the government budget due to increasing expenditure to cater for the growing population. There is increasing demand for social services such as education , medical care ;as the population is increasing, and this results into dependence on external donations and loans.
4. Increases income inequality/ disparities. Increasing population enlarges the economic gap between the rich and the poor. People with resources become richer while those without become poorer; which causes social, political and economic discontent.
5. Increases unemployment and under employment; because the rate at which the population increases is higher than the rate of job creation/rate of investment. This leads to increased poverty and represents a wastage of human resources.
6. Results into over exploitation of natural resources especially the non-renewable resources like minerals. This leads to quick exhaustion and reduces the potential benefits of the future generations from the resources.
7. Reducing the per capita income. Increasing population reduces the average income per person and hence low standards of living.
8. It increases rural-urban migration of the landless people. Surplus labourforce moves to the urban areas in search for jobs and hence associated problems like increased crime, social unrest among others. This also reduces the importance of agriculture leading to food shortages.
9. Results into inflation due to excessive demand. Increasing population results into shortage of goods and services due to increasing demand causing persistent increase in the general price level. This leads to increase in cost of living.
10. Worsens the balance of payment problems of the country because the internally produced goods and services become insufficient to meet the growing demand. This increases the demand for imports, hence increasing foreign exchange expenditure.
11. Leads to excessive reliance on foreign aid/ assistance in form of food, medical services, grants, loans in order to support the rapidly growing population. This aid comes with many strings attached which increases external dependence.
12. Leads to increase in brain drain since many qualified professionals /highly skilled workers continue leaving the country to look for better opportunities in

other countries. This causes a skilled manpower gap and negatively affects the development process.

13. Rapid population growth increases pressure on land and reduces land productivity. A growing population reduces available land for various activities such as agriculture in rural areas. This leads to land conflicts and land fragmentation. (Or which leads to slow economic growth and unbalanced development). There is also over-use of land for cultivation leading to a decline in its productive value and thus lower yields realized.
14. Facilitates the growth of slums associated with immorality and increased crime rate, low standards of living in form of inadequate and poor housing, poor health facilities, poor hygiene among others. There is robbery, alcoholism, drug abuse in the slum areas due to growing population.
15. Leads to overcrowding which results into easy spread of diseases. There is crowding of social public services such as schools, health centres, piped water among others. This leads to quick depreciation of the service facilities.

Measures to control population growth

1. The government is encouraging education of children especially girls. For example through universal primary education to allow children to spend more years in school to reduce early marriages.
2. Sensitization of the public about the dangers of large families.
3. Promoting the status of women/women emancipation. This is through recognizing their rights including rights to decide on when to produce children, providing them with public obligations/responsibilities.
4. Encouraging the use of contraceptives and other methods of family planning. This is intended to reduce unnecessary pregnancies.
5. Setting/enforcing laws regarding child care and responsibility over children. For example every parent must educate his/her children and provide essentials of life as provided by the constitution—such that parents produce children they are able to look after.
6. Marriage age legislation. The age limit in Uganda is 18 years for both boys and girls which is trying to reduce early marriages (raising the age of consent / fight early marriages).

7. Sex education is being emphasized in schools, though with mixed feelings. This is intended to reduce teenage pregnancies and improve the quality of life among school-going children.
8. Encouraging investment /income—generating activities.
9. Controlling immigration rate using laws and a clearing system

WORLD POPULATION DISTRIBUTION

Population distribution refers to the way people are spread out in a given area on the earth's surface. The world population is unevenly distributed . Asia alone has more people than other continents combined yet it is 1/3 of the world's total area.

Within the continents the population is still unevenly distributed for example in Asia, china alone has a population of more than 1.4 billion accounting for almost ½ of the population on the continent. In Africa and Latin America which are sparsely populated, there are fewer people in areas like Sahara desert and Amazon basin.

The world's population distribution is categorized as follows:

1. **Densely populated areas**
   - Western and central Europe especially Britain, France, Germany
   - East –central North America including the St. Lawrence –Great lakes region and the Atlantic seaboard.
   - Indian sub-continent –India, Pakistan, Bangladesh etc
   - Eastern Asia including china, Japan, Koreas.
   - The Nile valley and the delta region.
2. **Moderately populated areas**
   - South and eastern Europe –including the Mediterranean Europe, Balkan peninsula, southern Scandinavia, alpine Europe and European Asia.
   - Foot hills of mountains, plateaus and grasslands for example the Rockies, Andes, Asia Minor, Mexico, Ethiopian highlands, some tropical and Mediterranean grasslands such as New Zealand.
3. **Sparsely populated areas**
   - Hot deserts like Sahara, Atacama, Kalahari and the Australian desert.

- Cold deserts –Tundra and ice carp regions of Antarctica, Greenland, Siberia, northern Canada.
- High mountain ranges such as Himalayas, high alps
- Hot-wet forests i.e. the dense equatorial jangles of Congo, Amazon among others.

POPULATION DISTRIBUTION IN AFRICA

The population is unevenly distributed and the densely populated areas include the Nile valley, Nile delta, Niger delta, Maghreb of north west Africa, Johannesburg industrial area of south Africa, East and west African coastal regions

The moderately populated regions are Ethiopian highlands, and Margins of the densely populated areas

The sparsely populated areas include Sahara desert areas, Namib and Kalahari desert areas, Hot-wet forests (such as the Congo basin areas, Gabon)

Factors influencing population distribution in Africa

Physical factors

1. Climate. Areas which receive heavy and reliable rainfall ,and hot temperatures favour arable farming/ crop growing hence attracting dense population such as south east Nigeria, Lake Victoria, and Kenya highlands. However, areas which receive low and unreliable rainfall of less than 500mm per annum and very hot temperatures discourage crop farming leading to sparse population such as Kalahari desert areas.
2. Soils. Areas with deep / well-drained fertile soils promote crop growing hence attracting dense population such as the fertile alluvial soils of river valleys and deltas such as South West and South East Nigeria, Nile valley and Nile delta. The volcanic rich soils of the Kenya highlands and Ethiopian highlands also support crop growing and hence attract moderate to dense population.
   However, areas with thin /infertile soils such as Sahara desert areas with sandy soils limit crop growing hence leading to low population density.

3. Altitude. Population decreases with increase in altitude in response to environmental conditions such as reduced atmospheric pressure, low oxygen content, dampness and cold temperatures. This explains why there are very few settlements above 2700m above sea level on the highlands of Africa like Mt. Kilimanjaro. However, areas of low altitude have warm conditions which attract dense settlement such as the coastal regions of West and East Africa.
4. Relief. In the high mountain areas such as Rwenzori, Mt. Cameroon, the rugged relief/ steep slopes limit construction of structures and mechanization of farming leading to low population settlement. However areas of relatively flat relief/ gentle slopes or the foothills of the mountains encourage construction of structures and mechanization of farming hence leading to dense settlement.
5. Vegetation. The dense /thick forest vegetation such as tropical rain forests of the Congo basin and West African coastlands hinder the construction of transport routes/ are not easy to clear, and thus have sparse population. These areas also favour the breeding of mosquitoes that cause malaria. However savanna grasslands of Africa are easy to clear for various activities such as farming and thus have dense settlement.
6. Biotic factors. Areas infested with diseases causing vectors such as tsetse flies—like the Miombo woodlands of Tanzania and the Fulani areas of Nigeria scare away people leading to sparse population settlement. However, areas free from disease causing vectors attract more people to settle and carry out various activities leading to dense settlement.
7. Drainage. Water logged areas/ areas with periodic flooding have low population density due to problems in cultivation and construction. Such as the East coast swamps of Somalia. However well-drained areas encourage growing of various crops and construction leading to dense population such as plateau areas of central Uganda.
    - Presence of water bodies such as rivers, lakes, oases, springs. Desert oases like in the Sahara desert favour some settlement due to provision of water and some little crop farming. Areas with large water bodies such as the Lake Victoria region favour various activities like farming, industry due to provision of water. However, areas without large water bodies such as Kalahari and Sahara desert are sparsely populated due to limited water supply.

Human factors

8. Economic activities such as industry, trade and commerce. Presence of many economic activities such as industrialized centres of Africa provide more employment opportunities to the people and hence attract dense population such as in Johannesburg and Pretoria in south Africa, Lagos and port Harcourt in Nigeria, Cairo and Alexandria in Egypt. However areas with limited economic activities such as mining, industry have less chances of employment, hence have low population density.
9. Level of urbanization. The development of towns/ urban centers attracts a large population such as cape town and springs in south Africa, Mombasa and Nairobi in Kenya, Accra and Port Tema in Ghana, Free town in Sierra Leone, Yaoundé in Cameroon. These urban centres have developed banking facilities, insurance, entertainment, education, port facilities and thus offering more opportunities to the people. However, areas without developed urban centers offer less opportunities to the people and hence are sparsely populated.
10. Level of development of transport routes. Areas with developed transport system such as along main roads, railways, rivers and coastal areas are easily accessible and thus promote economic activities like trade, farming hence attracting dense population as seen in the Mediterranean city of Alexandria and Cairo in Egypt. However, areas which are remote / far from main roads such as the Southern highlands of Tanzania are less accessible / limit economic activities leading to sparse population settlement.
11. Culture. In some parts of Africa where people depend on primitive cultural ways of life such as shifting cultivation and fruit gathering there is sparse population such as parts of the Congo basin. areas where is nomadic pastoralism dominant until today areas, there is sparse population since the system requires large land area for grazing such as the Fulani areas of West Africa and Maasai regions of Southern Kenya and Northern Tanzania. However in areas where there are cultural changes and activities like modern dairy farming, trade and commerce—(like central Uganda, central Kenya) have developed there is a moderate to dense population.
12. Historical factor

(a) Slave trade. There was compulsory transfer of people from some areas in the past. Slave trade depopulated some parts of Africa like the middle belt of West Africa, Southern Tanzania and Northern Zambia. Upto today these areas sparsely populated.

(b) Duration of settlement. Areas of ancient kingdoms / with long history of settlement and with strong kingdoms attract more opportunities upto today such as trade, jobs; and thus densely populated like Nile valley and delta of Egypt, Mombasa on the coast of Kenya , Ibo land and Yoruba land in Nigeria, Buganda in Uganda . While areas of relatively recent settlement or those with weak kingdoms have fewer opportunities for development leading to sparse population.

13. Government policy. Governments deliberately direct people to migrate and settle in certain parts of the country for strategic, economic or social reasons. Government policy of forest conservation (such as national parks, forest reserves) discourages settlement in such areas leading to sparse population. Government policy of resettlement schemes, infrastructural development attract settlement leading to moderate to dense population.
14. Political climate/situation. Areas which are politically stable encourage productive activities such as trade, farming leading to dense population. Examples are Kano region of Nigeria and western DRC. However areas which are insecure / unstable such as Eastern DRC, Southern Sudan and Somalia discourage productive activities like trade leading to sparse population.

Population distribution in Kenya

The population of Kenya is unevenly distributed. Since most of the country is arid or semi-arid, over 70% of the population is concentrated in a belt of about 10% of the total land area *(which has high agricultural potential from the Ugandan border to Nairobi)*

The densely populated areas include: the lake Victoria region (Nyanza , Kericho, Trans-Nzoia,, and Nandi region); Kenya highlands (Kikuyu land, Embu, Nyeri, Kiambu); the coastal plain (stretching from Mombasa to Malindi). The highly populated towns are: Nairobi, Kisumu and Nakuru.

The moderately populated areas include: Mt.Elgon region, Kitale, Nyahururu, Naivasha, higher areas of Machakos, Kwale district, Taita hills and higher areas of central Kitui district.

The lowly populated areas include: parts of the Rift valley, Maasai land, Nyika plateau, North and North Eastern Kenya(Lodwar, wajir, Marsabit, and Moyale).

A sketch map showing population distribution in Kenya

Factors influencing population distribution in Kenya

Physical factors

1. **Climate.** Areas which receive heavy and reliable rainfall which is over 1500 mm per year and hot temperatures favour crop growing hence attracting dense population such as lake Victoria region, and Kenya highlands. However, Areas which receive low and unreliable rainfall of less than 500mm per annum and very hot temperatures discourage crop farming leading to sparse population such as North and North Eastern Kenya.
2. **Soil types/ Edaphic factor**. Areas with fertile soils promote crop growing hence attracting dense population such as the fertile volcanic soils of the Kenya highlands which support coffee, pyrethrum and wheat growing.However areas with infertile soils such as Northern Kenya with sandy, thin and stony soils limit crop growing since they retain very little moisture, hence leading to low population density.
3. **Altitude.** Population decreases with increase in altitude in response to environmental conditions such as reduced atmospheric pressure, low oxygen content, dampness and cold temperatures. This explains why there are very few settlements above 2700m above sea level on the highlands of Africa like Mt. Kenya, Aberdares, and Mt. Elgon. However, areas of low altitude have warm conditions which attract dense settlement such as the coastal regions of Kenya.

