Instructions to students

- ***Copy all this work in your books***
- ***Leave 3/4 page space for the maps.***

THE NETHERLANDS

Introduction;

The Netherlands is one of the countries that make up the Rhine lands. Also called Holland, it is a small country in North West Europe bordered by the North Sea in west and north, Belgium in the south, in the east is Germany and across the North Sea lies Britain.

More than ½ (half) of Netherlands lies below sea level thus most of the land has been reclaimed from the sea and the Rhine delta, hence the Dutch saying, "God created the world, but the Dutch created Holland'. The Dutch built dykes around flooded lands and pumped the water back to the North° Sea, first° using windmills and later water pumps. The Netherlands lies between 51 N and 54 N of the equator and lies between 3 E and 8 E of the Greenwich.

Netherlands covers a total land area of 41,562km, with a population size of over 16,570,613 people. The population density is 491 people per km2 making her one of the most densely populated in Western Europe and the world.

Administratively, it is divided into 12 provinces each under commissioner of the queen and the provinces are divided into municipalities, 430 in total and also sub divided into water districts each with a water authority.

CLIMATE OF NETHERLANDS;

Netherlands experiences a temperate type of climate which is characterized by the following features;

She experiences full summers due to the mild maritime influence,

Rainfall is well distributed throughout the year with annual totals of about 750mm,

Winters are mild due to the low altitude,

Average temperature is about 10 °C, to about 20 °C in July,

Summer temperature increases

Climate is mainly influenced by the moist westerly winds due to nearness of the North Sea.

RELIEF OF THE NETHERLANDS;

The country is generally low lying except for Limburg in the south. There are three major relief regions namely;

1- The coastal sand dunes; this is made up of sand bars / ridges formed by wave deposition. It's also made up of a group of islands and peninsulas separated by

long shallow inlets of river Rhine and its tributaries that form the delta i.e. Ijssel, Waal, leek and Maas. It provides a natural defense to the low lands in the interior against sea waves.

2- Low /alluvial Netherlands; this is land below sea level. Most of it is covered by alluvial soils and either submerged by water or has been reclaimed. This area is home to nearly 60% of the country's population.

3- High Netherlands / geestlands; this is higher land which rises from 1m to 321m above sea level. It is made of barren sandy soils which makes it unproductive.

Netherlands is still geologically young and the following factors are responsible for her formation and relief;

Effects of the ice age;

During the ice age (about 20 million years ago) most of Europe was covered in snow and when the snow started to retreat due to temperature increase, it left behind a lot of moraine material, which was evenly distributed such that the landscape in the Netherlands is generally flat.

River deposition;

The major rivers in the Rhine lands form a delta on the south western coast of Netherlands. The Rhine, Waal, Meuse and Scheldt rivers carry material from higher lands and deposit it in the delta in the western coast of Netherlands which makes the delta region raised from the sea.

Wave deposition / current formation;

Many parts of Netherlands were formed from the accumulated material deposited by sea waves or flood waters hence the flat relief.

CLIMATE

Netherlands has a temperate maritime climate common to much of Northern and Western Europe due to its proximity to the North Sea and Atlantic Ocean. The climate is characterized by; cool summers, and mild winters.

FACTORS THAT HAVE INFLUENCED THE CLIMATE OF THE NETHERLANDS.

1. The influence of proximity to the North Sea and AtlanticOcean, during the winters daytime temperatures differ from 0 to 6^0C in winter and 17 to 22^0C in summer.
2. The influence of the prevailing Easterly winds from the North Sea. These winds lead to the following conditions to the Netherlands.

a. Mild winters and summers, cloudless days are uncommon, as is prolonged frost because the Netherlands has a few natural barriers like high mountains.

b. Summers become warm and dry and winter to be cold and clear.

c. If this happens, summer temperatures can be 25 + ^{0}C and winter temperatures can go far below 0^0C.

d. The average temperature is 2^0C in January 19^0C in July, with an average annual temperature is 10^0C, clouds generally appear a very day and so is fog in the winter months, rainfall occurs frequently.

e. The annual average rainfall about 765mm.

- The Netherlands has a mild, damp climate due to westerly winds from the sea to warm Netherlands in winter and cool it in summer.

- The predominant wind direction in the Netherlands is South West, which causes moderate maritime climate with cool summers and mild winters.

- This is the case within direct proximity to the coastline which sometimes is over 10^0C warmer in winter or colder in summer than places in the South West of the Netherlands.

3. Influence of the ice days (period), the maximum temperature bellow 0^0C that usually occur from December to February with the occasional rare ice days prior to or after that period. Freezing days occur more often usually ranging mid-November to late march.

- During summer days the maximum temperature above 20^0C experienced between April and September. The maximum temperatures in summer days go up to 25^0C experienced from May to August tropical days (maximum temperature above 30^0C are rare and usually occur only from June to August.

- Generally, precipitation is received throughout the year and is relatively equally shared by each month.

MAP OF THE NETHERLANDS SHOWING RELIEF AREAS

(Leave space for map)

THE NETHERLANDS DRAINAGE

The Netherlands is drained by;

1. Rhine River, System
2. Meuse river system
3. The Scheldt river system and
4. Yssel river system which drains into L. Yssel in the centre of the country.

The river systems of the Rhine and Meuse drain much of the southern Holland before they open up into the North Sea. The two rivers form the extensive flood plain before opening up in the North Sea.

The central part of the Netherlands is drained by the fresh water lake Yssel. There are several polders reclaimed around this lake.

The Western and the Northern parts are drained by AtlanticOcean (North Sea) with the floating sand dunes underlying the coast

CANALS IN THE NETHERLANDS

Canals and rivers forman extensive transportation network across most of the Netherlands. The Dutch economy relies heavily on the international shipping industry, and these waterways facilitate ship access to internal producers.

The canals however are not used for commercial purposes exclusively. Here a small canal in Amsterdam isused as a commuter alternative to the city is narrow, crowded streets.

YSSEL / IJSSEL THE NETHERLANDS

The Ijssel River, the main branch of the lower Rhine River in east central Netherlands, meanders its way through the Dutch countryside.

LAND RECLAMATION IN THE NETHERLANDS

- Land reclamation is the transformation of waste land into useful or productive land
- For many years the Dutch have been struggling against the sea which from time to time has flooded land leading to sea attacks e.g.
- In 1334 the sea broke through sand dunes to form FrieslandIsland
- In 1421 the most fertile part of the country around Dordrecht was submerged and 72 villages were destroyed.
- In 1530 the centre of the town Reimerswaaldisappeared under the sea
- In 1953, the sea broke through southern Netherlands in 67 places, four hundred hectares of fertile land were flooded many people were drowned and thousands of cattle were lost.
- Dykes begun to be built in 1000AD to protect land from sea attacks. Some towns have their names from towns built on rivers e.g. Amsterdam on river Amstel, Schiedam on river Sehie.

CONDITIONS WHICH LED TO LAND RECLAMATION FROM THE SEA BY THE DUTCH

Two major reclamation projects the Zuider Zee and Delta plan were undertaken to work on the land reclamation in Holland.

1. To protect the landby the Dutch society from sea invasions (frequent floods during periods of high tides) much of the Western and Northern parts are below sea level of the country from sea water/attacks.

2. To create more land for cultivation around the coastline with the polders today most intensivelyfarmed parts in Western Europe e.g. Flevoland.

3. To create more land for settlement of the large dense population of the Netherlands

4. The desire to protect the soils from Salination by the salty sea water at the coastal farm land a barrier dam to cut off the North sea and create fresh water lake – Ijssel (Yssel)

5. There was need toenclose the low-lying areas, drain away the sally water in order to boost the productivity of the soils.

6. To provide fresh water for irrigation anduse in agriculture, horticulture and livestock at Amsterdam, Zwolle, Friesland, Leystad. This was done by building the north sea canal.

7. There was need to shorten the Dutch coastline by 700km. this was achieved by linking Wieringermeer to Friesland using an enclosing dam to the shallow gulf- The Zuider Zee. This was aimed at improving transport and relieving pressure on older dykes around the edges of the Zuider Zee.

8. To create more land for expansion of the port for urbanization and industrialization e.g. provided land for growth of Amsterdam now a major commercial, industrial and financial centre.

MAP OF THE NETHERLANDS SHOWING CITIES AND CANALS

(Leave space for map)

THE RHINE DELTA PROJECT/ THE DELTA PLAN

- The RhineDelta Project also called Delta Works, is a flood control project in Southern Netherlands

- In 1953 the spring tide severely flooded the delta region in the south west and about 1,800 people died.

- The Delta, Plan launched in 1958 and completed in 1986, was implemented to prevent such flooding.

- The Delta works is a giant flood control project that closed off; the Rhine, Maas and Scheldt Rivers with dykes linking the inlands of Walcheren, Noord-Bevrlands, Schouwen, Goeree, and Veorne and created what amounts to several fresh water lakes that are free of tides.

- To shorten the Dutch coastline by about 700km distance developed a system ofdykes, and built dams, sluices, bridges, locks, and a major canal.

- The dykes created fresh water lakes and joined some islands.

- The delta works in series of construction projects between 1950 and 1997 in South West of the Netherlands.

- To protect a large area of land around the Rhine – Meuse – Scheldt delta from the sea.

- To reduce the length of the dyke exposed to the sea

- The dyke's dongthis waterway had to be heightened and strengthened.

- The works would be combined with road and waterway infrastructure to stimulate the economy of the province of Zeeland and improve the connection between the ports of Rotterdam and Antwerp.

- The South Holland coast region is the most important dyke area with four million population and most of the people live below normal sea level.

THE ZUIDER ZEE PROJECT

- The Zuider Zee was ashallow bay of the NorthSea in the Netherlands, extending about 100km inland and at most 50km wide, with an overall depth of about 4 to 5 meters and a coastline of about 300km. It covered 5,000km^2.

- The majority of the Zuider Zee was closed off from the North Sea by a man made system of dams, land reclamation and the salt water inlet changed into fresh water lake called Ijsselmeer (Ijssel – lake)

- The work of reclaiming the Zuider Zee a large arm of the North Sea, began in 1927. By 1932 a 29-km dyke had been built across the entrance to the Zuider Zee.

- The dyke turned the bay into a fresh water lake within five years. By the early1980's about three quarters of the area had been drained, but the project to reclaim the last polder was concluded by the early 1980's.

- The fresh water lake left behind is called the Ijssel-meer.