4. **Relief.** In the high mountain areas such as Mt. Kenya, the rugged relief/ steep slopes limit construction of structures and mechanization of farming leading to low population settlement. However, areas of relatively flat relief/ gentle slopes or the foothills of the mountains encourage construction of structures and mechanization of farming hence leading to dense settlement.
5. **Vegetation.** The dense forest vegetation such as tropical rain forests of the Eldoret, Kisii, Mt.Kenya and coastal mangrove forests hinder the construction of transport routes/ are not easy to clear, and thus have low population settlement. These areas also favour the breeding of mosquitoes that cause malaria. The desert vegetation also discourages settlement. However savanna grasslands of Kenya are easy to clear for various activities such as farming and thus have dense settlement.
6. **Biotic factors/ pests and diseases**. Areas infested with tsetse flies—like the Lambwe valley in western Kenya scare away people leading to sparse population. The mosquitoes have also limited settlement in areas of hot temperatures and low-lying areas with stagnant water and river valleys. However areas free from disease causing vectors attract more people to settle and carry out various activities leading to dense settlement.
7. **Drainage.** Water logged areas/ areas with periodic flooding have low population density due to problems in cultivation and construction such as the swampy areas. However well-drained areas encourage growing of various crops and construction leading to a moderate to dense population such as plateau areas of Kenya.

   Presence of water bodies such as rivers and lakes. Areas with water bodies such as the Lake Victoria region favour various water-related activities like farming, industry, fishing. Rivers like Tana, Athi, and Turkwel flow through large arid areas and have settlement along them to utilize the rivers for small-scale irrigation and domestic use. Areas without large water bodies such as Northern Kenya are sparsely populated due to limited water supply.

   Human factors
8. **Economic activities such as industry, trade and commerce**. Presence of many economic activities such as industrialized centres provide more employment opportunities to the people and hence attract dense population such as in Nairobi (general engineering, printing, brewing), Mombasa (oil refining, ship building ,

food processing), and Nakuru. However areas with limited economic activities such as northern Kenya have less chances of employment, hence have low population density.

9. **Level of urbanization.** The major urban centers such as Nairobi, Nakuru, Mombasa and Malindi attract a large population to enjoy the urban facilities such as banking facilities, insurance, entertainment, education, port facilities which offer more opportunities to the people. However, areas without developed urban centers such as Northern Kenya offer less opportunities to the people and hence are sparsely populated.
10. **Level of development of transport infrastructure**. Areas with developed transport system such as Nairobi and Nakuru urban areas, along main roads, railways, and coastal areas are easily accessible and thus promote economic activities like trade, farming hence attracting dense population. However, areas which are remote / far from main roads such as the northern interior are less accessible / limit economic activities leading to sparse population settlement.
11. **Culture.** In areas where people depend on primitive cultural activities such as nomadic pastoralism, there is sparse population since the system requires large land area for grazing such as the Turkana areas of north west Kenya and Maasai regions of Southern Kenya. However in areas where there are cultural changes and activities like modern dairy farming, trade and commerce-(like central Kenya) have developed there is a moderate to dense population.

12. **Historical factor**

    (a)Slave trade. There was compulsory transfer of people from some areas in the past. Slave trade depopulated some parts of interior Kenya and Up to today these areas sparsely populated although slave trade ended many years ago.

    (b) Coastal settlement and governance. The British colonial government divided Kenya into 'white lands' and 'African lands'. The African lands became densely populated due to limited land for expanding population (such as the districts of the central province). Also the setting up of irrigation schemes such as Ahero and Mwea attracted settlement.
13. **Government policy.** Government policy of setting and expansion of national parks, and reserves such as Tsavo national park, Nairobi national park, Aberdare national park which are 'no settlement zones' by law has limited settlement.

Government policy of infrastructural development such as roads, piped water, power supply in particular areas of central Kenya attracts settlement leading to moderate to dense population.

14. **Political situation**. Areas which are politically stable such as Nairobi and Nakuru encourage productive activities such as trade, farming leading to dense population. However areas which are insecure / unstable such as northern areas bordering Somalia discourage productive activities like trade, farming leading to sparse population.

15. **Population distribution in Nigeria**

Nigeria is located in West Africa and it is the most populated country in Africa with a population of over 140 million.

The densely populated areas include the southern parts along the coast, urban centres and the extreme north. High population is in the delta states , ibo land and in north Kaduna. Cities which have more than 3 million people are lagos, Benin, Port Harcourt.

The moderately populated areas include: located in the northern part of the country particularly around Sokoto, Kano, and Katsina. Also the margins of the densely populated areas.

The lowly populated areas include the middle belt, desert margins of the north and the forested areas of the south.

A sketch map showing population distribution in Nigeria

Factors influencing population distribution in Nigeria

Physical factors

1. **Climate.** Areas which receive heavy and well distributed rainfall which is over 1500 mm per year and hot temperatures favour crop growing hence attracting dense population such as south east and south west Nigeria where oil palm , cocoa, maize and other crops are grown. However, areas which receive low and unreliable rainfall of less than 500mm per annum and very hot temperatures discourage crop farming leading to sparse population such as the middle belt region of Nigeria.

2. **Soil types/ Edaphic factor**. Areas with fertile soils promote crop growing hence attracting dense population such as the Southeast and South West Nigeria where a wide variety of food and cash crops are grown such as cocoa, rubber, maize. However, areas with infertile soils such as the middle belt with sandy, thin and stony soils limit crop growing since they retain very little moisture, hence leading to sparse population.
3. **Altitude.** Population decreases with increase in altitude in response to environmental conditions such as reduced atmospheric pressure, low oxygen content, dampness and cold temperatures. This explains why there are very few settlements above 2000m above sea level. However areas of low altitude have warm conditions which attract dense settlement such as the coastal regions of Nigeria (delta states).
4. **Relief**. Rugged relief/ steep slopes limit construction of transport routes , housing structures and mechanization of farming such as in the Yoruba highlands bordering Cameroon leading to low population settlement. However relatively flat landscape of South East and South West Nigeria encourage construction of structures and mechanization of farming hence leading to dense settlement.
5. **Vegetation.** The dense forest vegetation such as tropical rain forests and mangrove forests of the South hinder the construction of transport routes/ are not easy to clear, and thus have low population settlement. These areas also favour the breeding of mosquitoes that cause malaria. More so the government has put up restrictions on settlement in such areas by gazeting some of them as reserves. However savanna grasslands are easy to clear for various activities such as farming and thus have dense settlement.
6. **Biotic factors/ pests and diseases**. Areas infested with tsetse flies—like the Fulani areas of Nigeria scare away people leading to sparse population settlement. The mosquitoes have also limited settlement in areas of hot temperatures and low-lying areas with stagnant water and river valleys. However areas free from disease causing vectors attract more people to settle and carry out various activities leading to dense settlement.
7. **Drainage**. Water logged areas/ areas with periodic flooding have low population density due to problems in cultivation and construction such as the mangrove swamps along the coast. However well-drained areas encourage growing of

various crops and construction leading to a moderate to dense population such as South East Nigeria .

Presence of water bodies such as rivers and lakes. Areas with water bodies such as the Niger river and the Atlantic ocean favour various water-related activities like farming, industry, fishing, transport; and thus they have moderate to dense population. Areas without large water bodies such as the middle belt and the northeastern part of Nigeria are sparsely populated due to limited water supply.

Human factors

8. **Economic activities such as industry, trade and commerce**. Presence of many economic activities such as industrialization provide more employment opportunities to the people and hence attract dense population such as port Harcourt with oil refinery, machinery , automobile assembly and food processing, Benin city and Ibadan . However areas with limited economic activities such as the North Eastern region have less chances of employment, hence have low population density.
9. **Level of urbanization/ the growth of major urban centers** such as port Harcourt , Lagos, Ibadan, Abuja (capital) attracts a large population to enjoy the urban facilities such as banking facilities, insurance, entertainment, education, recreation facilities which offer more opportunities to the people. However, areas without developed urban centers such as North Western Nigeria offer less opportunities to the people and hence are sparsely populated.
10. **Level of development of transport infrastructure**. Areas with developed transport system such as Lagos, Ibadan, Enugu, along main roads, railways, and coastal areas are easily accessible and thus promote economic activities like trade, farming , mining hence attracting dense population. However, areas which are remote / far from main roads such as the northern interior are less accessible / limit economic activities leading to sparse population settlement.
11. **Culture.** In areas where people depend on primitive cultural activities such as nomadic pastoralism, there is sparse population since the system requires large land area for grazing such as the Fulani areas of northern Nigeria. Still many moderately settled areas on the margins of the densely settled areas could also support far more people but people have not moved into them due to traditional social attitudes and the need to stay near friends and existing cultural centres.

12.Historical factor

(a) Historical background. Each of the three main centres of population is the chief area of settlement of one of the three main ethnic groups in Nigeria. The ***Ibo are concentrated in the South East, the Yoruba are in the South West, and the Muslim Hausa in the north***. These are the most successful and powerful groups and their populations have grown rapidly than the smaller groups that were for long subjected to wars , slave raiding.

(b)Slave trade. There was compulsory transfer of people from some areas in the past. Slave trade by the more powerful tribes depopulated the middle belt and the western parts of Kwara state of S.W. Nigeria and upto today these areas sparsely populated although slave trade ended many years ago.

13. Government policy. Government policy of setting and expansion of national parks, and reserves which are 'no settlement zones' by law has limited settlement. Government has also encouraged a wider spread settlement by developing transport routes , mineral resources, power supplies and agriculture in the regions which are capable of supporting a larger population.

14.Political situation. Areas which are politically stable such as Kano region and most urban areas (like Lagos, Abuja) encourage productive activities such as trade, farming leading to dense population. However, areas which are insecure / unstable due to religious and ethnic groups discourage productive activities like trade, farming leading to sparse population.

Population distribution in china

China is located in Asia and is the most populated country in the world with over 1.4 billion people. About 1/5 of the world's population live in china. About 26% of the population lives in the urban areas and 74% live in rural areas.

The most densely populated areas include the north china plain, Yangtze basin (Chiang Jiang basin), the Sichuan basin and Xi-Jiang (Si-Kiang) basin. The densely populated states are in the East including Shanghai, Zhejiang, Jilin, Hunan, and Duardong. The highly populated towns are shanghai, Beijing, Tianjin, Shenyang, Hongkong, Guangzhou, Wuhan etc

The moderately populated areas are found on the margins/ fringes of the densely populated regions.

The sparsely populated regions are in the interior provinces of the west such as Xin Jiang (sin kiang), Gansu, Qinghai (Tsinghai), Tibet, Inner Mongolia. The population density is generally less than 10 people per km^2.

Generally over 90% of the population occupies the land in the East while the remaining 10% occupy the Western states.

A sketch map of china showing population distribution

Factors influencing population distribution in china

Physical factors

1. **Climate.** Areas which receive heavy and well distributed rainfall which is over 1500 mm per year and hot temperatures(average 24^0c) and this favours crop growing hence attracting dense population such as tropical south china , sub-tropical east-central china and temperate north east where crops like rice (most important), wheat, maize and tea are grown. However, areas which receive low and unreliable rainfall of less than 500mm per annum and very cold temperatures discourage crop farming leading to sparse population such as most western states. The Gobi desert ranks as one of the coldest deserts in the world and this discourages population settlement.
2. **Soil types influencing farming**. Areas with fertile alluvial soils promote crop growing hence attracting dense population such as river valleys and coastal areas (Yangtze valley, Sin Kiang delta) where a wide variety of food and cash crops are grown such as rice, maize, soybean, cotton, and tea. However areas with infertile soils/ dry , rocky and sandy soils of western china limit crop growing since they retain very little moisture, hence leading to sparse population.
3. **Altitude.** Population decreases with increase in altitude in response to environmental conditions such as reduced atmospheric pressure, low oxygen content, dampness and cold temperatures. This explains why there are very few settlements in upper slopes of the Himalayas in the west. However areas of low altitude have warm conditions which attract dense settlement such as the coastal regions of Eastern China.
4. **Relief**. Rugged relief/ steep slopes limit construction of transport routes, housing structures and mechanization of farming such as in western china characterized by the Tibet ranges and Himalayas leading to low population settlement.