- The work on this scheme started in 1923 after a law had been passed authorizing the same. The Zuider Zee plan was divided into two projects.

The Lake Yssel polders are;

(i) MarkerWard (61,000 hectares)
(ii) Wieringermeer(20,000 hectares)
(iii) South Flevoland (44,000 hectares)
(iv) North East Polder (49,000 hectares)
(v) Eastern Flevoland (55,000 hectares)

THE GOALS OF THE ZUIDER ZEE ACT OF 1918 BEFORE THE GRAND UNDERTAKING BEGAN.

- To protect central Netherlands from the effects of the North Sea.
- To increase the Dutch food supply with new agricultural land
- To improve water management by creating a lake out of the farmer uncontrolled salt water inlet.
- To shorten the distance along the Dutch sea coastline (between North and South Holland)
- Tocreate more land for theexcess population.
- To control frequent floods from the North Sea

DESCRIBE THE FACTORS WHICH HAVE FAVORED THE ESTABLISHMENT OF THE ZUIDER ZEE POLDERS

- Availability of highly developed technology toconstruct the polders
- Presence of low-lying areas that made it possible to block the sea from the land.
- Availability of large capital base to invest in the construction of the polders.
- Availability of skilled labour to work in the construction site of the dykes and pump water out of the polders
- Availability of wind energy due to strong winds torun the wind mills for further drainingof the sea
- availability of supportive government policy towards land reclamation in Netherlands
- Existence of large population that needed land for settlement and farming practices.
- Presence of the narrow land between Waden Sea and L. Ijsselmeer that waseasy to connect with the Great Dyke / barrier wall.
- The need to have fresh water for both domestic and industrial uses.

SITE MAP OF LAKE IJSSELMEER
THE YSSEL – LAKE POLDERS

(Leave space for map)

EXPLAIN THE BENEFITS / SIGNIFICANCE OF THE ZUIDER ZEE PROJECT TO THE DEVELOPMENT OF THE NETHERLANDS.

- The interior lowlands are now protected from sea attacks.
- The drainage of the polder areas has been improved.
- Lake Yssel supplies fresh water from Northern Netherlands and Friesland.
- The enclosing dam carries a first class road, thus improving communication between North Netherlands and Friesland.
- It has provided more land for cultivation in Netherlands.
- Tourism has been encouraged by the presence of fresh water for sports.
- The 30km barrier dam provides immediate protection against strong sea waves. Dyke are therefore less affected and are now cheap to maintain since there is no direct attack by waves
- Building dykes for future polders is easy because the water is free from tides.
- Lake Yssel acts as a fresh water reservoir for agriculture and stock breeding.
- In winter Lake Yssel serves as a catchment basin for floods.
- Lake Yssel provides water used in industries.
- Sub-soil Salination has been reduced i.e. the salt content of the surrounding land has been reduced.

POLDERS

A polder is land below sea level reclaimed from the sea

The word, ‘‘polder’’ is a Dutch word meaning reclaimed land

A dyke is a ring canal made of bush wood, stones and concrete.

It is constructed around the area to be reclaimed.

HOW A POLDER IS MADE / PROCESS OF BUILDING A DYKE.

- Survey / exploration to establish the nature of rocks / soil depth are done
- Ring dykes areconstructed/built around the area to be drained using materials such as concrete blocks, clay and sand to enclose part of the sea tobe reclaimed.

- The water from the reclaimed areas is then pumped out using pumping machines / pumps run by wind energy to a collecting reservoir.
- The main trenches and ditches are constructed to drain out water from the enclosed land.
- The second major central channel/canal is constructed to take the water from the drained area, pumping station pumps water into a canal.
- The reclaimed area is divided into regular portions (5 polders) using inner dykes and ring canal.
- Desalination of the land using reeds planted to help dry out the soil by transpiration of water away and lime (alkaline) is added to lower salinity of the land.
- Irrigation is done using fresh water from the nearby rivers or LakeIjsselmeer to further reduce the saline conditions.
- Pumping out water from the polders is a continuous process to prevent water from accumulating in the reclaimed land at any stage and treating the soil is done regularly.
- Deep ploughing/cultivation for further softening of the soil using deep ploughing equipment.
- Pasture is then planted in the reclaimed land
- Polders are finally used for food production and animal rearing, Settlement, recreation and industrialization.

STRUCTURE OF THE POLDER

Polders and same special uses	
Polder	Special use assigned
North East polder	Beautification
Weiringmeer	Flood barrier
Eastern Flevoland	Flood barrier
Southern Flevoland	Flood barrier
Hortermeer	Watershed
Haarlemmermeer	Urbanization
ZuidplasPolder	Landscape beauty

LAND USE IN THE POLDERS

ARABLE FARMING

Production of cereals, fodder crops, potatoes, bulbs at Groningen and Haarlemmermeer

Horticulture under glass houses (market gardening) at Hague, Rotterdam and at Hook of Holland. Crop production at the polder includes, cereals, wheat, roots and tubers like potatoes and sugar beet, vegetables, fruits and flowers.

POULTRY REARING

Poultry is raised throughout the Netherlands especially in areas of infertile sandy soils.

DAIRY FARMING

The principal dairy farming regions are in central and Northern Holland. The animals provide manure to fertilize soils. It is done intensively and animals are kept indoors during winter.

Land for settlement has been created e.g. Utrecht and 17cities with population of 100,000 in habitants are concentrated in the western provinces of North Holland and South Holland and Utrecht.

The polders are used **for industrial development** e.g. Utrecht has heavy chemical, aluminium rolling and zinc sheet.

Polders are used **for tourism** e.g. tourist attractions located at Friesland to Groningen, nature areas are having military practice zones, attractive forests of Oak, birch, ash pine, heath and animals like roe deer, rabbits, hares and Swine, beaver, ether resulted into declaration as national park.

The polder lands have **improved transport and communication systems**East Holland like roads connecting between province of North Holland and Friesland has been considerably shortened by 320kms. A railway line links to the North Sea canal in the North to the new waterway at Rotterdam etc to transport goods and services to people.

They have been used **for agro-forestry** to improve environment e.g. the Flevoland in Leystad, Almere, and TilburgMarker woodform the green belt of the Netherlands. Friesland has forests of oak, birch, pin and ash. Afforestation has been done in the North Brabant forests are dominated by grass, trees bordered by slopes, public buildings and houses.

Polders have been **used for recreation**. They serve as green buffer zones and provide ideal recreational oriented country side for the city dwellers. The heath lands in the West act as nature reserves and open air museums. The major areas are Zoelermeerse, Weiringmeer polder, Zuidplas, Hortermeer, Lauwersmeer.

Polders encouraged the **process of urbanization**. Areas of dense population settlements that have built the Randstad (Ring city) starts at Dordrecht to Rotterdam, Hague, Leiden, Haarlem, Amsterdam to Utrecht to provide various service to people like commercial, residential, administrative etc. this conurbation only covers 5% of the Netherlands and houses over 40% of the population.

CONTRIBUTION OF LAND RECLAMATION / POLDERIZATION

- Polders have created employment opportunities to the skilled and semi-skilled workers in the agricultural sector and industry at centres like Rotterdam, Alkmaar, Hague and the Hook of Holland to improve people's standard of living.
- Land reclamation in polders has led to the creation of fresh water lake Ijsselmeer for irrigation, livestock, domestic and industrial purposes.
- Led to shortening the road distance between North Holland and Friesland thereby reducing the long coastline of 7,000km to 320kms to reduce transportation cost of goods and services between Weiringermeer and Friesland.
- Helped to reduce salinity of the soils due to Lake Ijsselmeer, there has been less incidence of infiltration of salty water from the North Sea to affect productivity of soils.
- Led to creation of more land from the reclaimed sea to increase farmland by 63,000km^2 of polder land that is intensively farmed under crop production to feed the large population of the Netherlands.
- Helped to protect the Dutch lowlands from destructive sea incursion that were witnessed before the Delta plan and Zuider Zee project of land reclamation, greater security with the population of the Netherlands lays 1m a S.1 with various economic activities carried out.
- Polders are important recreation areas serving as green buffer zones, the woodlands that are grown alongside the dykes provide natural conservation zones in areas where the landscape is built up as settlements, hotels, industries and crop production.
- Provision of plenty of hydroelectricity power generated from dammed rivers, canals and bridges to run factories and domestic uses in the polder lands and Delta region.
- Promoted Dairy farming in the polder lands with the Dutch cattle that have the highest yield per cow in the world mainly practiced in Friesland,Flevoland, Weiringermeer, Markerwaad and milk is produced into products such as thefamous Alkmaar Cheese.

PROBLEMS FACING LAND- USE IN THE POLDER LANDS

- Continued Salination of the Sub soil as a result of underground sea pap of salty water under the dykes which reduces the soil productivity in terms of quality of crops and grass produced.
- Fast growth of weeds which affect arable farming compete with crops and pastures and lead to stunted growth of crops.
- High population density with its associated evils such as slums, congestion, unemployment, etc.
- Excessive water logging conditions that occur when sandy subsoil forms its iron pan the iron salts which are deposited by rain, behind humus and sand together to form impervious layer cause water logging on the polders that lead to water borne diseases and unhealthy conditions to the people.

- Sea incursions / floods leading to seasonal floods and Salination of the soils by salt water in the reclaimed land.
- Shortage of land for different was due to increasing population e.g. building, agriculture etc.
- High incidence of pests and diseases as a result of dump weather conditions that favor the breeding of fungi, bacteria, nematodes which affect crops especially in the polder lands leading to high costs of maintenance using pesticides and fertilizers which are expensive worldwide.
- Siltation of canals leading to constant flooding that need regular dredging that is costly.
- Pollution of air and available water sources due to application of nitrate agro-chemicals, fertilizers, herbicides, huge amounts of manures from the livestock industry, etc. has led to shortage of fresh water for use.
- Unstable sinking of the polder land making it unsuitable for settlement and agriculture.
- Winter frost sometimes affects the crops and limits time for crop production.
- High costs of maintaining dykes and soils from Salination by continuous pumping of excess water to trenches.
- Soil exhaustion due to over use of soils for intensive farming

STEPS BEING TAKEN TO SOLVE THE PROBLEMS FACING LAND USE IN THE POLDERS

- Constant by pumping out excess water from the polders to the canals using engines powered by wind mills.
- Erecting of stronger and higher dykes to minimize sea breakages by strong sea waves to reclaimed lands.
- Specialization in agriculture by regionalizing the country e.g. horticulture, arable and dairy farming zones.
- Application of fertilizers and manures to minimize salination and improve soil productivity for high yields e.g. planting seeds.
- Spraying of crops and animals using chemicals like pesticides and insecticides to control pests and diseases.
- Encourage mixed farming practices to improve soil fertilizers.