However relatively flat landscape of encourage construction of structures and mechanization of farming hence leading to dense settlement especially the plateaus, plains and basins of Eastern China.

5. **Drainage**. Water logged areas/ areas with periodic flooding have low population density due to problems in cultivation and construction such as the swamps along the coast. However well-drained areas encourage growing of various crops and construction leading to a moderate to dense population such as the plateaus and plains of Eastern China like North China plain and Sichuan.

   Presence of water bodies such as rivers and lakes. Areas with large water bodies such as Yangtze river, Huang He river, the Yellow sea and East China sea favour various water-related activities like farming, industry, fishing, transport; and thus they have a dense population. Areas without large water bodies are sparsely populated due to limited water supply especially in western china.
6. **Natural calamities /hazards**. Areas which are prone to natural calamities discourage population settlement such as the highland areas of the west (e.g Gansu) which are at times affected by landslides that destroy property and lead to loss of life. Also some valley areas of Yangtze and Huang He rivers are prone to flooding that destroys crops , life and other property. However areas which are safer like the gentle slopes attract dense settlement like large areas of Shanghai and Beijing.

   Human factors
7. **Presence of economic activities for employment such as mining and industry**. The states industrialized states of china like shanghai, Beijing, and Manchuria provide more employment opportunities to the people as industrial workers and into other associated activities and hence attract dense population. Beijing industries include iron and steel, motor vehicle, machinery, petro-chemical etc However areas with limited economic activities such as the western states of Qinghai and Inner Mongolia have less chances of employment, hence have low population density.
8. **Level of urbanization/ the growth of major urban centers** such as shanghai (china's largest port and industrial centre), Beijing (capital), Tianjin, Shenyang, Guangzhou, and Tongtu attracts a large population to enjoy the urban facilities such as banking facilities, insurance, entertainment, education, recreation facilities which offer more opportunities to the people. However, the western

areas without developed urban centers such offer less opportunities to the people and hence are sparsely populated.

9. **Level of development of transport infrastructure**. Areas with developed transport system such as Guangzhou-Beijing-Shanghai, along main roads, railways, and coastal areas are easily accessible and thus promote economic activities like mining, industry, trade, farming, tourism hence attracting dense population. The region also has developed canals such as the Grand canal—which is the world's longest artificial waterway. However, areas which are remote / far from main roads such as the western provinces of Gansu, Tibet and Inner Mongolia are less accessible / limit economic activities leading to sparse population.
10. **Historical factor.** The development of the early dynasties such as Qing dynasty of Manchus *(1644-1912)* in East China which organized china into a large society with developed social and economic and political organization created a high population in the east and central china. However western china lacked such organized dynasties explaining the sparse population there.
11. **Cultural factor.** The physical conditions of the west have limited intensive crop growing and the best form of land use is some form of nomadic herding practiced by the Tibetans, Kazaks, Mongols and Kirgiz who stay in the area, rearing goats, sheep, horses and camels etc. this partly explains the sparse population in such areas.

    Ethnic differences. Most Chinese are very reluctant to move to the western territories (which are not 'china proper'). The people of china proper are the true Chinese (especially the Han race) while the outer territories are populated by the smaller ethnic groups such as the Mongols , Zhuang , Miao, Yi among others.
12. **Government policy**. Government has influenced population distribution by developing transport routes, encouraging investors, importation of advanced technology, creating special investment zones, development of the required transport routes and power supplies in Eastern China. However, a large western part of china has received less government attention and hence less opportunities which explains the sparse population.
13. **Political situation**. Areas which have been politically stable for a long period and most urban areas encourage productive activities such as trade, farming leading to dense population since the security of property and life is assured.

However, areas which have some unrest discourage productive activities like trade, farming leading to sparse population such as the north western areas bordering Mongolia and Kazakhstan.

POPULATION MIGRATIONS

(*There is no agreed definition of migration*). However generally **migration** refers to the movement of people from one place (origin) to another (destination). Population migration takes a longer span than population mobility or tourism although they are interrelated. Migration may be short term, long term or seasonally.

The movement of people is called **migration** and the people involved are called **migrants**. Migrations can either be **voluntary or forced/ compulsory migrations**. Generally, the voluntary migrations are associated with the search for better economic opportunities / conditions existing in other regions. People move willingly and it mainly occurs due to economic push and pull factors while compulsory migration may be legislation by government, slave trade or even wars etc

Population migrations affect growth by either decreasing population of the source area (origin) or increasing the population of the receiving area.

Classification of migrations

The meaning of migration is best understood based on the different types / forms of migration. Migration involves changing location and involves some degree of permanence. The classification id based on three (3) aspects namely; distance, time, and origin.

According to time

1. **Permanent migrations**. This involves the movement of people who leave their homes having no intentions of returning home. Permanent migrations should be the movement from one place to another place which lasts for at least more than one year.
2. **Temporary migrations.** This involves movement of people who leave their homes for a short period of time.

According to distance

1. **Internal migrations**. This involves movement of people from one part of the country to another part of the same country without crossing international borders. People who move out of an area are called ***out-migrants*** where as those people who move into an area are called ***in-migrants***.

Internal migration is further subdivided into the following forms:

(a) Rural-urban migration
(b) Urban-rural migration
(c) Rural-rural migration
(d) Urban-urban migration
(e) Intra-rural and intra-urban migration

Rural-urban migration is the most common type of migration in the developing countries. It refers to the movement of people away from the countryside to towns or cities. Over the last 50 years in Africa and South America a large proportion of people, especially the young move from rural areas to urban areas. This is mainly a result of economic pull and push factors. This stems from the unequal distribution of facilities between the rural areas and the urban areas. Rural-urban migration tends to lead to rural under development because the young ones move leaving only the aged and children; but also causing urban problems (resulting from urbanization).

Urban-rural migration

This is not very common in the developing world and takes place on small scale. People migrate from towns to the countryside and in the developed world, it takes place as a result of overcrowding, pollution etc in towns. People probably move outside the towns to enjoy bigger space where they can have bigger compounds and clean environment.

Rural-rural migration is the migration from one rural area to another. It mainly occurs when they have anticipated opportunities in the new location. It is a result of push-pull factors where there is population pressure on land such as people in Kigezi migrating to other areas.

Urban-urban migration is the movement of people from one town to another mainly because people are seeking for better opportunities in business, social and economic facilities. It has got to do with perceived opportunities.

Stepwise migration is the movement of people in stages i.e. step by step. For example in 1950s people in kabala were advised to move to other areas for enough land such as Kabale-Rukungiri-Bushenyi etc

2. **International migrations/ external migrations**. This involves the migration from one country to another .i.e. crossing international borders/ boundaries. This type of migration is today facing a lot of restrictions via controlled permission in form of visa.

International migration has two major forms:

(a) Emigrations
(b) Immigrations

Emigration refers to the movement of people out of a country. The people involved are called emigrants.

While

Immigrations refers to the movement of people into a country. The people involved are called immigrants.

The difference between emigration and immigration is called net migration. Depending on the source or destination the main source of emigration and immigration is the search for better employment opportunities.

Factors that influence population migrations

The factors for migration can be grouped as pull factors and push factors. The factors are usually categorized as political, social, economic and ecological factors.

Pull factors are the favourable factors which attract people to migrate to an area such as better social services or these are the advantages /opportunities at a destination that attract to that area.

Push factors are the unfavourable factors which force people out of a given area and therefore migrate to other areas such as high level of unemployment, poor infrastructures or these are the disadvantages at the source area that make people to move to other areas.

1. Political factors

- Difference in political belief/ party. People are sometimes forced to migrate because of being threatened since they belong to a particular party /system or political thinking.
- Political insecurity in some areas / war or civil strife which make people vacate the insecure areas such as people in Rwanda during the 1994 genocide , people in DRC due to rebel activities , people in southern Sudan during the struggle for power in 2013-2014, northern Uganda due to Kony rebel activities, etc. such people migrate as refugees or internally displaced people.
- The attaining of independence in some countries, which caused many migrations such as in India 1947 and people were forced to move especially non-Moslems to Pakistan. The same applied to many African countries on attaining independence—when many whites went back to Europe in the mid-20th century.
- Shift in ideology (capitalism versus socialism). For example, Germany after the Second World War, East Germany became a socialist state while West Germany remained capitalistic in ideology. Thus, people who were capitalistic in ideology migrated from east to West Germany and vice versa.
- The effect of slave trade. During slave trade era people were forced to migrate i.e. were captured and carried away against their will. Slave trade affected especially African countries such as west Africa, Rhodesia (Zimbabwe) , east Africa etc. Today people may be abducted, kidnapped, and taken to other areas or countries to work as 'slaves'.
- Government schemes lead to forced migration of people such as settlement schemes, gazetting of national parks and wildlife reserves to displace people. Many people are displaced from the gazetted areas by law and they are taken to resettlement schemes prepared by the government or forced to go elsewhere.

2. Economic factors
   - Economic factors are often taken as the major reasons for migration, with the search for employment being the major reason for this type of motive. Labour migration is selective in nature and may be long or short term. The major destinations of labour migrants since 1945 are Western Europe and the Gulf

States. Most migrants come from the Mediterranean countries and the ex-colonial territories among others.

- Search for employment opportunities. South Africa is known for its reliance on migrant labour for the exploitation of its natural resources such as mineral resources. These migrants come from Britain, USA and Japan. Many workers also migrate from the neighbouring countries such as Lesotho, Swaziland, Botswana, Mozambique, and Namibia.
- Shortage of land. Land in some rural areas is in short supply. The rural community heavily depends on land for production of food for home consumption and for sale. However, the available land in many areas is inadequate to produce sufficient food for the population. This causes migration to buy land from other areas and increase food supply.
- The declining productivity of land in some areas which makes people to migrate to other more productive zones agriculturally. Use of soils in some areas for long leads to exhaustion and forces farmers to look for fertile lands elsewhere.
- Uneven distribution of economic opportunities between areas especially industrial concentration in the urban areas, meaning that meaningful employment is mainly found in urban areas. Hence, the major cause of migration is the search for employment which is better paid, in a bid to improve the standards of living.

3. Social factors
    - Social pressures also force people to migrate such as evidenced by refugees (according to the UNHCR-United Nations High Commission for Refugees). These are related to social oppression, political control, housing, health and education facilities. Today the greatest concentration of refugees are in the developing countries.
    - The presence of better social services in some areas like medical facilities, schools of better standards. For example, much of the quality education can be attained in the urban areas where most of the cities always want to stay. Other social facilities include health facilities, recreation facilities, entertainment facilities which generally missing in the rural areas.

- Cultural practices also force many people to run away from the rural areas such as rituals, compulsory circumcision by some societies. They migrate and take advantage of the urban areas. There are also social obligations of marriage especially in the rural areas which may not fit in people's priorities in life.
- Population pressure in some areas causes migrations to other areas which are less populated. For example some parts of Kigezi, Kabale are highly populated, leading to shortage of land and land fragmentation. This limits settlement and cultivation land, forcing many people to migrate other areas.
- Religious factors especially religious discrimination in particular areas. For example in Northern Nigeria, the Muslims discriminate against Christians, in Sudan the Muslims also do not want to stay in the same areas with Christians. Many times, there is conflict/ fighting between the different religious groups and this forces many people to migrate to other safer areas.
- Racial discrimination is also common in particular areas, resulting into social conflicts and at times loss of life. This forces some people to migrate to other accommodative areas.
- Migration for leisure such as pilgrimages—journeys to certain places under religious devotion. For example, pilgrimage to Mecca and Madina by Muslims. Many people do not come back to their home countries, but find new places in other areas. In addition, tourism involves traveling of people abroad for holidays, which may be short term or long term. However many tourists end up becoming migrants.
- Love for adventure and prestige
- The desire for change and a better life

4. Ecological factors/ environmental factors
   - Many people move because of environmental pressures such as drought, desertification, floods, landslides, volcanic eruptions, pests and diseases, earthquakes.
   - For example, many people move to areas which receive heavy and reliable rainfall, which ensures increased food production for consumption and for sale. They migrate away from areas which experience frequent drought or desertification.

- Landslides and earthquakes lead to great loss of life and property. Therefore, many people move away from vulnerable areas to safer zones.
- Many people move away from areas infested by pests and diseases such as tsetse flies, and epidemics outbreak. For example, the outbreak of Ebola in the West African countries in 2014 forced many people to migrate.
- Fertile soils induce people to migrate and settle in such areas especially near river valleys with alluvial soils yet the infertile soils in the semi-arid areas push people to migrate away.
- Drainage. Most people migrate and settle near water bodies especially coastal areas to access water supply, water transport and other advantages.