AGRICULTURE IN NETHERLANDS

Despite the small size and dense population of the Netherlands, agriculture is highly productive and a major source of exports. Cultivation fields cover 27 percent of the land.

Most Dutch farmers are members of cooperatives through which they purchase equipment and supplies. Dutch farmers also market much of their produce through cooperatives.

Dutch agriculture has been marked by the decline of the small family-owned forms and the rise of large corporations that specialize in agriculture.

Since 1945 the number of employees in agriculture has decreased because of the following;

- Young men are not interested in agriculture instead they have gone to urban areas to work in industries.
- The old men who are against scientific methods of farming have been driven out of their farms.
- Even the young men who can't afford the scientific methods of farming have been sent a way.

CHARACTERISTICS OF AGRICULTURE IN NETHERLANDS

- 2,000,000ha of land in the Netherlands are used for agriculture.
- There are 108,000 farms in total of which 1.5% cover more than 100ha
- The average size of a Dutch farm is 19ha.
- 28% of agricultural land used is devoted to tenant farming.
- Agriculture produces 3% of the country's wealth and employs 5% of the workforce (210,000 workers 27% of whom are salaried employers)
- Horticulture accounts for 42% of the total value of the Netherlands agricultural production.
- Exports of cut flowers are of particular significance (18% of total agricultural production value)
- It is highly intensive due to the high value of land.
- Emphasis is on dairy farming because it is more profitable than crop growing
- Many crops are grown e.g. Oats, Rye, hay, Barley etc.
- Specialization in one line of production e.g Cattle, pigs, sheep and poultry.

TYPES OF FARMING IN NETHERLANDS

ARABLE FARMING

- This is the cultivation of only field crops to yield food, feeds, or fibre.
- Holland has 820,000he of arable land mostly in Needbrabant, Ginderland and Over Ijssel
- The Netherlands is among the world's three largest exporters of agricultural products next to United Kingdom and France.
- The Netherlands accounts for nearly a quarter of European vegetable exports.
- Germany,France and the United Kingdom are the largest buyers of Dutch produce.
- A variety of crops are grown in the Netherlands under arable farming

THE FOLLOWING CROPS ARE GROWN UNDER ARABLE FARMING

Cereals: 60% of the arable landin Netherlands is under cereals mainly wheat, rye, oats and barley.

- Cereals are grown for both human and animal consumption, with 60% is turned into animal feeds.
- The fodder crops include; sugar beet, table potatoes and legumes.
- Rye and oats are mainly grown in the East Holland and South Holland on reclaimed land because the two crops need fertile soils.

Potatoes

- These are grown all over the country for human consumption
- Potatoes and fodder crops are grown in the south (Zealand) Groningen and Haarlemmermeer.
- Potatoes are grown for both human consumption and to feed livestock.
- Special potatoes are grown for their high starch content in far district, to manufacture starch and chocolate.
- Some potatoes are exported as seed potatoes

Sugar beet: Is grown and processed into white sugar at cooperative factories.

- Much of the white sugar is exported to Germany, France and United Kingdom..
- Used aslivestock food, the crop is crushed and is made into cattle cakes and the leaves are used for silage as stock food.
- These crops are grown in rotation basins

Flax: is grown in the districts of Zeeland and Groningen.

- Some of the flax is exported to Belgium for the textile industries

Food crops: is grown are barley, corn, potatoes, sugar beets and wheat.

- Despite its wheat and barley production, the nation is a major importer of wheat for cereal production and animal fodder.

FACTORS INFLUENCING THE DEVELOPMENT OF AGRICULTURE IN NETHERLANDS

- Existence of a generally flat land scape that encourages the application of agricultural mechanization e.g. Yssel polder region.

- Availability of large supply of skilled manpower to reclaim land and to work on the farm lands.

- Existence of large capital base that was used to create the polders and to train labour force employed to work on the polders.

- Presence of fertile alluvial soils along the river banks which supported the growth of crops.

- Presence of favourable maritime climate with cool summers, mild winters andreliable rainfall received throughout the year that enables the proper growth of the crops.

- Presence of ready market for the agricultural produce both within and outside Netherlands

- Accessibility of Netherlands from its position on the North Sea and the Rhine River which facilitated the easy transportation of agricultural produce.

- The formation of cooperative societies and credit banks which provided ban facilities for buying agricultural inputs and help in marketing the farmer's produce

- Presence of water from lakes for irrigation farming and stock breeding especially in periods of prolonged drought.

PROBLEMS FACED BY THE AGRICULTURAL SECTOR IN NETHERLANDS

- Shortage of land due to loss of agricultural land to other forms of land uses e.g. expansion of land under woodland.

- High costs of farming due to high costs of inputs and it is highly intensive that require large sums of resources to manage the farm.

- High costs of maintenance of the polders from any form of sea incursions by dredging canals and maintaining dykes from breaking.

- Periodic flooding due to the sea breaking dykes lead to flat areas getting flood.

- Soil deterioration (exhaustion) in reclaimed areas due to intensive farm techniques lead to over use of soils.

- Salination of the soils due to by the sea incursions contamination the soils.

- Stiff competition for market with from other countries e.g. china, USA etc. producing similar agricultural products lead to low profit margins and demoralize farmers

- Severe cold winter conditions reduce on the growing period for crops and other farmers activities.

- High incidence of posts such as arthropods, nematodes and diseaseslike fungi, the bacteria affect root crops,swine fever, bird flu caused by H5NI avian influenza virus and mad cow disease especially in the damp humid climate conditions in the polders or Zeeland, increase the rate of breeding, destroys the crops.

- Over production of dairy products has led to fluctuation of price for the products.

- Shortage of fresh water especially during drought seasons for irrigation industrial and domestic purposes.

- High levels of pollution from heavy use of fertilizers results into nitrate pollution of water, pigs and other animals reared produce huge amounts of manure and ammonia gas which pollute underground resources and degrade vegetation, kill useful insects.

(Leave space for map)

SOLUTIONS TO PROBLEMS FACING DUTCH FARMERS.

- Dutch farmers are organized in cooperative societies such as the marker gardener to access credit to acquirenecessary farm inputs.

- Farmer'semphasize intensive productions since the land is limited to grow high yielding crops which can mature fast.

- Organic farming is being emphasized by using farming techniques that do not harm the natural environment e.g. use of composed manure, crop rotationetc.

- Dutch farmers are legally required to keep some cattle to ensure supply of organic manure

- In pastoral areas farmers produce hay from their farms to be used in e.g. fodder and feedstuff are acquired before winters. Cereals such as oats, barley, fodder sugar, beer, are grown to cut down the costs of milk and other animal products.

- Intensive research in disease and pest control is being emphasized to reduce pest and diseases outbreak on animals and plants.

Horticulture: is the industry and science of plant cultivation and the process of preparing the soil for the planting of seeds, tubers or cuttings.

- The work basically involves growing of fruits, berries, nuts, vegetables, flowers, trees, shrubs and turf.

- Horticulturalists work to improve crop yields, quality, nutritional value and resistance to pests and diseases and environmental stresses.

There is greenhouse system,where horticultural crops are grown under glass houses (**made of materials like transparent canvas / glasshouse allow sunshine through and reduce loss of heat the protect crops from frost/fog/smog and snow falling in winter)**

The fields are full of mushrooms, street trees, full-soil vegetables, cut flowers and bulbs.

Netherlands has over a half of all green houses in Europe. A total of over 44,000 acres of flowers are under cultivation.

CHARACTERISTICS OF HORTICULTURE FARMS

- This is the growing of fruits, flowers and vegetables mainly under greenhouse technology.

- It requires large capital to invest in the farm inputs like for fertilizers, chemicals,packaging and marketing etc.

- It is highly intensive farming practices in the Netherlands.

- It is scientifically controlled under glass house technology where conditions are carefully managed to ensure maximum yields.

- Requires very high scientific methods of research e.g. from the laboratory where new crops are manufactured and engineered, flowers and grown in glass house under controlled conditions.

- Requires very quick transport e.g air transport, electrified trains etc. with modern refrigerated storage facility to deliver to the market when still fresh

- It is market oriented.

  Netherlands has 59% of the glass houses in Europe. Horticulture accounts for 20% of the agricultural exports of Netherlands.

CROPS GROWN UNDER HORTICULTURE

VEGETATION GROWING

- The most important of vegetables are tomatoes, cucumbers, lettuce, cauliflowers, carrots and spinach 70% of each of this crop is exported.

- The most important region for vegetable growing is the delta region in the south west and north Netherlands on the polders.

FRUIT GROWING

- The main region is Gelderland.
- Fruit growing is concentrated in Limburg and Utrecht
- The important fruits are apples, pears, plums, cherries, crocuses, daffodils etc.

BULB GROWING

- This is mainly carried out between Leiden and Haarlem, Hague and Rotterdam in the light sand soils.
- The coastline has warm conditions ideal for growing bulbous flowers, hyacinth and daffodils
- Flowers are grown in glass houses under controlled conditions
- During winter, heating is required and black plastic heat absorbing bags are exposed to light to control the growth rate of the flowers.

- Large quantities of fertilizers and irrigation are required to boost the soil fertility
- The cut flowers are sold in cities, exposed to the Ruhr, Norway and Sweden Southern Germany via Amsterdam.