5. Behavioural factors
   - Migration also has a basis on individual perception. This explains why certain categories of people choose to migrate to new areas while other people facing the same pressures do not migrate.
   - Minor issues like criminal tendencies—where criminals run away from their regions to go to other areas where their life may be a bit safe. Also misunderstandings such as between family members, law and order maintenance by authorities, AIDS scourge especially if patients are stigmatized.

CONSEQUENCES / IMPACT OF MIGRATIONS

A. The impact of migration on the source areas

- The migrants remit money to their home country and this increases the national income of the respective country. In addition they also remit money/ property to their relatives which improves the standards of living.
- Decline in labour supply because the able-bodied men move to the urban areas or other countries and this reduces economic prosperity in the place of origin such as retarded agricultural production since only the old and very young children remain in the rural areas.
- Accelerates poverty and insecurity especially in the countryside since the able bodied men are moving to urbanities.

- Results into social disintegration of cultural settings. This is because the indigenous people adopt the values of the migrants such in Africa many people have taken on norms and values of Arabs, British, and Indians.
- Permanent migration reduces the total population and slows down the population growth rate in the source area. This relieves the problem of unemployment in the formerly over crowded areas. It also relieves pressure on land in the origin / source areas.
- Creates imbalance in the age-sex structure in the source area. This is because the migrants are usually young adults and mainly the male sex, leaving majorly the old folk and females.

B. Impact of migration on the receiving areas/ destinations

- Causes strain on the existing services and facilities in the receiving areas especially urban areas which may have been meant for a smaller community. For example road network are congested, education facilities are over strained. Many times there is less expansion of the facilities.
- Permanent and temporary migration increases the population of the receiving areas. This leads to rapid urbanization with associated problems such as unemployment, prostitution, high crime rate, and political strife. The growth of slums characterized by congestion, poor sanitation, poor housing , stagnant water etc
- External migration brings together people of different origins, races, language, and religion. This integrates them into a new dynamic society; but may also lead to plural societies associated with continuous underground conflicts which eventually may become violent.
- Migration leads to easy spread of diseases in the destination areas such as Ebola, SARS, Cholera, AIDS scourge, airborne diseases due to mixing of people from
- Population migration also changes the age-sex structure of the destination areas. The number of young adults is raised and men may outnumber the women. This affects the birth rate and increases the incidence of prostitution and rape cases.

- Migrants often face prejudice and even violence in the destination area. This in the longrun sparks off return migrations back to the areas of origin or migration to other areas to seek a better life.
- Loss of social morals and cultural values due to mixing up of different groups of people.

Positives

- Adventure through tourism and movement to ne areas by the migrants.
- There is increased industrial growth due to the increase in the market size in the destination area and availability of land for expansion in the source area.
- Increase in labour supply and expansion of the tax base in the destination area.
- Increases human relations both economic and social influence. Leads to the spread of new ideas.
- Restrains people from the vulnerable / risky areas such as war-torn areas, landslide areas, dry areas.
- Migrants acquire improved standards of living and chances of employment.
- Eradicates violence when the misunderstanding people separate to different areas/ locations.
- Migrations also avail government with land for national parks, wildlife reserves, and other projects.
- Improvement in infrastructure in the destination area.
- Reduces pressure on land in the rural areas
- Environmental protection as forests and bushes grow freely with less disturbance.
- Land consolidation is encouraged in the source areas which favours extensive farming.

Negatives

- It is a source of brain drain and repatriation of resources.
- Shortage of land in the destination areas such as urban areas leading to conflicts and death.
- Resettlement problems on part of government.

- Refugee problems. Refugees are people who are forced to leave their homes due to several reasons such as wars, drought, floods and political persecution. Therefore refugees usually leave their homes in a desperate condition. In Africa many refugees in Somalia, Ethiopia, south Sudan, DRC, where people have been displaced by wars. This strains the economy of the receiving country as well as misery on the refugees themselves.
- Regional imbalances in development
- Increase in government expenditure in the urban areas
- Environmental degradation
- Etc

Case study: Africa

Arabs and Semites entered North Africa in great numbers in the 7th and 8th centuries. Such people spread their religion, language and culture as well as intermarriage with the Berbers. About ¼ of Africa's population is of Arab blood.

From the 16th century, many Europeans entered Africa from all directions starting with the Dutch at cape region of South Africa. Today Africa has about 4 million whites. The 19th century so the French occupation of Algeria, Tunisia, and Morocco. The major initial reasons were colonialism and the exploitation of minerals. Lastly the Asians also came to east and South Africa initially working on sugar plantations in natal and the East African railways.

In general, migration inn Africa can be analyzed in terms of pre-colonial era, colonial era and post-colonial eras. At the beginning of the 16th slave trade started to depopulate Africa. Many African slaves were shipped /moved to America, the Middle East and India. West Africa was the most affected by slave trade since it lost about 20 million people. Still many examples of internal migrations can be cited in Africa –with more emphasis on rural-urban migration.

Guiding questions:

1. Discuss the advantages and disadvantages of population migrations in Africa.
2. Using specific examples from Africa, explain the economic and environmental effects of migration.
3. Discuss the push and pull factors responsible for population migrations in sub-Saharan Africa

4. Discuss the causes and effects of rural urban migration in either DRC or India.
5. Examine the impact of migrations on the source areas and destination areas using specific examples in Africa
6. Assess the causes and effects of international migrations in tropical Africa.

FISHING IN THE WORLD

The term fishing refers to the extraction of aquatic animals from the seas/ oceans and inland water bodies. The aquatic animals include fish, whales, seals, pearls, crabs, shrimps etc. Fishing is one the oldest occupations of man.

Due to advancements in technology and increased demand for proteins, fishing is increasingly becoming an important occupation.

A well-developed fishing industry can provide cheap proteins and essential minerals (like calcium, iodine, phosphorus), fish liver oils; employment , industrial development (e.g. making animal feeds, glue, soap, margarine, paints, ink, medicine, perfumes and cosmetics). Today there is protection of international waters

to check on the impact of the fishing industry, in order to ensure sustainable exploitation of aquatic life.

Distribution of Major fishing grounds in the world

The world's major fishing grounds (fisheries) are located in the cool waters of the northern hemisphere, although there is also fishing in the southern hemisphere. The fishing grounds include:

1. North West Pacific fishing grounds
2. North East Pacific fishing grounds
3. North West Atlantic fishing grounds
4. North East Atlantic fishing grounds

Other important fishing grounds are:

a) The Caribbean region
b) The Peruvian-Chilean coastlines
c) Maghreb region (North West Africa)
d) South African coast upto Angola

World fish types

1. **Salt –water fish**
   These spend their entire lives in oceans and seas, and they are categorized as:

   (a)Pelagic fish

   Fish stay at or near the water surface of seas/ oceans. Examples are herrings, mackerel, sardines, pilchards, brisling, anchovies/anchoveta, menhaden, tuna, swordfish, marlin, mahi-mahi, shell fish

   (b) Demersal fish

   This lives at the bottom of the seas/ oceans or in deep waters. Fish species include cod, haddock, halibut, hake, plaice, Pollock, flounders, sole, cusk, and Rose fish.

2. **Fresh water fish**

This is found in inland streams, rivers and lakes. Also in ponds, paddy fields etc the fish species include: Sturgeon, Carp, Roach, Tilapia Nilotica, Nile pearch etc

3. **Anadromous fish**

These stay in both salt and fresh waters. The best example is salmon *(which is extensively fished in North America, particularly from Alaska to Oregon on the pacific coast)*. The young salmon live in the sea but after 2 to 5 years, they return to stream where they were born to lay their own eggs or die. (They move in large shoals and find their original breeding / spawning ground. Their migration routes and spawning ground. Their migration routes and spawning grounds are readily spotted and they are easily caught by traps or nets).

Modern/commercial fishing methods

1. **Gill netting (drifting)**

This is a method used to catch pelagic fish. A net is suspended in water with floats at the top and weights at the bottom. The net hangs vertically in water and the fish are caught by their gills as they try to pass through the net. Once trapped they can move neither forward or backward. When the fish has been caught the net is removed onto the drifter/ ship for processing.

2. **Purse seining**

This method is also used to catch pelagic fish living near the water surface. A purse seine net is laid out in a circular form below the water to trap a shoal of fish. The fish shoals are located using an eco-sounder. At the bottom of the net a ring exists through which a rope attached to a small boat passes. The small boat is used to lay the net, which net is suspended by floats at the top and weights at the bottom. The net has a close mesh where fish are caught by gills.

After the circle has been made, the rope is pulled to close the bottom of the net thereby engulfing/ trapping the fish. The net is lifted onto the boat/ seiner.

3. **Long lining**

This method is used to catch demersal fish found in deep water. It involves the use of a long main line with attached drop lines which have hooks with baits. The main line / main rope can stretch for several kilometers with about 200 drop lines. The fish are caught as they try to eat the baits. When enough fish has been caught, the line is pulled out of water onto the ship and fish removed for processing.

4. **Trawling**

This method is used to catch demersal fish living in deep waters. A cone-shaped net is dragged behind a ship/ boat called a trawler. A trawl net is a bag-shaped net whose mouth is kept open by otter boards (either wooden or metal) and has weights at the bottom and a slim cod end. Any fish that enters the net is trapped at the cod end and after the trawl net is pulled out of water and emptied onto the ship for processing. The process is repeated.

Other methods include whaling and sealing. Whaling involves catching of whales. They are located by spotter planes or an eco-sounder and catcher boats with explosives are later used for killing the whales and floated in ships to the processing factories. Sealing involves catching of amphibians called seals that live both in marine and inland water. Seal herds are chased from the sea/ ocean where they are easily killed using game guns and later processed

The above modern methods are more advantageous than traditional methods which are common in developing countries. The traditional methods include basket method, spear method, hooking, bows and arrows, beach seining, fish poisoning etc in still some countries electricity is used *(fish paralyzed by electric shocks but this is dangerous).*

NORTH WEST PACIFIC FISHING GROUNDS

The North West Pacific fishing ground is the area from the Bering Sea to the East China Sea and it is the world's greatest fishing region. Japan is the greatest contributor to the total annual fish yields in the North West Pacific fishing grounds. The rest is shared by china, North and South Korea, and the eastern former soviet republics.

Within the enclosed sea –the Sea of Okhotsk, Sea of Japan, yellow sea, East China Sea are intensive for both inshore and deep sea fishing.

FISHING IN JAPAN

In the north pacific, Japan has an outstanding fishing industry and today it is the world's leading fishing nation in all activities of fishing. Japan accounts for about 15%of the world's output. Japan exports majorly fish products in addition to industrial items. The major fish species are: sardines, herrings, mackerel, salmon, yellow tail, cuttlefish, tuna, shell fish, cod, bonito, crab, shrimp, Pollock etc. in addition whales and pearls are caught.

Almost 3 million *(a large number of)* Japanese are directly dependent upon fishing for a living. Every Japanese village fronting the sea is engaged in fishing. There is coastal fishing by small boats, offshore fishing by medium-sized boats, and deep-sea fishing by large vessels.

Factors that have favoured the development of fishing in Japan

Physical factors

1. ***Presence of a broad continental shelf with shallow waters*** especially off northern Kyushu and southwest Honshu and this allows sunlight to easily reach the seabed providing ideal conditions for the growth of planktons which fish feed on, hence survival of large populations of fish. Besides the concentration of planktons along the coast attracts pelagic fish like mackerel and sardines to be easily caught. This in turn leads to large quantities of fish caught.
2. ***The meeting of the warm Kuroshio (Kuro siwo) and the cold Oyashio (Oya siwo) currents*** which also creates ideal conditions for plankton growth and as a result pelagic and demersal fish is abundant in the area. The Japanese islands are located in the zone of convergence /mixing between the two great water masses. The large fish stocks lead to increased quantities of fish caught.
   The warm Kuroshio Current also provides warm conditions which prevent the freezing of water, thereby allowing fishing to go on throughout the year.
3. ***Presence of a long and highly indented coastline*** which has promoted the development of coastal fish landing ports in the numerous bays and sheltered inlets. The ports include Tokyo, Yokohama, Nagoya, Osaka, Kobe, Toyama, Kagoshima, and Hakodate which increase accessibility to many fishing villages and handling of fish exports. Besides the indented coastline provides good breeding grounds for fish since the strong water waves that would carry the eggs are sheltered off; leads to increased multiplication of fish.
4. ***Japan is made up of islands*** and these include Honshu (the largest), Hokkaido, Kyushu and Shikoku. In addition to these huge islands, there are over 3000 islands which has increased the fishing villages and in turn increasing the quantity of fish caught and distributed. This also made the Japanese traditionally sea ferring people and hence many have become fishermen.