FLORICULTURE

- This is a discipline of horticulture that involves the growing of flowering and ornamental plants for gardens and fro floristry, comprising of the floral industry.
- The development via plant breeding, new varieties is a major occupation of floriculturists.
- About 1900ha.of land are set aside for the growing of flowers in Netherlands.
- Floriculture crops include bedding plants, flowering plants, foliage plants or house plants, cut cultivated greens and cut flowers.
- Horticultural crops are generally herbaceous, bedding and garden plants consist of young flowering plants and vegetable plants. These are grown in cell packs (in flats or trays) in pots, or in hanging baskets usually inside controlled environment and sold largely for gardens and landscapes.
- Flowers are sold in posts for indoor use in offices, hotels and restaurantsinteriors
- Cut flowers are usually sold in bunches or as bouquets wit cut foliage. The production of cut flowers is specifically known as **the cut flower industry**.
- Farming flowers and foliage employs special aspects of floriculture such as spacing, training and pruning, plants for optional flower harvest and post-harvest treatment such as chemical treatment, storage, preservation and packaging.
- Flowers are mainly grown in big cities especially around Amsterdam. Examples of flowers are roses, like and daisies.
- Medicinal and aromatic herbs grown for production of medicine and cosmetics.
- Horticulture seed production for flowers and vegetables for export
- Arboriculture, the production of small trees for decoration of compounds.
- Horticulture, especially the growing of ornamental plants and flowers is a major factor in Dutch agriculture.
- The Dutch export significant amounts of cut flowers and bulbs, and the nation are world-renowned for its tulips.
- About 75 percent of flowers are exported and there has been dramatic growth in exports to the United Kingdom, Italy and Russia
- Horticulture is conducted in both open fields and through the use of glass greenhouses. The Netherlands new contains over half of all of the greenhouses in Europe, and there is a total of 44,000acres of flowers under cultivation. Over 3,000 companies areengaged in horticulture in the kingdom.

DESCRIBE THE CONDITIONS THAT HAVE FAVOURRED THE DUTCH HORTICULTURE FAMING

- Existence of a mild maritime climate with relatively warm temperatures to support the growth and ripening of thehorticulture products
- Availability of fertile alluvial soil from the polders and delta regions support the growth of luxuriant growth of horticulture plants for high yields.
- Presence of highly trained skilled farmers to work in the growing horticulture fields
- Existence of credit facilities extended to the farmers through the cooperatives to boost their capital requirements.
- Availability of advanced research and advisory boards for farmers to consult and provide assistance on management of horticulture fields and marketing
- Dutch farmer's possess along experience in farming provide extra skills in horticulture practice
- Availability of a ready market for horticulture products both in the Netherlands and abroad in the neighboring countries.
- Existence of developed transport and communication systems to transport horticultural products to market centres by the Rhine waterways, air transport and roads
- Existence of high levels of advertisements used through various media platforms like journals, magazines, and televisions, documentary etc.

PROBLEMS FACED BY HORTICULTURE FARMERS IN THE NETHERLANDS

- Frequent frost which restrict the growing periods of horticulture crops in glass houses is expensive
- Horticulture is capital intensive which is sometimes limited for easy maintenance
- Shortage of land for expansion of the farms which restrict production on small plots.
- Stiff competition from other horticultural producers limits the markets and profit margins the farmers
- Price fluctuations of horticulture products affect the farmer's income
- Horticulture products are highly perishable leading to post harvest losses to farmers
- Cold winter conditions and freezing affect the horticulture crops and limit the period for growing
- Sometimes there are marshy and water logged conditions that disturb the horticulture farmers.
- Flooding of the polders affect farmers
- Over dependence on foreign markets like E.U countries exposes farmers to high risks of stiff competition and costs like taxation
- Soil exhaustion due to intensive farming lead to high costs of application of fertilizers to improve yields
- High salinity of soils due to sea incursions and excessive application of fertilizers
- High incidence of pests and diseases leadtohigh costs of continuous spraying of chemicals to maintain quality.
- Sinking of land under polders
- High costs of land rent fee limit increase costs of production

MEASURES BEING TAKEN TO SOLVE PROBLEMS FACED BY HORTICULTURE FARMERS

- Practice of intensive farming to minimize shortage of land for production
- Building of strong embankments to minimize flooding from river Rhine, Meuse and canals
- Diversification of crops is being taken seriously to get crops suitable to climate conditions e.g. cucumber, tomatoes, watermelon etc. are introduced
- Spray crops using chemicals to kill pests and diseases
- Application of manures and fertilizers to improve soil fertility for high yields
- Intensive research is being carried out to improve glass house technology and crop maintenance.
- Containerization in refrigerated trucks and railway wagons or airplanes for easy transportation of horticulture products.
- Refrigeration of transport trucks for perishable horticulture products to address post – harvest losses.
- Glass houses are introduced for growing horticulture crops during longcool winter periods.
- Importation of improved seeds by cooperative for farmers to buy at subsidized costs.

LIVESTOCK FAMING

This is the keeping of animals. It consists of the following

(a) SHEEP REARING

This is declining because of shortage of space in Netherlands. Most of this activity takes place on the coastal dunes, South Holland and north Holland. Sheep can survive on relatively low quality pasture growingon sandy infertile coastal soils. The products from sheep are mutton which is consumed at home and exported. Wool is rather little.

(b) PIG/SWINE REARING

This is concentrated in the following districts, Utrecht, Gelderland, Over Ijssel and north Brabant. Pig rearing is organized on a cooperative basis. The products include; pork bacon and lard. Most of these are exported but some is consumed at home.

(c) POULTRY FARMING

This is keeping of birds. The birds kept are chicken, ducks and turkeys. Poultry farming in some areas is organized on a cooperative basis. In some other parts of the country, poultry farming is a family affair which is advantageous in that labour costs are reduced. Netherlands exports eggs to neighboring countries and the Middle East.

(d) DAIRY FARMING

Type of farming concerned with production and use of milk usually from dairy cows but also from goats and sheep and milk products

Dairy farming involves the management of dairy cows, the cultivation of crops for feed, the production of milk and cream, and the manufacture of butter, cheese and cream

60% of agricultural land is under grass in Holland mainly in the North East and South West of Friesland in the green heart

There are 4 million hybrid cattle in Netherlands. About $\frac{3}{4}$ are black and white Friesian Holland breed, $\frac{1}{4}$ are red and white Meuse Rhine Yssel breed

About $\frac{1}{3}$ of the dairy products in Netherlands are exported

The dairy industry exports in Netherlands had built a reputation abroad by the 16^{th} century.

The introduction of milk processing factories led to the further expansion of the industry. Netherlands is the leading cheese exporter in the world. It is the fourth largest butter exporter in the world.

Dairy product is used for feeding livestock and is converted into powder in considerable quantities

The farms are mechanized and the output is high with milking is done using milking machines.

CHARACTERISTICS OF DAIRY FARMS IN THE NETHERLANDS

Farming is carried out on commercial basis

Dairy species are mainly kept by farmers are; Friesian cow, Jersey cow etc.

High scientific methods are used by the farmers in maintenance and management of their forms e.g. record keeping, use of veterinary doctors and trained personnel, etc.

Cattle breeds are hybrid and have high milk yields output.

Animals are fed on fodder crops grown in fields during winter and extra are used to supplement the hay.

Cattle farms are small in average not larger than 50 hectares and hybrid animals with more attention given to quality of animals and their products.

Dairy farms are highly mechanized with milking machines, food stores, cattle sheds and milk par burse.g. milking of cows is done using machines and

processing of milk to products like cheese, butter, milk powder, condensed milk and chocolate.

Cattle are grazed indoor during winter using pans controlled automatically.

MAJOR DAIRY FARMING DISTRICTS / PROVINCES IN THE NETHERLANDS

- Friesland
- North Holland
- South Holland
- Over Yssel
- Drenthe

TYPES OF CATTLE KEPT

- Black and white Friesian $\frac{3}{4}$ called the Holland breed.
- Red and white Meuse $\frac{1}{4}$ called Rhine Yssel breed
- Darnish red-Jersey cow
- Ayrshire cow

DESCRIBE THE CONDITIONS THAT HAVE FAVOURED THE DEVELOPMENT OF DAIRY FARMING IN THE NETHERLANDS

- Availability of fresh water from lakes Yssel and rivers like Ijsselmeer/canals for animals

- Presence of highly productive varieties of animal feeds e.g. Friesian leading to high quality and quantity of dairy products

- Existence of ready market to sell dairy products like cheese, milk, etc. both from the Netherland, the BENELUX countries and the Europeans union

- Availability of large supply of skilled labour to work in maintenance of animals in the farms

- Presence of plenty of pasture and fodder crops for feeding animals to produce high quality yields and quantity.

- Availability of a large capital base with adequate capital resources invested in dairy farming and related industries.

- Existence of efficient and well developed transport of roads, water and air with refrigerated containerized trucks, railway wagonsetc. for easy transportation and marketing of dairy products

- Presence of high levels of technology used in processing of dairy farming e.g. use of electric milking machines, use of wind mills to pump water etc. to simplify work on the farms

- Development of cooperative societies which help in buying and selling dairy products from the farmers

- High levels of research in cattle breeds leading to high milk and beef production

- Increased specialization in dairy farming encouraged by the European Union policies

EXPLAIN THE CONTRIBUTIONS OF DAIRY FARMING TO THE DEVELOPMENT OF THE NETHERLANDS

- Source of valuable animal protein through the production of beef and milk related products

- Prevision of employment opportunities to thousands of the Dutch people thereby improving their standards of living

- Generation of foreign exchange earned through export of animal products to government for provision of service to people

- Generation of revenue government through taxes imposed on dairy activities for provision of social services

- Led to development of social economic infrastructure like roads, schools and hospitals to provide services nearer to the people.

- Dairy farming is a means of economic diversification thus reduce over dependence on one economic sector

- Has led to improved international relations / regional cooperation through trade on experts and imports with other countries on dairy products

- Led to improved income earned through farming for the households to improve their standards of living

- Led to development of urban centres in the rich agro-processing zones e.g. Rotterdam, Utrecht, Amsterdam, etc. to extend social services topeople like administrative, commercial, bankingetc.

- Led todevelopment of industries involved in making, cheese, condensed milk, butter, yogurt, powdered milk etc. thus provide market for animal products.

A SKETCH MAP OF NETHERLANDS SHOWING DAIRY FARMING DISTRICTS

(Leave space for map)

PRODUCTS FROM DAIRY FARMING

- Cheese /Ghee
- Butter
- Yogurt
- Powdered / condensed milk
- Whole milk
- **Etc**

COUNTRIES WHERE THE NETHERLANDS EXPORT HER DAIRY PRODUCTS

- Belgium
- Any African counties
- United Kingdom
- Any Asian countries

MIXED FARMING

This involves the growing of crops and the rearing of animals. It is mainly practiced in East and South Netherlands.