5. ***The mountainous nature of Japan's landscape with limited lowland***. Much of the available agricultural land is used in the production of staple food crops like rice and therefore less left for dairy and ranching. This has emphasized fishing as a major source of animal protein supplying about 60% of animal protein in the Japanese diet.

   Still the mountainous nature of the landscape has made the population to be concentrated on/near the coast, which releases labour to the fishing industry as well as ready market. This increases production in the fishing sector.
6. ***Existence of large forests to support fishing*** since originally many islands of Japan were forested. This plus the forested former Soviet Republics provided the required timber for ship building for carrying out fish extraction, construction of ports for landing fish and handling fish exports and even making packaging boxes for fish. This increases production in the fishing industry.
7. ***Presence of a variety of valuable fish species*** fished during various seasons both pelagic and demersal; and which exist in large quantities. These include sardines, mackerel, yellow tail, cuttlefish, herrings, salmon, lobsters, cod, shellfish, tuna, and Pollock. These have a variety of uses such as making drugs, cosmetics and glue—hence commanding a large market. This encourages large-scale investment in the fishing industry.
8. ***Northly location of Japan in the cool waters of the northern hemisphere*** and this points to the natural productivity of the cool waters surrounding Japan, in terms of planktons, fish species and yet the cool climate makes fish preservation easy.
9. ***Presence of many rivers and streams*** which bring in mineral salts from inland dissolved in water and this facilitates plankton growth and in turn existence of large stocks of marine fish. The streams/ rivers also provide good breeding grounds for certain fish species like salmon, hence favouring the multiplication of fish, and thus sustainable exploitation. The rivers include: Shinano (the longest) in central Honshu flowing to the Sea of Japan; Tone River and Ishikari River.
10. ***Presence of large fishing grounds/ large water bodies***. Japan is bordered by the large pacific ocean which is the major fishing ground containing many fish species like tuna, and mackerel. There are also rivers flowing from the interior

which act as fishing grounds like Shinano River. These large fishing zones promote large scale fishing investment due to large quantities of fish caught.

11. ***Presence of a smooth ocean floor*** which promotes the use of modern fishing methods like trawling, and long lining in the Japanese fishing zones and this results into large quantities of fish caught and marketed. A large part ocean floor is free from rock outcrops that could affect the landing of fishing vessels and destroy the fishing nets.

Human factors

12. ***Availability of large sums of capital to invest in the fishing industry*** accumulated from the strong industrial sector and provided by investors. The capital is used to purchase of modern machinery for catching fish and the construction of ports for landing fish. There are large corporations carrying out fishing in Japan and these possess big and sophisticated fleets/equipment, processing and canning facilities. These corporations are managed and corporate worldwide. There is high quality and quantity production.
13. ***Large supply of highly skilled labour employed in the sector*** since most settlements are near the coast and fishing being a major sector in the Japanese economy. Many people have been trained in fish extraction, fish processing, transportation and marketing. The coastal settlement has also given the Japanese a long experience in fishing activities. This has led to long-term and large scale fishing investment.
14. ***Presence of a large market both domestic and foreign***. Japan has a generally large population *(over 130 million)* and yet it is concentrated along the coast, hence providing a ready home market. Fish also provides about 60% of proteins to the Japanese diet. Besides Japan is located to the proximity of mainland Asia, which countries have large populations to support the Japanese fishing industry (countries like North Korea, South Korea, and china). There is large scale fisheries investment to support the ready market.
15. ***Advancement in technology employed in the sector*** (Japan leads the world in the invention of modern fishing technology). Modern fishing methods are employed such as trawling leads large quantities of fish catch; refrigeration plants, floating cannaries and other processing facilities for the preservation of the fish caught

for a long period. For example tuna and salmon are caught and processed on spot. This technology has increased efficiency in the fishing industry.

16. ***Adequate/continuous research in the fishing industry*** which has led to many innovations to improve fishing activities. There is research in the breeding habits, feeding and maturation of various fish species. There are also hatching/ breeding techniques used such as for shellfish; which are then released into the waters. This in turn promotes the multiplication of fish and thus sustainable fishing in Japan.
17. ***Efficient transport system*** such as a well-developed sea transport with over 2000 fishing ports (*like Nagasaki, Otaru, Tokyo, Yawata,*) and modern vessels; which facilitates fishing operations/ extraction, distribution and marketing of fish. There is also a modern electrified railway network connecting various fishing ports and urban centres. This increases the supply of fish in the processing factories and the large market.
18. ***Political stability of Japan*** for long period since the Second World War, which increases the confidence of investors and workers in the fishing industry. This factor has enabled long-term and large-scale investment in the fishing industry such as construction of modern fishing ports and modern fishing vessels.
19. ***Ability of the Japanese to put fish to many uses***, which has kept the demand for fish high. Through technology many industries using fish as an input have come up such as making fish meal, fish oils, cosmetics, perfumes, glue, drugs, fish manure ; and thus increase in the fish products on the market. This has prompted further investment in the fishing industry.
20. ***Supportive / positive government policy towards the fishing industry*** such as spearheading research in fishing such as fish spoting, breeding habits of certain species ; leading to increased multiplication of fish. It has also encouraged fisheries investment by large corporations and undertakes fisheries controls. This results into sustainable exploitation of fisheries resources.

Problems facing the fishing industry in Japan

1. ***Restrictions in the fishing grounds*** and this has come from excessive efficiency of Japanese fishing fleets. Reductions in fish stocks resulting from over fishing

have forced many countries to protect their fishing waters from foreign interference and as such Japan falls a victim.

a) South Korea imposed the Rehee—line in the Korean straits as the limit beyond which the Japanese fleets should not go.
b) Salmon fishing is limited by a convention with former USSR that sets 48^0N as the Japanese fishing limit in north pacific waters ; where as that of USA and Canada is 170^0West.
c) There are problems with Australia over the use of the Australian coastline water for pearl fishing.

2. ***Over fishing*** and important species are getting extinct especially the herrings and tuna due efficient fishing methods. Whales are really extinct in the region. Accordingly today there is an international ban on whaling. This reduces the quantity of fish production and more so threatens future production.
3. ***The US tests her atomic and hydrogen bombs in the pacific***, which interferes with the fishermen's schedules and increases the rate of water pollution. This reduces the quality of fish.
4. ***Water pollution problems*** due to discharge of toxic substances into the water especially where industries are along the coast and this negatively affects fish survival. This reduces the quantity of fish caught.
5. ***Competition from other major fishing nations*** such as Norway, Canada, Peru especially in the control of foreign markets. This limits the foreign market available for fish and fish products.
6. ***Competition from other sectors of the economy*** such as industry, which attract labour away from the fishing sector. This limits the quantity and quality of production.
7. ***Accidents*** occur due to strong winds that develop due to pressure difference between the sea and the land—leading to strong water waves. This interferes with fishing schedules and limits the volume of fish production.
8. ***Indiscriminate fishing in some areas*** involving the use of some methods which scoop large quantities of fish of all sizes and age; and this is leading to the extinction of some valuable species like halibut and cod.

9. ***Freezing of some rivers during winter*** also limits fishing sector. For example it limits the movement of some fish species which breed in fresh waters to the spawning grounds.

Assignment (write essay)

Qn. Examine the impact of the fishing industry on the economy of Japan.

NORTH EAST PACIFIC FISHING GROUNDS

This occurs in the sea waters off the western coast of North America extending from Alaska in the north to California in the south. The coastline is about 11200km and is highly fiorded /indented. In the middle belt British Columbia is the most important region.

A variety of fish species occur which include: salmon, hake, herrings, tuna, sardines, sole, halibut, mackerel, flounders and a variety of shell fish. There are also marine sea animals such as whales, oysters, shrimps, and small crabs. Drifting and trawling are the most important methods employed. To a small scale seining and lining are also used. The major fishing and processing ports are: Prince Rupert, Vancouver, Seattle, San Francisco, and San Diego.

A sketch map showing the North East Pacific fishing grounds.

Factors for the development of fishing in the north east pacific

Physical factors

1. ***Presence of a wide and shallow continental shelf*** (for the whole coast of western North America from Alaska to California) and this allows sunlight to easily reach the seabed providing ideal conditions for the growth of abundant planktons which act as fish food, hence survival of large populations of fish. Besides the concentration of planktons along the coast attracts pelagic fish like mackerel herrings and tuna to be easily caught.
2. ***The meeting/mixing of the warm and cold ocean currents***, that is, the warm North Pacific current and the cold California current in the North East Pacific waters. This also creates ideal conditions for plankton growth and as a result pelagic and demersal fish is abundant in the area. The warm north pacific Current

also provides warm conditions which prevent the freezing of water, thereby allowing fishing to go on throughout the year, and thus large quantity of production per year.

3. ***Presence of a highly indented/fiorded coastline*** which has promoted the development of coastal fish landing ports *(in the numerous bays and sheltered inlets)*. The ports include: Prince Rupert, Vancouver, Seattle, San Francisco, San Jose, anchorage, San Diego; and these increase accessibility to many fishing villages as well as handling fish exports. Besides the indented coastline provides good breeding/spawning grounds for fish since the strong water waves that would carry the eggs are sheltered off, hence the multiplication of fish.
4. ***Presence of off-shore islands*** and these include Vancouver, Queen Charlotte Islands; which have increased the fishing villages/ fishing area; hence large quantities of fish caught and distributed.
5. ***Limited agricultural resources on the mainland*** partly due to the thin infertile soils which characterize much of the adjacent mainland especially to the north of the fishing ground due to past Glaciation. More so, the rugged mountainous terrain (such as the Rocky Mountains, Sierra Nevada ranges) has made mechanized farming more difficult and this in turn has driven many people to the coast to engage in fishing as investors and as workers. This leads to large-scale investment in the fishing sector.
6. ***Presence of large stretches of forests to support fishing*** for example the temperate forests of British Columbia (*with species like firs, pines, hemlock)* provided the required timber for construction of fishing vessels to help in catching fish, construction of ports to support the landing of fish and even making packaging boxes for fish. This increase the quality and quantity of fish.
7. ***Presence of a variety of valuable fish species*** and in large quantities fished during various seasons both pelagic and demersal. These include salmon, hake, sardines, mackerel, sole, halibut, cuttlefish, herrings, lobsters, cod, shellfish, and tuna, which have a variety of uses *(such as making drugs, cosmetics and edible oil)*. Salmon is the most important because it is both a fresh water and marine species and commands a large market in America and Europe. There are also marine animals caught like whales, shrimps, oysters and small crabs. This leads to increase in production.

8. ***The cool temperate climate in the region,*** which ensures cool waters for the growth of abundant planktons and survival of various fish species; hence encouraging large scale fish exploitation. Still the cool temperate climate helps in fish preservation and transportation of fish to distant markets while still fresh; which encourages further fisheries investment.
9. ***Presence of many rivers and streams*** running from the Rockies to the pacific coast such as Colorado River, Columbia River, Fraser River, and Sacramento River. These rivers bring in mineral salts from inland dissolved in water and this facilitates plankton growth and in turn existence of large quantities of fish. The streams/ rivers also provide good breeding grounds for certain fish species which breed in fresh waters like salmon. Columbia River is the main salmon stream in the region.
10. ***Presence of large fishing grounds/ large water bodies*** particularly the Pacific Ocean, which is the major fishing ground containing many fish species like tuna, salmon, sole, and mackerel. There are also rivers flowing from the interior which act as fishing grounds like Columbia River. These large fishing zones leads to large quantities of fish catch and thus promote large scale fishing investment.
11. ***Presence of a smooth ocean floor*** which promotes the use of modern fishing methods like trawling, and long lining in the North East Pacific fishing zones; leading to large quantities of fish caught. A large part ocean floor free from rock outcrops that could affect the landing of fishing vessels or destroy the fishing nets.