MANUFACTURING INDUSTRIES IN NETHERLANDS

The Dutch manufacturing sector is dominated by the following;

TYPES OF INDUSTRIES

- Agro-based industries
- Metal and engineering products
- Electrical machinery and equipment
- Chemical industries
- Petroleum industries
- Construction industry
- Micro-electronics manufacturing
- Pharmaceuticals industries
- Food processing industries
- Tobacco processing

Electronics manufacturing in the Netherlands is dominated by the **multinationalcorporation**Philips. This company makes lighting consumer electronics, appliances, semiconductors and communication systems Philips is the ninth largest manufactures of semiconductorsin the world.

Many of the manufacturing industries are based on the processing of raw materials or semi-finished materials into finished products. In other words, companies in the Netherlands import materialssuch as metal or chemicals and turn these items into products that consumers can use such as car parts or cleaning chemicals

The Dutch chemical industry produces a variety of goods including synthetic rubber, plastic consumer goods and polyester yarns for industrial purposes. Major Dutch chemical companies include shell

Ship building and repair continue to be significant factors in the Dutch economy. However, competition from countries where workers are paid less has caused drastic setbacks in the field which is only about one-half the size it was previously.

Ship building and repair employ about 10,000 workers and are concentrated in the large parts on the western coast.

OTHER INDUSTRIES IN NETHERLANDS

1. **IRON AND STEEL INDUSTRY:**this employs 20% of the working population and is important in the cities of Nynegen, TheHague, Amsterdam and Rotterdam. The industry produces raw materials for the ship building and car industries.

2. **TEXTILE INDUSTRY:**this employs 9% of the working population. This industry specializes in different materials like synthetic fibrese.g. nylon and natural fibres like cotton textiles are found in the east mainly in Hengelo while the wool industry is located around Limburg.

3. **FOOD PROCESSING INDUSTRY:**this is an important industry because Netherland is mainly an agricultural country. The food processing has existed for a very long time. Both tropical and temperate foods are processed e.g. coffee, cocoa, tea, wheat, oats and fruit canning distillation and brewing alcohol.

4. **ELECTRICAL ENGINEERING INDUSTRY**: this is wide spread all over the country. The products from this industry include radio, TV sets, house appliances etc.

5. **CHEMICAL INDUSTRY**: this industry contributes approximately 17% of the total Dutch exports. The chemical industry is distributed where raw materials are available. The towns for the chemical industry are Delfzijl which has a raw material of salt and natural gas, Geleen which has a raw material of coal from Limburg, Rotterdam, Amsterdam and Velsen which has raw materials of oil. The products from the chemical industry include acids, fertilizers, perfumes, cosmetics and laboratory chemicals.

6. **DIAMOND CUTTING AND POLISHING:**this is found in Amsterdam and specializes in the making of different ornaments.

7. **POTTERY:** this is found in Delft and Goode, the products are ceramic articles.

MAJOR INDUSTRIAL REGIONS

1. **WEST NETHERLANDS**: north of the Rhise Delta and south of the Zuider Zee. This area has all the major parts of Netherlands i.e. Rotterdam and Amsterdam. This region became industrialized because of being near the North Sea which transports raw materials and manufactured goods.

2. **LIMBURG REGION:**this region became industrialized because of the availability of coal. It is situated in an agricultural region.

3. **EAST NETHERLANDS**: the region became industrialized because of the presence of salt and natural gas. The most important industry in this region is the chemical industry.

(Leave space for map)

EXPLAIN THE FACTORS WHICH HAVE FAVORED THE DEVELOPMENT OF THE INDUSTRIAL SECTOR IN NETHERLANDS

- Amalgation of small companies into one big company e.g. textile industries led to specialization and high production of quality products for export market.

- Availability of a variety of energy sources like coal, hydro-electricity, nuclear power, and natural gas to run the industrial machinery.

- Presence of a variety of raw materials both agricultural and mineral resources to feed the industrial machinery for high quality products to the consumers.

- Existenceof well-developed transport and communication systems of roads, electrified, railway, air and canals to transport industrial raw materials and finished products to different market destinations.

- Availability of abundant supply of both semi-skilled and skilledlabor provided by high population in the Netherlands to work in the industrial sector.

- Existence of ready market for industrial both locally in the Netherlands and abroad.
- Availability of high level of specialization in the production of heavy and light goods for export markets.

- Availability of adequate capital resources to invest in their industrial sector.

- Presence of abundant supply/ plenty of water from the North sea, rivers Moas, Rhine, Waal and Ijssel, River Rhine, Meuse, etc. for industrial operations like cooling machines among others.

- Existence of large land for establishment of industries and related industrial infrastructure.

- Availability of supportive government policy for encouraging industrialization through offering loans and industrial protectionism.

- Presence of advanced technology through the adoption of automated operations for fast, efficient and effective industrial production.

EXPLAIN THE PROBLEMS FACING MANUFACTURING INDUSTRIES IN NETHERLANDS

- Shortage of basic raw materials for industrial development e.g. coal, iron ore and oil lead to high costs of production from import of raw materials abroad.

- Pollution of air, water and noise caused by industrial wastes dumping and toxic fumes inform of smoke.

- Competition from other industrialized countries e.g. Japan and Germany lead to limited market for products.

- Flooding of the canals and Rhine Delta cause accidents to industrialists.

- Congestion leading at the port terminals causing delays at entre port of Rotterdam for raw materials.

- Shortage of land for expansion of industries due to high costs for land.

- Limited home market which requires exportation of most industrial goods.

MINING AND MINERAL EXTRACTION

Although there was once a vibrant coal mining industry in the Netherlands, the discovery of oil and natural gas led to the demise of the coal companies during the 1970's.

By the 1990's, the only mining operation left were small companies that extracted salt, peat and some sand and gravel for construction uses.

The Dutch do produce a limited amount of oil. However, oil production packed in 1986 at 66,500 barrels of oil per day. Since that time, production has declined to an average of about 60,000 barrels per day.

Netherlands is Western Europe's number one supplier of natural gas extracted from the North Sea. This region contains the main reserves of natural gas and is actually larger than the country itself. The main company in the sector is the Netherlands natural gas company which is owned by Dutch and American energy firms and by the Dutch government.

About half the natural gas produced is used within the country, with the rest exported to the European Union. The main export destinations are Germany, Belgium, France, Switzerland and Italy.

MINERALS IN THE NETHERLANDS

URBANISATION IN THE NEHERLANDS

THE MAJOR TOWNS AND CITIES OF NETHERLANDS

In the Dutch law the general consensus is a city should constitute a population of not more than 30,000 to 50,000 in habitants.

1. **THE HAGUE:**is the third largest city of Netherlands and Rotterdam with a population of 485,818 and an area of approximately 100km^2.

- It is located west of the country in the province of south Holland, of which it is also provincial capital, along with Amsterdam, Rotterdam, Utrecht and Almere.
- The Hague is part of the Ramstad metropolitan area that totals 6,659,300 inhabitants.
- Cultural centre: TheHague is the seat of the Dutch parliament, government and Royal court. Queen Beatrix of the Netherlands lives and works in TheHague.
- An administrative centre , home of all foreign embassies, government ministries as well as the supreme court of justice, council of state and many lobbying organizations.
- The Hagueis the base of international court of justice and the headquarters of Europol (police of European nations).
- The Hague is an industrial centre for electronics, metal products, chemical and food processing.
- The Hague is the facto judicial capital of the United Nations being the location of its primary judicial institutions.

2. AMSTERDAM:

- Located in the North Holland. It is a seaport and the largest city in the Netherlands.

- It is a cultural and economic centre connected to the North Sea by the North Sea canal. The canals divide the Amsterdam into 90 islands linked by 1000 bridge.

- Amsterdam is Europe's most commercial centre and an individual city.

- It is an industrial centre with ship building, sugar refinery, publishing, brewing, heavy machinery, paper products, textile, aircraft land and automobiles.

- It is the second largest port after Rotterdam and residential Centre in 2004, it had 1.3million people.

- Amsterdam is a capital of the Netherlands and it is the largest city although the central government activities are located at TheHague.

- Amsterdam is a financial and business capital and business capital of the Netherlands.

- Amsterdam stock exchange (AEX) is part of the Euronext and the world's oldest stock exchange.

- Amsterdam is the province of the North Holland, Rotterdam and TheHague in the south Hague in the South Holland; Utrecht is the province if Utrechtjoin up to form a metropolis called Ramstad, a largest Metropolitan area in Europe.

3. MAASTRICHT

- The city is located in the southern Netherlands, as a capital of Limburg province and the Maas River, near the border with Belgium.

- It is an industrial Centre, has textile, chemical, ceramics and glass industries.

- It is a major education Centre as it has made secondary, tertiary and universities such as Maastricht school of management, academy for dramatic arts, music, etc.

- Historical Centre with the cathedral of Saint servatius founded in the 16^{th} century, is the older church in Netherlands.

- It is a cultural Centre with a music conservatory, symphony, orchestra and natural history museum.

- The city gained international prominence in December 1991 as a city of historical summit meeting where leaders of the European community nations agreed on a treaty to speed up their economic and political integration. (The Maastricht Treaty)

4. GRONINGEN

- Groningen, city in the North eastern Netherlands, capital of Groningen province, on the canalized HunzeRiver.

- Groningen, the largest city in the northern region of the country, has a number of canals and is an important port.

- Is an industrial Centre with the principal industries that deal in the production of beet sugar, beer, flax, furniture, bicycles, pianos and tobacco;

- It is a large trade Centre mainly carried in cattle, wheat and oil seed.

- In addition, many gold smith, silversmith and book printing shops are located in the city.

- A tourist Centre with the places of interest like, St. Martin's church (13^{th} to 16^{th} century), the Aa church of 13^{th} century and the new church of the 17^{th} century. In the library of the state university of Groningen (1614) is a copy of the Latin translation of the new testament by the Dutch humanist Desiderios Erasmus, annotated by the Germany religious reformer Martin Luther.

5. ROTTERDAM

- Located in the south western Netherlands in Zaid Holland (SouthHolland) province. It is a major port on R. Maas near TheHague.

- Rotterdam is one of the major sea ports in the world, directly linked with the commercially important Rhine River.

- It is the principle Centre of h overseas trader for the Netherlands and heavily industrialized Ruhr region of Germany.

- Rotterdam port once suffered destruction by bombing during World War II (1939-45). A modern planned city built after.

- The chief residential and commercial Centre, areas are located on the Northern bank of the R. Maas. The west of the Hoogstraatcoolsingel is the spacious shopping Centre called the lijnbaanis open to only pedestrians and the stock exchange traverse.

- Tourist Centre with the attractions like Boymans-von Beiningen museum,BlijdorpZoologicalgarden is an outstanding European example of such grounds, the popular ''Euromast'' stands at 186m tall, Europe skyline top,New Orleans Tower, etc.

- An education Centre that has a popular Erasmus university at Rotterdam.

- A deep water channel known as the new water way, opened in1872 was constructed (1866-1890) to allow access by large ocean going vessels from the North Sea.

- This channel and the expansion of trade it allowed was largely responsible for the city's economic beem in the late 19^{th} century.

- Euro port, a large harbor area at the western end of the channel was built in the 1960's, chiefly for the unloading and storing of oil from the large tankers.

- Other extensive port facilities and major industries including: oil refineries, ship building yards and factories for the production of chemicals, metal goods and refined sugar, are on the southern bank of the Maas River at Rotterdam.

- Exports include coal, machinery and dairy products, principal imports are oil ores and grain.

A MAP SHOWING THE LOCATION OF ROTTERDAM PORT AND NEIGHBORING CITIES.

(Leave space for map)

Name the;

i. Canal marked **A-Rhine Scheldt canal**
ii. Water body marked **B- The North sea**
iii. Rivers marked **C- Maas/Meuse**
D- Rhine

iv. Country marked **1- Germany**
v. Towns marked **2- Amsterdam**
3- Lege

Explain the factors which influenced the location of Rotterdam port or Basel.

- The location of Rotterdam at the Rhine river , as an important water way to the interior of Rhine land countries

- Presence of deep natural harbor that is well sheltered for large ocean going vessels to anchor.

- Proximity to the North Sea, one of the busiest international sea routes has made Rotterdam a busy port.

- Presence of deep water canals to create 'the new Rhine water way canal after dredging that allows large ocean going vessels to sail easily.

- Availability of adequate skilled man power to work in the construction, maintenance and management of the port of the port facilities made the modernization of the port.

- Presence of high levels of technology provided by the Dutch engineers for construction of the new water way canals and dredging canals and for the port. Favorable Dutch government policy in relation to the development of Rotterdam into a modern port through investment of more resources into a modern port.
- Availability of adequate capital invested to modernize the port and the Western Europe contributed to development of Rotterdam in form of capital and man power to handle exports and imports. Existence of a relatively flat land scape has made it easy for the construction of the port facilities to her modern status.

- Presence of deep constructed to straighten and widen the River Maas (Meuse) i.e. the new water way canal, allowed large water vessels to reach Rotterdam.

- Availability of fast growth of industries in the Ruhr, The Netherlands and Switzerland required cheap water transport to transport bulky raw materials.

- Presence of a rich hinterland that supplies the port with agricultural, industrial and mineral resources like coal, and iron ore for export at the port.

- Existence of ice free conditions enables the use of the port all the year around.

- Presence of low tidal range that prevents the occurrence of accidents by water vessels.

FUNCTIONS OF ROTTERDAM PORT.

- Rotterdam is a largest entre port to Europe, handling imports and exports.

- Rotterdam port is an industrial centre; with giant consumer goods like Uniliver, Mittal steel company the world's largest steel company.

- Rotterdam is a great transport and communication centre, with the Rhine water way as an important international route.

- Rotterdam is an educational centre with a major university, the Erasmus University of Rotterdam.

- Rotterdam is a residential centre with the tallest residential building in the whole of Netherlands e.g. the Montevideo tower (160m tall).

- Rotterdam is a commercial centre with well-known streets as shopping centres like the Lijnhaan,Hoogstrant, Cool single with the city hall and the Weenie. The Stock Exchange Traverse.

- Rotterdam is a major tourist centre for the Netherlands housing several tourist attractions e.g. the popular "Euromast" stands at 186m tall, Europe skyline top, New Orleans tower etc.

OUTLINE THE PROBLEMS FACING THE ROTTERDAM PORT

- High rates of pollution of the environment as a result of increased industrial development

- Congestion at the port since Rotterdam is the busiest port in the whole Western Europe.

- Shortage of space / land for expansion is a great challenge for municipal authorities of Rotterdam.
- Frequent silting of its river channels / canals e.g. River Maas and the new water way leading to high costs of dredging.

- High levels of unemployment as a result of uncontrolled population migration into the port.
- Shortage of housing facilities is costly to Rotterdam municipality authorities.
- Characterized by high costs of living which is out of reach of low income inhabitants.
- Shortage of fresh water supply as the port grows and expands.
- Frequent flooding of River. Maas and Rhine during heavy rains leading to destruction of property.

MEASURES BEING TAKEN TO SOLVE THE PROBLEMS FACING ROTTERDAM PORT.

- Treatment of industrial wastes before disposal and strict laws enforced to control this problem.
- Containerization is used in handling and transportation of export and imports to overcome congestion.
- Vertical expansion of the port facilities is being encouraged to overcome the limited space, construction of sky scrapers is in progress.
- Time tabling freight to minimize delays and congestion both on water and land.
- Construction of by-pass canals to minimize congestion and delays of traffic.
- Encourage the regional cooperation among the Rhine lands for joint development of the Rotterdam port.
- Use of strong flood lights to overcome poor visibility due to fog at the port.
- Use of radar to detect incoming ship when there is fog to minimize accidents.
- Dredging of canals to overcome silting to allow easy movement of ships.
- Clean air act against emission of industrial fumes to reduce pollution and resultant health hazards to people at the port.

Instructions to students

- ***Copy all this work in your books***
- ***Leave 3/4 page space for the maps.***

BELGIUM

Belgium officially the kingdom of Belgium is a country in the North West Europe. It is a founding member of the European Union (EU) and hosts its headquarters, as well as these of other major international organizations, including the North Atlantic Treaty Organization. (NATO)

It has prospered in the past half century as a modern, technologically advanced European state.

A SKETCH MAP OF BELGIUM SHOWING MAJOR CITIES.

AREA:

Belgium covers a total area of 30,510sqkm, which land covers 30,230sqkm and water occupies 280sqkm. She has a population of about 10,700,000 people.

LOCATION:

Belgium is located in Western Europe bordering the North Sea to the North West, France to the south and Netherlands to the North, Luxemburg to the east and Germany to the North East.

PHYSICAL REGIONS OF BELGIUM Belgium

has three main geographical regions.

3. The coastal plain
4. The central plateau, and
5. The Ardennes highlands

Belgium has flat coastal plains in the North West, central rolling hills, and rugged mountains of Ardennes forest in south east.

PHYSICAL REGIONS OF BELGIUM

The coastal plain (in the North West): This consists mainly of sand dunes and polders. Polders are areas of land, close to or below sea level that have been reclaimed from the sea, from which they are protected by dikes or further inland, by fields that have been drained with canals.

THE ARDENNES (UPLANDS IN THE SOUTH EAST)

This is more rugged than the first two.

It is a thickly forested plateau, very rocky and not very good for farming, which extends into northern France and in Germany where it is named Eifel.

This is where much of Belgium's wildlife can be found.

Belgium's highest point, the signal de Botrange is located in this region at only 694 metres (2,277ft)

Belgium has relatively few natural lakes and none of any great size

BELGIUM'S COASTLINE

In the northwest, stretches 66km (41 miles) along the North Sea. A low coastal plain extends inland 16 to 48km (10 to 30 miles).

Nearest the North Seais low lying areas consisting mainly of sand dunes and polders

The polders, sections of land reclaimed from the sea and protected by dikes, were developed between the 13^{th} and 15^{th} centuries.

Lyingfurther inland is a flat pasture land drained by canals. The coastal plain's elevation ranges from sea level to about 20m (65 ft.)

THE CENTRAL PLATEAU

This lies further land. This is a smooth, slowly rising area that has many fertile valleys and is irrigated by many waterways.

Here one can also find rougher land, including caves and small gorges.

The central plateau is a gently rolling lightly elevated area.

Irrigated by many water ways, it contains a number of wide, fertile valleys with a rich, alluvial soil caves, grottoes and ravines are found in parts of this area.

THE ARDENNES HIGHLANDS

Densely wooded plateau, extends across southeastern Belgium and into north eastern France.

Located here is Botrange, the highest peak in Belgium, with an elevation of 694m (2,277ft). The average elevation of the Ardennes highlands is 460m (1,500ft)

The area is generally rocky and poorly suited to agriculture.

DRAINAGE AND RIVERS (STUDY THE MAP ABOVE)

The chief rivers are;

The Scheldt (known as the Escautin in French) and

The mass (most commonly known by its French name, Meuse).

The Scheldt and Meuse and their tributaries run slowly through the central plateau to the sea in a generally south west to north east direction

Both rise in France and are for the most part navigable throughout Belgium

On the Scheldt, the principle waterway of Belgium, are the ports of Antwerp and Ghent

Although the Scheldt flows through Belgium, the river meets the sea in Netherlands.

The chief tributaries of the Scheldt are the Leie (lys), Dender (Dendre), Zenne (Senne) and Rupel rivers.

TheSambre and Outhe rivers are the main tributaries of the Meuse.

CLIMATE

Belgium generally has a temperature climate, with winters that are not excessively cold and with cool, rainy summers. The climate near the sea is humid and mild. Further inland, away from the moderating maritime influences a marked increase in the range of temperature occurs

Belgiumhas a temperate, maritime climate predominantly influenced by;

Airmasses from the AtlanticOcean

Rapid and frequent alternation of different air masses separated by fronts gives Belgium considerable variability in weather

Frontal conditions moving from the west produce heavy and frequent rainfall, averaging 750 to 1000mm a year. Winters are damp and cool with frequent fogs, summers are rather mild. The annual mean temperature is around 10^0C

INFLUENCE OF RELIEF

Inthe Ardennes highlands hot summers alternate with cold winters. Heavy rains are confined almost exclusively to the highlands. Fog and drizzles are common, and April and November are particularly rainy months

The Ardennes region, the highest and furthest inland, is the coldest

In winter, frost occurs on about 120 days, snow falls on 30 to 35 days and January mean minimum temperatures are lower than elsewhere.

IN SUMMER

The elevation counteracts the effect of distance inland and July mean maximum temperatures are the lowest in the country

In Brussels, located at the center of the nation, the average temperatures range from 0^0 to 5^0C in January and from 13^0 to 22^0C in July.