Human factors

12. ***Availability of large sums of capital to invest in the fishing industry*** since Canada and USA are developed and highly industrialized countries . The capital is provided by the governments and private investors. This has been used in the purchase of modern vessels andequipment used in the extraction of fish, the construction of ports for landing of fish, and carrying out fisheries research to develop large quantities of fish. This increases the quality and quantity of fish.
13. ***Large supply of skilled and unskilled labour employed in the sector.*** Most settlements are near the coast since the interior is forested or rugged –hence releasing the necessary labour for fishing activities such as fish extraction, fish

processing, transportation and marketing. The coastal settlement has also given the people a long experience in fishing activities. This has made fishing a long term investment sector in the North East Pacific.

14. ***Presence of a large market for fish and fish products both domestic and foreign***. USA has a generally large population (over 300 million) and yet many people are concentrated along the coast, hence providing a ready market. There is a large market in the major urban centres of Canada and most especially USA *(such as Los Angeles, San Francisco, Seattle, Salt Lake City, and Las Vegas).* Still the fish species especially salmon are highly demanded in European markets, which has encouraged fish extraction and marketing.
15. ***High level of technology employed in fishing*** that is, use of modern fishing methods such as trawling and drifting which enable catching of large quantities of fish. There are also modern preservation involving refrigeration, floating cannaries and other processing facilities, which add value to fish and enable it to be marketed in distant markets. This in turn increases efficiency in the fishing industry.
16. ***Continuous research in the fishing industry*** which leads to many innovations to improve fishing activities. There is research in the breeding habits, feeding and maturation of various fish species. There are also hatching/ breeding techniques used and the fish species are then released into the waters to mature. This in turn promotes the multiplication of fish and thus sustainable fishing in Japan.
17. ***Efficient/developed transport system*** involving sea transport with many fishing ports (*like Anchorage, San Diego, Seattle, Vancouver*,) and modern vessels; which facilitates fishing operations, distribution and marketing of fish. There is also a modern road and electrified railway networks connecting various fishing ports to market centres in the interior.
18. ***Political stability of the region***. North America has been politically stable for a long time which increases the confidence of investors and workers in the fishing sector. This in turn has enabled long-term and large-scale investment in the fishing industry such as construction of modern fishing ports and modern fishing vessels.
19. ***Supportive / positive government policy towards the fishing industry***. The governments of Canada and USA control fishing activities to limit over fishing,

and encroachment on the fishing grounds by foreign vessels. USA and Canada put up 170^0West against fishing by Japanese vessels. The governments have also encouraged fisheries investment by large companies and spearheaded fisheries research, resulting into sustainable fishing.

Problems facing the fishing industry in North East Pacific

1. ***International restrictions in the fishing grounds***. Fishing is not allowed beyond 200miles from the coast due to conventions with other countries like Japan, Australia. The reductions in fish stocks resulting from over fishing have forced many countries to protect their fishing waters from foreign interference.
2. ***Over fishing*** due to advanced methods of catching fish. Therefore there is great danger of wiping out some of the species for example salmon fish which is often trapped on its way back to the ocean water after breeding in the fresh waters. The fish stocks are rapidly decreasing. Accordingly today there is an international ban on whaling.
3. ***The US tests her atomic and hydrogen bombs in the pacific***, which interferes with the fishermen's schedules and increases the rate of water pollution.
4. ***Water pollution problems*** due to discharge of toxic substances/industrial wastes into the water especially where industries are along the coast. These contain poisonous chemicals which affect fish survival. Still the barks of logs are poisonous to the fish in the rivers.
5. ***Competition from other major fishing nations*** such as Japan, Norway, Peru, china, especially in the control of foreign markets and thus causing price fluctuations and fluctuations in incomes.
6. ***Shortage of labour for fishing sector*** due to the small population especially for Canada and due to the fact that many people are employed in other sectors such as forestry, mining and industry. This in turn limits fisheries production**.**
7. ***Accidents*** which occur due to strong winds that develop due to pressure difference between the sea and the land—leading to strong water waves that at times lead to capsizing of boats and hence limiting production.
8. ***Indiscriminate fishing in some areas*** involving the use of methods that scoop fish of all sizes including young ones. Accordingly some valuable species are

threatening extinction like halibut and salmon; and thus threatening future production.

9. ***Freezing of some rivers during winter*** and this negatively affects fishing activities especially in the higher latitudes such as by limiting the movement of fish to the breeding grounds.
10. ***Construction of dams on rivers / damming of rivers from the Rockies*** due to great demand for power in the US and Canada. This has adversely affected fish spawning / breeding of especially salmon fish which is prevented from reaching the breeding area and hence decline in fish stocks**.**

Steps being taken to solve the above problems

1. Controlling of fishing activities by government in order to reduce over fishing and indiscriminate fishing. There are stringent regulations/ laws on fishing in particular seasons of the year such as when the salmon fish is moving down to marine waters after breeding.
2. Treating and proper disposal of industrial wastes in order to control pollution of waters.
3. Exporting fish and fish products to other countries to solve the problem of small domestic market. This is coupled with carrying out market research.
4. Setting up more factories that use fish as a raw material such as those producing animal feeds, glue, fertilizers, oil to increase the market for fish.
5. Diversifying fish sources such as by introducing fish farming to supplement the natural sources of fish.
6. Increasing mechanization to minimize the problem of shortage of labour.
7. Signing international fishing agreements to solve conflicts over territorial waters. These agreements recognize fishing rights and grounds for each country.
8. Constructing of ladders for fish to move across the dams. These ladders assist salmon fish to overcome areas where dams have been constructed so that they can reach their spawning / breeding areas upstream.
9. Diversifying the economy to avoid over dependence on fish exports.

NORTH WEST ATLANTIC FISHING GROUNDS

This region is located along the eastern shores of Canada and USA. It extends from eastern Canada coastal lands downwards to the Georgia bank. The North West Atlantic fishing grounds has along coastline of about 8000km, with a fishing area of about 520,000km^2. The fishing region is categorized as follows:

Canadian fisheries

a) **Newfoundland and Labrador**—the eastern most province of Canada. Newfoundland is an island and Labrador is on the mainland of Canada. Here fishing provides employment to the vast majority of the population. The region was formerly the world's richest cod fishing area, although catches have declined due to over fishing.
   This region also includes the Labrador coast on the mainland of Canada.
b) **Maritime Provinces, including lower st.lawrence**. The maritime provinces of Canada include: Prince Edward, New Brunswick and Nova Scotia.

In the Canadian fisheries today the main species are: flounder, turbot, halibut, crabs, lobsters, shrimps, herrings, plaice, haddock, oyster, cod, and salmon among others.

USA fisheries

a) New England. The species are similar to those in Canadian fisheries. Larger vessels are based on larger ports like Boston, Gloucester, Portland, and New Haven.
b) Central and south coast of USA. Among the variety of fish caught (*similar to Canadian fisheries)*, there is also oyster fishing based at Delaware and Chesapeake bays, crab fishing.

A sketch map showing the North West Atlantic fishing grounds

Note: In the North West Atlantic fishing grounds more workers are employed in fish processing than catching. However increased mechanization is making the process capital intensive. The largest percentage of Canada's catch **(*about 2/3*)** is exported to USA given its large population (high demand) despite having large-scale fishing.

Factors which have favoured the development of fishing in the northwest Atlantic

Physical factors

1. ***Presence of a wide/ broad an shallow continental shelf*** extending from southern New England to Newfoundland area which provides an excellent breeding ground for fish. It also allows the penetration of sunlight to the ocean floor/ sea bed and this facilitates the growth of planktons-which act as fish food and thus multiplication of large quantities of fish. Besides the concentration of planktons along the coast attracts pelagic fish like sardines, mackerel to be easily fished.
2. ***The convergence of the cold Labrador Current and the warm gulf stream***. This occurs off Newfoundland at about latitude 45^0—55^0N which condition favours the existence of abundant planktons and hence large stocks of fish. Based on the tides and the general small storms, there is increased supply of oxygen required for life. Still the ice bergs which come south with the Labrador Current bring in minerals from the land important for plankton growth.

   Besides the warm gulfstream which washes the Northeast coastline of North America results into the melting of ice which enables fishing activities to go on throughout the year.
3. ***The cool temperate climate*** which ensures cool waters which favour the growth of abundant planktons and the survival of various marine fish species, hence large-scale commercial fishing. It also favours the preservation and storage of fish which has promoted export trade in fish. However modern canning and refrigeration facilities have also been put up.
4. ***Presence of a variety of valuable fish species and which exist in large quantities*** which include: flounders, turbot, halibut, herrings, lobsters, plaice, haddock, mackerel, salmon, sardines, cod, shell fish, menhaden in the Canadian and US fisheries. The fish species command a large market since many products are got from them such as oil, fish meal, fertilizers, glue, cosmetics. There are also marine animals like oysters, crabs, and shrimps. This leads to increase in the quantity of fish caught.
5. ***The highly indented coastline*** which has encouraged fish breeding since it shelters off the strong water waves that would carry away the eggs of the fish. It

has also favoured the development of modern fishing ports which include: St. John's, Stephenville, Saint John, Boston, Portland, Providence, Bridgeport, New Haven, and Halifax which support fish landing, processing and exportation.

6. ***Presence of many offshore islands*** which include Newfoundland (the main island), Anticosti island in the gulf of st. Lawrence, Prince Edward island, Cape Breton island, Sable island among others. These have increased the fishing villages and hence increased fish catch, processing and marketing.
7. ***Presence of large stretches of temperate forests*** which were used by the early settlers *(like the Dutch)* to make fishing vessels/crafts to extract fish. Still many other Europeans crossed the Atlantic ocean and settled at various points like Boston, Halifax and st. john; and used the timber to make vessels, packaging boxes for fish and also in the construction of ports to handle fish landing, processing and exportation.
8. ***Limited productive natural resources in many parts of the mainland***. There are very few minerals on the mainland of New England, yet the soils are poor, thin, rocky, and infertile –implying limited agricultural opportunities. The area also has a short growing season. The Appalachian Mountains deep inland also limit the agricultural opportunities further especially mechanization. All this has driven many people to the sea to seek a livelihood, hence large supply of labour for fishing and therefore large-scale fisheries investment.
9. ***Presence of many rivers and streams*** which include St. John River, St.Croix River and Restigouche River in Brunswick; Jupiter River on Anticosti Island, Churchill River in Labrador; Exploits River and Gander River on Newfoundland. These rivers bring in mineral salts from the land that facilitate plankton growth and in turn the existence of large stocks of fish. The rivers/streams also act as breeding grounds for certain fish species, hence the multiplication of fish.
10. ***Presence of large fishing grounds/ large water bodies***.
11. ***Presence of a smooth ocean floor***.

Others factors/ human factors

12. ***Availability of large sums of capital invested in the fishing industry*** provided by the US federal governments (of Massachusetts, New Hampshire, Maine, Delaware etc) and the Canadian federal governments (of Newfoundland, New

Brunswick, Nova Scotia etc). There are also private fishing companies. The capital is used to purchase modern vessels for fish extraction, contruction of modern processing factories and paying fisheries workers. This leads to increased fisheries production.

13. ***Presence of a large market, both local and foreign***. The local market is especially provided by the urbanized north east of USA (including towns like Boston, St. John, New Haven, Newyork etc). For example St. John is a large settlement zone with about ¼ of Newfoundland's population. There is also market in the eastern cities of Canada. However there is also exportation to other countries especially of processed fish products. This encourages further fisheries production.
14. ***Availability of skilled labour to work in the fishing sector.***
15. ***Advancement in technology.***
16. ***The developed transport system.***
17. ***Political stability of the region.***
18. ***Supportive/ favourable government policy towards fishing.***
19. ***Continuous research in the fishing industry***.

Problems facing the fishing industry in NW Atlantic

1. ***Overfishing leading to depletion of fish stocks***. This is due to large-scale operation and modern technology. Some fish species are being threatened by extinction most notable being cod fish which used to be the dominant species in the region.
2. ***Water pollution problems***, since the fishing ground is located along the coastline of one of the most industrialized regions of the world. There is heavy discharge of waste material/ substances into the water which endanger fish survival and in turn humans who consume fish.
3. ***Poor visibility due to the dense fog***. Therefore, the fishing vessels often run into one another causing accidents. However today vessels are equipped with a radar system which can be used to detect approaching vessels/ships.
4. ***Indiscriminate fishing in some coastal areas*** and this involves catching of even young fish and the endangered species; and this limits sustainable fishing.