In Ostend, on coast the average range is 1^0 to 5^0C in January and 14^0 to 20 ^{0}C in July. Rainfall in Brussels is uniformly spread throughout the year, with a yearly average of 820mm, mean annual precipitation in Oostende averages 580mm. proximity to large water bodies like North Sea

Regional climatic differences are determinate by elevation and distance inland. Further inland, maritime influences become weaker and the climate becomes more continental, characterized by greater seasonal extremes of temperature

BECAUSE OF THE TOPOGRAPHY

This region has the highest rainfall in Belgium. In contrast, the Flanders region enjoys generally higher temperatures throughout the year. There are fewer than 60days of frost and fewer than 15 of snow. On the sea coast these figures are reduced to below 50 and 10, respectively. There are a few hot days, especially on the coast, where the annual rainfall is the lowest in the country.

THE PEOPLE OF BELGIUM

Straddling the cultural boundary between Germanic and Latin Europe, Belgium is home to two main linguistic groups the Dutch speakers, mostly. Flemish and the French speakers, mostly Walloons, plus a small group of German speakers.

Belgium's two largest regions are the Dutch speaking region of Flanders in the north and the French speaking Southern region of Wallonia.

The Brussels-capital region, officially bi-lingual, is a mostly French speaking enclave within the Flemish region. A small German-speaking community exists in eastern Wallonia. Belgium's linguistic diversity and related political and cultural conflicts are reflected in the political history and a complex system of government

BELGIUM: THE HISTORICAL BACK GROUND

Belgium became independent from the Netherlands in 1830 and was occupied by Germany during World Wars 1 and II

Tensions between the Dutch speaking Flemings of the north and the French speaking Walloons of the south have led in recent years to constitutional amendments granting these regions formal recognition and autonomy.

AGRICULTURE, FORESTRY AND FISHING

Belgium has favorable conditions for agriculture; moderate temperatures, evenly distributed precipitation and a long growing season, for centuries much of Belgium, especially the Flanders plain, was an area of intensive cultivation. Today, about 28 percent of the country is under cultivation.

Farming engages only 2 percent of the total labour force, but it produces sufficient quantities to make Belgium a net food exporter. About two-thirds of the farms are intensively cultivated units of less than 10 hectares (25 acres)

The leading crops were

d. Potatoes
e. Sugar beets
f. Wheat
g. Barley
h. Other crops included fruits, tomatoes and flax

Belgium, the Netherlands and Luxembourg were known as the law countries, which used to cover a somewhat larger area than the current Benelux group of states

LAND USE IN BELGIUM

Arable land	27.42%
Permanent crops	0.69%
Other	71.89%
Total land area:	30, 278 sqkm

EXERCISE

DRAW A PIE CHAT TO REPRESENT THE INFORMATION GIVEN ABOVE

Livestock and dairy farming are major agricultural industries. In 2006 the livestock population of Belgium numbered some 6.3 million pigs, 2.7 million cattle, 153,976 sheep and 34,799 horses.

Only a small percentage of the country's active population engages in agriculture, and agricultural activity has continued to shrink, both in employment and in its contribution to the economy. About one-fourth of Belgium's land area is agricultural and under permanent cultivation; more than one fifth comprises meadows and pastures.

MAP SHOWING BELGIUM AGRICULTURE

MAJOR CROPS ARE;

Sugar beets, chicory, flax, cereal grains and potatoes. The cultivation of fruits, vegetables and ornamental plants also is important, particularly in Flanders.

Forage crops, barley, oats, potatoes and even wheat are grown everywhere, but especially in the southeast.

The region is one of striking contrasts: in Condroz farms range in size from 75 to 250 acres (30 to 100 hectares), whereas in the Ardennes they are between 25 and 75 acres (10 to 30 hectares)

Most farms in the far north-maritime Flanders and the lower Scheldt -range in size from 25 to 75 acres (10 to 30 hectares), some of which are under positive, while the remainder are cultivated, with wheat and sugar beets again the dominant crops.

INTERIOR FLANDERS IS DEVOTED TO GRAZING

Intensive cultivation is confined to gardens and small farms which are usually smaller than 10 acres (4 hectares). Oats, rye and potatoes are the chef crops, wheat, sugar beets, chicory, hops, flax and ornamental plants (e.g. azaleas, roses and begonias) also are grown in South Western Flanders

FACTORS THAT HAVE FAVOURED THE DEVELOPMENT OF AGRICULTURE IN BELGIUM

ϕ. The presence of fertile loess soils in the central plateau to support the growth of crops

γ. The presence of various rivers like Scheldt, Lys and Meuse which act as transport routes for agricultural products

η. Availability of R. Meuse and Rhine River as a major water way for the transportation of both agricultural raw materials and finished products to market centres.

ι. Presence of mild maritime climate characterized by warm wet summers and cold winters support the growth and ripening of variety of crops.

φ. Existence of undulating relief which encourage easy mechanization of agricultural activities

κ. The establishment and growth of cooperative societies which have helped to mobilize and provide easy access to loans and market their produce

λ. Availability of local and foreign market like from both the BENELUX countries and the European Union for agricultural products

μ. Existence of high levels of technology like; automation of activities using tractors, use of green houses in crop production etc.

ν. Availability of favourable government policies that encourages farmers through provision of cheap loan facility, research on crop and animal diseases, including improved variety of breeds.

EXPLAIN THE PROBLEMS FACED BY FARMERS IN BELGIUM

- Shortage of land for expansion for agricultural activities due to loss of land to other sectors of economy

- Salination of soil from the sea waters for areas at the coast like the Flanders.

- River floods during heavy rains that increase volumes of water which end up into farms to destroy the crops.

- Shortage of labour

- especially during the busy periods due to competition for labour from other sectors lead to delay and post-harvest losses

4. Price fluctuations of agricultural products due to over production and economic depressions

5. Extreme environmental pollution from excessive use of chemicals for spraying crops and animals, use of fertilizers much of their time to improve soil fertility

6. Traffic congestion at the port causes delays of perishable fresh agricultural products on transit to markets on time

7. Stiff competition for market with other countries like the Netherlands and Germany affect profit margins and demoralize farmers.

MEASURES BEING TAKEN TO SOLVE THE PROBLEMS FACING BELGIUM FARMERS

- Belgium farmers are organized in cooperative societies to access credit to acquire necessary farm inputs.

- Farmer's emphasize intensive production since the land is limited to grow yielding crop which can mature fast.

- Organic farming is being emphasized by using farming techniques that donot harm the natural environment e.g. use of composed manure, crop rotation etc.

- Organic farming is being emphasized by using farm manure.

- Intensive research in disease and pest control is being emphasized to reduce pest and diseases outbreak on animals and plants

- Building of strong embankments to minimize flooding from R. Meuse and canals

- Diversification of crops is being taken seriously to get crops suitable to climate conditions e.g. cucumber; tomatoes, watermelon etc. are introduced.

- Spray crops using chemicals to kill pests and diseases

- Application of manures and fertilizers to improve soil fertility for high yields

- Intensive research is being carried out to improve glass house technology and crop maintenance

- Containerization in refrigerated trucks and railway wagons or airplanes for easy transport of products

- Importation of improved seeds by the cooperatives for farmers to buy at subsidized costs.

OUTLINE THE BENEFITS OF AGRICULTURE TO THE DEVELOPMENT OF BELGIUM

5. Promotion of international relations with the countries to which agricultural exports are made.

6. Led to generation of foreign exchange through the export of both agricultural raw materials and products to facilitate the provision of services to people

7. Led to development of agro-based industries to provide consumer goods and employment opportunities to people.

8. Source of revenue to government through taxations required to facilitate provision of services to people
9. Source of income farmers which has improved their standards of living

10. Creation of various employment opportunities in agricultural related activities to improve the standard of living of many people directly.
11. Source of food to the people of Belgium that has improved their diet and heath

12. Led to diversification of the economy to reduce over dependence on one sector mainly agriculture helped to widen the source of revenue to Belgium

BELGIUM FORESTRY

Is the main land use in Ardennes region;

Forests cover 22 percent of the area of Belgium, and wooded areas are used primary for recreational purposes. In recent years, stands of conifers have been planted and forestry activity has increased, however, timber is still imported for country's paper industry.

FACTORS THAT HAVE FAVOURED THE DEVELOPMENT OF FORESTRY IN BELGIUM

- Presence of large forested land to promote commercial lumbering and forestry

- Existenceof trees in pure stand for exploitation

- Presence of moderately heavy rainfall which support the growth of trees

- Availability of skilled labour to work in the forestry industry.

- Existence of ready market for forestry products both in Belgium, European countries and other countries in the world

- Presence of plenty of water from river Sambre, R. Meuse to float the legs.

- Availability of stable energy/power e.g. oil, coal, thermal and hydroelectricity to run the machinery in processing wood and powered sows.

9. Availability of positive government policy that support the sector through providing capital market research and concessions in the forests through licenses.

INDUSTRIALIZATION IN BELGIUM

Belgium was the first country on the European continent to industrialize, following the lead of Britain in the industrial revolution. It remains one of the most highly industrialized countries of Europe, largely because of its geographical location and transport facilities

Industrial production increased steadily after World War II (1939-45) but began to decline in the 1970's, when recession and obsolescence began seriously to erode many traditional sectors Wallonia, which had been the centre of the country's traditional industries, was hit hard while newer,lighter industries such as electronics developed in Flanders

- In 2004 manufacturing accounted for only 17 percent of total economic activity
- Belgium is one of the most industrialized nation in Europe
- Belgium is still a major producer of iron and steel, although production has fallen since the 1970's.
- Belgium also furnishes metallurgical, chemical and other industries with copper, lead, tin and uranium.
- The availability of steel and nonferrous metals has encouraged the manufacture of heavy equipment, especially at Liege, Antwerp and Brussels.
- Products include machine tools, railroad cars, diesel engines, pumps and other industrial equipment.

TYPES OF INDUSTRIES IN BELGIUM

- Engineering and metal products
- Motor vehicle assembly
- Transportation equipment
- Scientific instruments
- Processed food and beverages
- Chemicals
- Iron and steel
- Textile

- Glass
- Petroleum
- About 11 million metric tons of crude, steel were produced annually in the early 2000s.
- Belgium also has an old and important nonferrous metal industry. It was for example, Europe's largest zinc producer into the 1990s, although several European countries have since supposed Belgium in zinc production.
- Oil refining
- Printing and publishing
- Ship building

RESOURCES OF BELGIUM

The natural resources of Belgium are almost entirely mineral;

(ϖι) Coal was mined in abundance for many years, but supplies have been exhausted and the last mine closed in the early 1990s.