5. ***International conflicts over territorial boundaries***. The demarcation of legal fishing grounds per country has often created conflicts over boundaries (which are in most cases imaginary) between USA and Canada; and with European countries.
6. ***Competition from other major fishing nations*** such as Japan, Norway, Peru, china, especially in the control of foreign markets. This causes price fluctuations and fluctuations in incomes.
7. ***Shortage of labour for fishing sector*** due to the small population especially for Canada and the fact that many people are employed in other sectors such as forestry, mining and industry. This limits production in the fishing sector.
8. ***Freezing of some rivers during winter*** and this negatively affects fishing activities especially in the higher latitudes. For example limits the movement of fishing vessels.

Evaluation question

To what extent have physical factors favoured the development of the fishing industry in either Canada or USA?

Note: In this question consider both the North East Pacific fishing grounds and the North West Atlantic fishing grounds.

NORTH EAST ATLANTIC FISHING GROUNDS

This region extends from Iceland to Mediterranean shores. Fishing is highly organized by the European countries especially Norway, Denmark, Spain, Iceland, and United Kingdom. Fishing is carried out all round the year in the shallow waters of the North Sea, although spring is the busiest fishing season (but also the most hazardous due to the stormy weather). The major fish species are: herring, cod and mackerel. Others are haddock, turbot, halibut, hake, plaice, sole, anchovies, pilchards, sardines, skate etc

Fishing is generally best developed where there are least opportunities for alternative gainful employment on land. For example commercial fishing is less important in countries like Sweden, Holland, Belgium where agriculture and forestry are crucial for the livelihood of the citizens.

NORWEGIAN FISHERIES

Norway is the greatest fishing country in Europe accounting for almost 3% of the world's total catch. The main fish species in the Norwegian fisheries include: herring (*which contributes 65% of the total fish catch),* cod, tuna, brisling, and mackerel. The main fishing ports include: Haugesund, Stavanger, Bergen, Tromso, Oslo, and Hammerfest.

The leading Norwegian ferring port is Haugesund and it exports mainly herrings to many parts of the world. Stavanger specializes in canning of brisling fish and sardines, and has one of the most advanced canning industries of Europe. The major fishing methods are: drifting, trawling, and lining.

A sketch map showing the fishing grounds in Norway

Factors for the development of the Norwegian fishing industry

Physical factors

1. ***Presence of large fishing grounds/ large water bodies***. Norway is bordered by the large Atlantic ocean (*which includes the Norwegian sea and the North sea)* which are the major fishing grounds containing many commercial fish species. There are also rivers flowing from the interior which act as fishing grounds. These large fishing zones lead to large quantities of fish caught and thus promote large scale fishing investment.
2. ***Presence of a smooth ocean floor*** free from rock outcrops that could affect the landing of fishing vessels and also destroy the fishing nets. The smooth ocean floor therefore promotes the use of modern fishing methods like trawling and lining in the Norwegian fishing zones, and thus large quantities of fish caught.
3. ***Extensive/wide and Shallow continental shelf*** which allows the penetration of sunlight to the seabed and this promotes the growth of phyto-planktons. The planktons act as fish food that helps in the multiplication and maturing of fish such as herrings, cod, and brisling. Besides the wide and shallow continental shelf from Stavanger to Hammerfest promotes easy catching of pelagic fish like herrings.

4. ***Favourable conditions at the continental shelf such as cool waters,*** which also contain a variety of mineral salts resulting in the abundance of planktons which attracts fish. The Northly position and cool temperate climate makes the preservation of fish relatively easy-as fish cannot easily be spoilt, and thus enabling the marketing of fish in distant markets.
5. ***The effect of the warm north Atlantic drift*** which enables fishing to be carried out all year round, by keeping the waters open through the winters. It enables ice to melt but water remains cool enough for fish survival. This leads to large quantities of fish caught per year.
6. ***Presence of many rivers and streams*** that provide good breeding grounds for various fish species, which breed especially in fresh waters. The rivers also bring in mineral salts from inland dissolved in water and this facilitates plankton growth and in turn existence of large stocks of fish. The rivers include: River Glama (Glomma) in the east, River Tana in the north and several other small streams.
7. ***Presence of a highly fiorded/ indented coastline*** which has promoted the development of fishing ports such as Stavanger, Trondheim, Bergen, and Oslo in the sheltered areas, which enable fish landing and exportation. The fiords also provide suitable grounds for fish breeding, since it shelters off the strong water waves that would carry away eggs of fish; and thus enabling the multiplication of fish. The long fiorded coast between Stavanger and Hammerfest is noted for cod fishing.
8. ***Presence of off—shore islands*** which increase on the fishing villages, right from Tromso to Kristiansand. The Lofoten islands form the greatest cod fishing area. Other smaller islands are Vesteralen islands, Vega Island, Andoya and Shetland islands. This results into increase in the fishing areas and thus increased fish caught and this attracts more investment in the fishing industry
9. ***The poor agricultural resources such as rugged terrain / mountainous landscape and infertile soils*** which has driven people to seek a livelihood at the sea and more labour supply. This has led to increased investment in the fishing industry. Approximately 75% of Norway is of high altitude rugged terrain with steep slopes of unproductive land. This in turn increases fisheries investment.

10. ***Existence of many valuable/ commercial fish species*** such as herrings, cod, tuna, brisling, mackerel, halibut, pilchards, haddock, dogfish, and capelin. These species are of high commercial value and in large quantities which has attracted large scale investment in the fishing industry.
11. ***Presence of extensive forests (Norwegian forests)*** with species like spruce, firs, pines favouring the building of ships and boats at Bergen, Stavanger, and Tromso. These ships are used in hauling fishnets and transportation of fish to processing centres/ports. The timber is also used in the construction of modern ports for fish landing and making packaging boxes for fish.

Human factors

12. ***Norwegians have a long Sea ferring tradition*** and this dates back from the times of the Vikings and Norsemen (kings). These encouraged quite often people to become sailors and fishermen. As such, fishing is rooted in culture. This has led to large scale and long-term investment in the fishing industry.
13. ***The cooperative movement***/ highly organized and developed cooperatives engaged in all fishing activities such as fish extraction, processing, preservation and marketing of fish. The cooperatives also enable fishermen to raise adequate capital to invest in all those activities. This leads to increased quantity and quality of production.
14. ***Presence of adequate capital to invest in the fishing industry.***
15. ***Most settlements are at or near the coast/ availability of labour, both skilled and unskilled.***
16. ***Presence of a large market, both internal and external.***
17. ***Well developed fishing technology***
18. ***Continuous research in the fishing industry.***
19. ***Efficient transport system***
20. ***Political stability of the country.***
21. ***Supportive / favourable government policy towards fishing.***
22. ***International cooperation***

Contribution of the fishing industry to the Norwegian economy

1. ***Fishing has promoted industrial development*** by providing raw materials. Many industries are now engaged in processing of fish products such as cod liver oil,

fish meal, fertilizer, glue. There are various industries at Stavanger specializing in modern canning of brisling fish. Inferior and undersized fish are converted into fishmeal for animal feeding or used in making of fish manure. There are also industries making fishing inputs like ship building and making of nets.

2. ***Generation of employment opportunities in Norway*** both direct and indirect employment in the fishing industry such as fish extraction, processing, transportation and marketing. These employees earn incomes which help them to improve their standards of living. They also pay tax to the government to raise revenue.
3. ***Generation of foreign exchange*** through the exportation of fish and fish products to various countries like France, Portugal, Italy, Belgium, Sweden, and Spain. Fish is exported in various forms like frozen, dried, pickled(*preserved in salt water)* and canned. The foreign currency earned is used in the importation of foreign technology and consumer goods not available domestically.
4. ***Fishing has promoted urbanization and port development***. The port of Haugesund is the greatest Norwegian port handling herrings and exports cured/preserved fish to various countries. Other important ports are Stavanger, Bergen, Tromso, Oslo, Hammerfest and Trondheim. These ports have trade links with many parts of the world and they are developed urban centres due to increased population and thus the concentration of associated activities like trading, banking, and recreation.
5. ***Fishing has promoted technological advancement and research*** due to the necessity to improve fishing technology, preservation and processing in order to keep pace with other fishing countries (like Japan, Canada). Fishing has also led to research into various fish species such as cod, tuna, and sardines—in breeding habits, fish feeding habits, which has increased efficiency in fishing.
6. ***Development of other sectors especially agriculture***. Fishing provides fertilizers which improve crop farming like wheat, corns and sugarcane. It also provides animal feeds for dairy farming at Stavanger and Trondheim. This also helps to improve the standard of living of the people and government revenue.
7. ***Provision of government revenue*** through taxation of the fishing companies, fish exporting companies, and individuals' incomes. This is in turn used to develop many sectors such as health, recreation, education among others.

8. ***Promotes international relations between Norway and other countries***, which import the fish and fish products such as Sweden, Portugal, Denmark, Holland, Finland, Spain, France, Belgium, and some African countries. It also relates with other major fishing countries like Japan, Canada, and Peru due to sharing ideas regarding the fishing industry. This in turn promotes economic contacts and increases the rate of capital inflow in Norway.
9. ***Development of transport infrastructure in Norway*** that is, the construction of roads and rail networks along the coast to access the fishing grounds such as Oslo-Stavanger road and railway. Besides the revenue from fish exports has been used in the rehabilitation and opening up of new feeder roads.
10. ***Development of tourism*** because many tourists are attracted by large-scale fishing by use of modern technology such as trawler boats, and factory ships. The various fish species like cod, sardines, and brisling also attract many tourists. This also generates foreign currency and creates market for the local goods.
11. ***Promoted diversification of the economy*** by acting as an alternative source of income for Norway instead of depending on industry or forestry. This makes the economy to remain stable and more so it widens the export base of the country. Besides the fishing industry has minimized the problem of population pressure on land, which land is of poor quality.

Shortcomings/ negative effects

1. ***Over fishing and hence reduction in fish stocks*** due to the use of efficient fishing methods like trawling and drifting which in turn leads to lowering of fish output.
2. ***Indiscriminate fishing which also reduces fish stocks***. This involves catching young fish and endangered species and this leads to inadequate production.
3. ***It is a source of international conflicts over boundaries*** (*which are in most cases imaginary*) between Norway and its neighbours such as Denmark, Iceland, Sweden, Finland, and USA. These conflicts are a barrier to beneficial diplomatic relations.
4. ***Fishing is associated with accidents*** leading to loss of life and property. This interferes with fishing schedules.

5. ***Depletion of forest resources*** due to the high demand for temperate forest species (like firs, pines) for boat making and shipbuilding at Bergen, Tromso has led to depletion of forest resources.
6. ***Industrial-related problems*** for example pollution due to discharge of toxic gases and other substances which impacts negatively on the environment such as by contaminating water.
7. ***Urban-related problems***. Fishing has led to growth of urban centres (such as Bergen, Oslo, and Tromso) but these are associated with many problems such as slum growth, poor sanitation, and hooliganism. The fighting of such social evils is costly to the government.
8. It ***has caused regional imbalance in development***. The coastal areas are more developed than the vast interior areas in terms of infrastructure such as recreation, education, and health facilities.
9. ***The fishing sector has attracted labour away from other sectors*** like agriculture, and industry; hence undermining their development.
10. ***Straining the government budget*** when financing various fishing—related activities such as research, quality control. This undermines investment in other sectors of the economy.

Problems facing the Norwegian fishing industry

1. ***Over fishing leading to reduction in fish stocks***. There are many fishing countries in the North East Atlantic which all use sophisticated weapons. As a result this has reduced fish stocks. For example Norway about half of the world's whaling vessels, a factor that has led to the almost extinction of whales in the North Sea.
2. ***Water pollution problems*** since industrialized countries border the North Sea where the Norwegian fishing industry is confined. The toxic waste disposals into the water cause death of fish and endanger plankton survival, also humans who consume the fish.
3. ***Competition from other fishing countries on the world market*** such as Japan, USA, which all flood the markets with the best fish types with or compared to Norway. This leads to fluctuations in the prices and incomes.

4. ***Competition from other countries in the North Atlantic fishing grounds***. There are interferences from international fishing lanes because some of the fishing grounds are located in the waters internationally used for fishing purposes. The competitors include Iceland, Denmark, Sweden, and USA. This limits fish production.
5. ***Restrictions in the fishing grounds***. Fishing by foreign vessels is often restricted over a variable distance from the land. This has been prompted by rapidly improving technology in fishing vessels and equipment, and if not restricted this would mean depleted grounds. For example the Norwegian were refused to fish in their reserved fishing grounds.
6. ***Accidents*** occur especially during the spring season –which is the busiest fishing season and the most hazardous. During this time, the North Sea is characterized by big waves due to pressure difference between the sea and the land. This interferes with the fishing schedules.
7. ***Seasonal variation in fish availability***. There is migration of fish from the north to the south and fish stays in waters off the coast from summer until the end of autumn. This has limited fishing activities.
8. ***Alternative employment opportunities offered especially in industry*** has also attracted the labourforce away from the fishing industry of recent. This also tends to limit fishing activities.

SOUTH PACIFIC FISHING GROUNDS

FISHING IN PERU

Peru is located in South America bordering the Pacific Ocean and is an important fishing nation, although fishing is a recent development. By 1970, Peru was the world's leading fishing nation and at that time it accounted for almost 30% of the world's total catch. However today catches have declined mainly due to indiscriminate fishing.

The main species of fish caught include anchovy, pilchards, tuna, haddock, sole, mackerel, smelt, flounder, lobster, sardines, and shrimp, among other marine species. Anchovy is the most important and is used for making fish meal, a product in which Peru leads the world. Fish meal is used in animal feed and fertilizer. There

are over 50 important fishing ports on the coast of Peru, but Chimbote and Callao are the most important.

Modern fishing is employed and government controls processing with a corporation called Pesca-Peru. The corporation monopolizes the processing of fish meal and fish oils. It also engages in the canning and freezing of especially tuna fish.

Today there are over 100 fish processing factories and the fish and fish products presently account for over 40% of Peru's export earnings. Much of the products are exported to USA, USSR, china, and the European Union.

A sketch map showing the Peruvian fishing ground

Factors for the growth and development of the Peruvian fishing industry

Physical factors

1. ***Presence of along coastline of over 2000km*** and this ensures a large fishing area and commercial deep-sea fishing off the Peruvian coast, which leads to large quantities of fish caught. It is not surprising that there are over 50 fishing ports along the coast, and thus increased fish landing and exportation.
2. ***Presence of a relatively indented coastline*** which has provided good sites for construction of fishing ports such as Chimbote, Callao, Trujillo, Piura, Pisco, and Chiclayo for fish landing and exportation. The indented coastline also provide suitable grounds for fish breeding, since it shelters off the strong water waves that would carry away eggs of fish-hence increased multiplication of fish.
3. ***Extensive and Shallow continental shelf*** which allows the penetration of sunlight to the seabed, which promotes the growth of phyto-planktons. The planktons act as fish food that helps in the multiplication and maturing of fish such as anchovy, tuna, and sardines—hence favouring fisheries development.
4. ***Existence of many valuable/ commercial fish species*** such as anchovies, tuna, mackerel, bonito, sardines, pilchard, haddock, sole, smelt, flounder, lobster, shrimps. There are more than 50 species caught commercially and anchovies are particularly found in large quantities—which has attracted large scale investment in the fishing industry.
5. ***The influence of the cold Humboldt Current (Peruvian current)*** which creates cool conditions for large quantities of phyto-planktons and in turn large

populations of fish survive for example anchovy. This leads to increased fish catches.

6. ***Presence of some small off—shore islands*** which increase on the fishing villages for example San Lorenzo Island and other smaller islands. This results into increased quantities of fish caught and thus large scale investment in the fishing industry.
7. ***The limited productive natural resources on the mainland*** such as due to presence of the Atacama Desert stretching from Peru to the south of Chile and the Andes mountains, and this limits settlement and agricultural production. The minerals which exist such as silver and iron ore occur in small quantities hence cannot support the export economy. This has led to increased investment in the fishing industry as the alternative source of livelihood.
8. ***Presence of large fishing grounds/ large water bodies***.
9. ***Presence of a smooth ocean floor***

   Human factors
10. ***Presence of adequate capital to invest in the fishing industry.*** This was provided by the government which looked for the alternative to the economy and the vision set to fishing.
11. ***The development of many processing plants at the coast*** such as Chimbote, Callao, and Lima. These process fish into fish meal, fish oil, and animal feeds**.**
12. ***Supportive / favourable government policy towards fishing***. The government has spearheaded research and also extended monopoly over the fishing grounds in the south pacific from 22km to 370km from the coast to avoid competition from foreign vessels. It also restricts on the local fishing seasons.
13. ***Presence of a large and ready market, both internal and external.***
14. ***Improved fishing technology***
15. ***Continuous research in the fishing industry.***
16. ***Improved transport system***
17. ***Relative political stability of the country.***

Problems facing the fishing industry in Peru

1. ***Over fishing*** which has drastically reduced the fisheries potential. This has been brought about by improved technology used and the invasion by the US and

Japanese fishing fleets to the Peruvian waters. Over fishing partly accounts for the decline of the anchovy fish in Peruvian waters.

2. ***Reduction in guano***. The establishment of a fertilizer plant using guano as a raw material has greatly reduced the guano available as fertilizer to the ocean water planktons and hence a decrease in fish stocks. This is because guano is very rich in phosphorous, nitrogen and potassium which is very essential in fertilizer manufacture.
3. ***Stiff competition from other fish exporting countries on the world market since 1970s*** such as Japan, china, USA, Norway, and Canada. To her disadvantage, Peru only exports fish meal and fish oil from one fish species (anchovy) compared to other countries exporting a variety of fish species—hence outcompeting Peru.
4. ***Competition from other sectors of the economy for government funding.*** Although fishing in early 1970s received great government funding but over time it has come under stiff competition from other sectors such as tourism and industry. This has been worsened by the declining fish species due to over fishing.
5. ***Limited valuable fish species***. Peru unlike other countries has been noted for one valuable species in abundance –anchovy, which has limited the growth of Peruvian fisheries. However there is in unedible fish species on the Peruvian coast, which hinder fisheries development due to limited uses of such species.
9. ***Water pollution problems*** due industries along the coast. The toxic waste disposals into the water cause death of fish and endanger plankton survival, also humans who consume the fish.
6. ***Inadequate capital to develop the fishing industry*** such as improving port facilities and funding research. More so there is limited industrial development. Apart from the fertilizer industry , fish meal and fish oil, Peruvian industries have not explored other fish processing factories like cosmetic , glue etc partly attributed to limited capital.
7. ***The El Niño weather phenomenon***. Towards the end and beginning of every year (between December and March) strong winds cross the equator and bring warm water south wards along the Peruvian coast which spread over the cool waters of the Peruvian current. This is mostly a problem during the abnormal

years when the north wind is very strong. This causes fish to migrate southwards into Chilean fishing grounds. It also creates unfavourable conditions for plankton growth and hence affecting fish survival.

8. ***Political problems***. After the military coup in 1970 that overthrew president Allende, it led to a decline in the fishing industry given the fact that it scared off the potential investors.
9. ***Low levels of technology used in some regions*** evidenced by people using poor fishing nets that catch even young fish. Some people even use poor fishing gears , hence limiting production.
10. ***Poorly developed transport facilities in some regions***, since Peru is a developing country; yet fish requires efficient transport to the market and processing centres.
11. ***Shortage of labor to work in the fishing industry***. This is because Peru's coastal lands are arid and therefore poorly settled, yet even most of the labour is unskilled; hence resulting into under production.
12. ***Accidents occur during fishing*** for example the capsizing of fishing vessels leading to loss of life and the fish caught.

Steps taken to develop the fishing industry in Peru

1. Conservation measures have been taken to ensure constant fish stocks and to increase fish stocks such as restrictions on the fishing seasons to avoid over fishing.
2. The government has extended the territorial waters from 22km to 370km away from the coastline. This is designed to keep off the invading American and Japanese fishing fleets, making monopoly of fishing in this region to Peru.
3. Fisheries research has been adopted for example at Chimbote in the available fish stocks, its behavior and fluctuations. The intention is better conservation for sustainable fishing.
4. Control of processing by a government corporation called Pesca-Peru, to ensure that all profits that accrue are ploughed back in the fishing industry.
5. Encouraging local people to consume fish in order to increase the home market for fish.
6. Stocking inland waters with improved species to improve on the fish catch.

7. Continuous improvement on the techniques of fishing, freezing, packing and canning.
8. Improvement in transport and communication facilities.
9. Continuous training of manpower to acquire the necessary skills for the fishing sector.

FISHING IN AFRICA

It should be noted that the fishing industry in Africa is not well developed. A few countries can afford big ships and other fishing equipment; although the situation is gradually changing.

In Africa the countries with a developed marine fishing industry include: **South Africa, Namibia**, Angola, Nigeria, Ghana, **Morocco**, Mauritania, and Senegal. These are countries that export fish and fish products (with regard to marine fishing).

The species of marine fish from African coastal waters include: sardines, stock fish, hake, anchovy, barracuda, sole, pilchards, mackerel, lobsters etc. Africa only contributes about 6% of the world total catch and unfortunately many African countries import fish.

Reasons for the low level of development of marine fishing in Africa

1. ***African coasts are generally straight with few indentations,*** unlike the coasts of the North Sea or Europe. As such it is not easy to develop ports and does not allow breeding of fish since even young fish require less turbulent water where they cannot easily be carried away by waves. The young fish also do not require open water where they may be eaten by large fish or marine animals.
2. ***Small continental shelf*** for most of the African coastline rarely extending for many kilometers from the coast. This doesn't allow easy penetration of sunlight for photosynthesis in phyto-planktons. It also limits the use of profitable methods like trawling (*for the fish sunk to the bottom)*. The east African continental shelf is extremely limited to only 15km from the mainland and the operation is very small.
3. ***Influence of warm ocean currents*** such as the Mozambique current, which do not favour the growth of planktons and therefore low fish populations. Still some

ocean currents are strong and interfere with plankton distribution and movement of vessels, many of which are actually non-motorized.

4. ***Large areas of Africa are located within the tropics, where temperatures are hot making waters generally warm***. This discourages the growth of planktons, encourages poor fish species and limited fish stocks. The fish that mostly develop in this warm water are always oily and not of good taste. The hot temperatures also make fish spoilt easily; and this limiting fisheries production.
5. ***Ideal climate for agriculture***. A reasonable area of Africa receives heavy rainfall which can sustain farming. Many people therefore look at farming as the main source of livelihood and backbone for development. It is only in areas like Namibia, Angola and Morocco with poor agricultural resources where fishing is developed.
6. ***Africa has few offshore islands***; which otherwise would have been used to increase the fishing villages. (*The few islands include Canary Islands, East African islands of mafia and Pemba).* This limits the fishing area and thus limited fish production.
7. ***Existence of coral reefs particularly along the East African coast***. These coral reefs interfere with fishing and movement of vessels, fishing nets especially trawl to be used in deep waters. This discourages many investors and this limiting production.
8. ***Scattered fish species*** that is, there are few species moving in shoals due to the scattered nature of planktons, such that even the fish scatter in search for them. This fish occur very far from the shoreline and have a peculiar characteristic of moving very fast. It is therefore uneconomical to apply modern methods like trawling and seining.
9. ***Limited capital in many African countries*** and this limits the use of modern fishing vessels resulting into low fish catch. Still many countries cannot finance research on fish stock available which limits fisheries development further (*to only a few countries like South Africa, Morocco*). Many countries use poor crafts like canoes and boats.
10. ***Low levels of technology employed in many areas***, resulting into low fish yields. Methods like basket trapping, beach seining, simple hooks are still noticed in several areas. Marine fishermen operate from small canoes and their activities

limited to a few miles off the shoreline. More so poor preservation methods such as smoking, salting and sun drying are common. This also limits the marketing of fish in distant markets.

11. ***Limited market for fish***. Africa's population is still small and hence a small demand for fish and fish products. More so traditional customs/cultures prevent fish consumption; some African societies take eating fish as a taboo, hence limiting demand. Most areas along the coast are sparsely populated and people relatively poor.
12. Export of marine fish is difficult because of ***stiff competition from the developed countries***, some of which already faced with the problem of over production of fish. This also discourages further investment in the fishing sector.
13. ***Political instability experienced in several areas*** such as Mozambique, Angola, Namibia, Liberia, Ivory Coast. This limits the investment in fishing industry by diverting funds to wars. It also limits the labourforce in the fishing sector.
14. ***Unfavorable government policies towards fishing***. Many African governments have weak policies to control fisheries such as over fishing, indiscriminate fishing among other activities. Where the policies exist, there is weak or no enforcement. This for example results into depletion of fish stocks.
15. ***Invasion by foreign vessels*** which catch much of the fish in Africa's coastal waters for example Japanese and Korean vessels which have in recent years been catching fish off the coast of West Africa. This reduces the fish stocks.
16. ***Poorly developed infrastructure*** connecting the coast and the interior for example poor roads and this negatively affects the marketing of fish and fish products. This discourages further investment in the fishing sector.