(ϖιι) Copper, lead and zinc are still extracted and refined in Belgium.

(ϖιιι) Nuclear power plants are the main source of electricity, supplying 57% of the country's electric power.

ENERGY REQUIREMENTS

(ιξ) With the decline of the coal-mining industry, Belgium has been forced to rely on imported coal, petroleum and natural gas.

(ξ) Since the 1980s environmental concerns about nuclear power have led to greater reliance on renewable energy sources such as; solar power, bio mass and geothermal technologies, a gas-powered generator was also constructed.

A MAP SHOWING INDUSTRIAL CENTRES IN BELGIUM.

TYPES OF INDUSTRIES IN BELGIUM

THE CHEMICAL INDUSTRY

Belgium's petrochemical, plastic and Pharmaceutical industry.

Antwerp has become a major petrochemical centre.

Dealing with oil refinery after the decline of coal mines

THE TEXTILE INDUSTRY

The textile industry, dating from the middle Ages, produces cottons, woolens, linens and synthetic textiles.

The textile industry is located in the cities such as Ghent, Bruges, Verviers, Kortrijk and Landen.

IRON AND STEEL INDUSTRY

Has long been the major industrial sector for the Belgium economy.Belgium is the world's leader in steel production for more than a century.

Production of iron and steel declined in 1970's with about 11 million metric tons of crude steel annually in the early 2000s.

Iron and steel industry is based in Leige, Mons La Louviere, Charleroi and Huy. The steel mills are close to the Grand Duchy of Luxembourg, south of the Arion, Zelzace on the banks of the Ghent-Temeuzen canal.

Iron and steel production centres are located at the coast to reduce the cost of transportation of bulky raw materials, iron ore and export of finished products.

MOTOR VEHICLE ASSEMBLY

Belgium has a large number of international companies like Leyland, Ford and General Motors.

(Buick, Chevrolet and Cadillac), Opel, Renault, Volkswagen andVolvo assembles cars in Belgium.

In 1999, the country produced 1.3 million cars. It also produced specialty vehicles including vans, trucks, buses and mini buses.

Motor vehicle assembly is located at Antwerp, Ghent and Michelin for Ford, Volvo, and British Leyland by general motors.

THE ENGINEERING INDUSTRY

The industry is located in the southern region of Belgium in the cities such as Charleroi, Mons, Liege, Brussels and Antwerp.

The presence of steel and non-ferrous metals have favored the location and manufacture of heavy equipment.

Examples of products produced are: diesel engines, railway equipment, caterpillar tractors and industrial equipment.

GLASS MAKING INDUSTRY

Glass is made from silver sandof the Kempenland and Limestone obtained from Sambre-Meuse Basin.

The industry is located in Liege district, Charleroi, Mons and Molin Kempenland. Glass

is used by car assembly orexported to Germany, United States, France and Italy.

DIAMOND CUTTING INDUSTRY

Diamond stones are cut, polished and mounted. Mainly located at Antwerp and Kempenland.

Antwerp is the leading diamond-cutting centre in the after 2nd world war producing up to 70% of the world's finished diamond.

The 19th century colonization of Congo was the major fact or to the early growth of trade in diamonds.

FOOD PROCESSING INDUSTRY

The industry located in Anderlecht, Uccle in Brabant provinces of Brussels.

The industry processes, eggs, chicken, pork, beef and meat into variety of products like eggs into cakes, cookies, mayonnaise and variety of other products.

The food products are exported to the European Union, mainly France, the Netherlands and Spain.

Preservatives and other food processing ingredients are also exported.

Organic processors like milk, fresh fruits and vegetables are processed into canned or frozen products.

THE BREWERY INDUSTRY: Is located in Leuven, is known for the product of chocolate, made from almonds and caramelized sugar wrapped in chocolate and beer. 600 varieties are produced and exported widely.

DESCRIBE THE FACTORS THAT HAVE FAVOURED THE DEVELOPMENT OF INDUSTRIES IN BELGIUM

- Presence of abundant supply of high grade cool used as energy to run industries from cool fields like Sambre-Meuse.
- Presence of adequate supply of skilled and semiskilled from the Belgium population to work in industries.
- Availability of large sums of capital from rich Belgium population to invest in manufacturing industries.
- Existence of a modern transport and communication systems to transport raw materials and manufactured goods to market centres by railways roads.
- Availability of a favourable government policy towards supporting industrial development by negotiating for low interest loans on behalf of manufactures.
- Presence of plenty of water supply from rivers Scheldt and Meuse for industrial use and cooling industrial machines.
- Existence of adequate supply of raw materials both agricultural and mineral resources to feed industrial machines for manufacture of quality products.
- The central location of Belgium in the Western Europe richest region with large population close to the iron ore mines near foreign market centres for sell of goods to neighbours in Europe.
- Presence of adequate imported raw materials like iron ore France, Luxembourg and Sweden.

- Presence of Rhine River as waterway through R. Scheldt and R.Sambre has linked to canal offer accessibility of Belgium to large markets in Europe.

- Availability of high levels of technology to harness nuclear energy, development of petro-chemical industries with high range of products like polythene, ethylene, benzene, plastics to maintain Belgium competitive goods on the market.

- Existence of a long history manufacturing reputation especially the iron and steel industry, Belgion woolen and linen cloth and Lace make Belgium goods highly competitive
- Availability of abundant resources invested into high levels of research and innovations to produce goods reputable in Europe.

EXPLAIN THE PROBLEMS FACING THE INDUSTRIES OF BELGIUM

- Over dependence on imported raw materials such as iron ore which leads to high cost of production due to high import prices limit profit margins.

- High costs of transportation of iron ore due to bulkiness from the mines to processing centres.

- Low grade iron ore from the Loraine fields leading bio quality products.

- Competition for raw materials with other industrial centres like iron ore for the Ruhr region in Germany.

- Competition for market with other producing countries like Germany and USA for manufactured produced.

- Stuff competition for land from activities like urbanization, transport infrastructure, extensive farming has limited space for expansion of industries.

- Unnecessary delays during transportation of raw materials and manufactured goods due to traffic congestion along canals and at ports like Antwerp.

- Depletion of same minerals like coal, iron ore deposits at Mons, Charleroi mines due to over exploitation has led Belgium to rely on imported iron ore from Brazil and Mauritania.

- High costs of labour with 75% of the workforce employed in service sector and just 24% is employed has led to shortage which limits performance.

OUTLINE THE MEASURES BEING TAKEN TO IMPROVE ON MANUFACTURING INDUSTRY IN BELGIUM

- Importation of high grade iron ore are from Brazil and Mauritania to feed industries.

- Migration of some industries like the iron and steel to the coastal areas to reduce transport costs.

- Use of raw materials saving techniques i.e. production of precision goods that are raw material saving to reduce the costs of production
- Production of high quality products to minimize competitions
- Reduction of taxes in order to reduce on the cost of production
- Diversification of the manufacturing industries to includeagro-processing industries
- Treating industrial discharges before emission to minimize the danger of environmental pollution
- Emphasis regional cooperation like European Union to widen the market size for manufactured goods.
- Use of raw material saving technology that involves automation of various industrial activities
- Redamotion of land for expansion of industries pulverization e.g. the Flanders.
- Recycling of industrial scrap for re-use e.g. iron scrap.

CONTRIBUTION OF THE INDUSTRIAL SECTOR TO THE DEVELOPMENT OF BELGIUM

- The industries have created different employment opportunities related to industrial activities to many people which have improved their standard of living.
- Source of government revenue through the taxes collected to facilitate the provision of social services to people.
- Industries earn the country foreign exchange to Belgium through the exportation of industrial products to enable provision of various goods and services to people.
- Industries have led to improvement of international relations between Belgium and the countries through exports and imports to trade in industrial products.
- Industrialization leads to economic diversification to reduce dependence on one sector like agriculture for revenue.
- Industries provided market for the agricultural produce bought as raw materials for the agro-industries.

EFFECTS OF INDUSTRIALIZATION ON PHYSICAL ENVIRONMENT IN BELGIUM.

- Pollution of land, air and water bodies through disposal of industrial wastes like gases, industrial fumesthat lead to environmental degradation.
- Severe effects on climate change due to greenhouse gases and fumes in the atmosphere lead to the destruction of the ozone layer and degradation of environment.

- Formation of fog in industrial cities leads to poor visibility andeventually of environment.

- Loss of aquatic life due to dumping of poisonous industrial wastes in water bodies lead to degradation of environment.

- Destruction of forests cover during establishmentand growth of industries have led to serious effects on climate and destruction of bio-diversity.

- Exhaustion of mineral resources from some has led to closure of some mines.

- Overcrowding of people has led to easy spread of diseases.

- High crime rates such as gambling, theft, rape, prostitution, etc. has led to social insecurity.

- Unemployment due to large population attracted by industrialization leading to low standard of living.

- Displacement of people leading to high costs of resettlement.

POSITIVE EFFECTS

- Increased the standards of living of people due to increased incomes to people employed.

- Led to the development of social economic infrastructure such as schools, roads, railways, etc. to facilitate extension of social services and goods to people.

- Diversification of the economy reducing over dependence on one sector to widen the tax base for the country.

MAP SHOWING BELGIUM MINERAL DEPOSITS.

FACTORS THAT LED TO THE DEVELOPMENT OF COAL MINING IN THE BELGIUM COALFIELDS.

- Provision of revenue to government through taxes for improved services delivery to people.

- Provision of foreign exchange through export of iron manufactured industrial products to facilitate the delivery of social services to people of Belgium.

- Led to development of urban centres like Antwerp and Brussels to extend services nearer to people like commercial, administrative, residential, etc.

- Promotes tourism that earns foreign exchange to the government as a source of income.

- Provision of employment opportunities to improve the standard of living of people.
- Provides market for both agricultural, mineral and forestry products locally and finished products abroad.
- Led to improved international relationship between importing and exporting countries to trade.

MINING

Belgium has very limited mineral resources. Coal was the chief mining product for much of the 20th century, but deposits were severely depleted by the 1950s. In the 1980s many of the mines were closed, and the last remaining coal mine was shutdown 1992. Coal and oil must now be imported for steel making and other industries.

- The presence of power in form of coal which was initially used to run the industries. Large quantities of coal were mined in the region.
- Availability of easy accessibility to the coal fields which is well served by developed network of, Sambre- Meuse Rivers, Canals, railways and roads to case transport for imports and exports of the region.
- Presence of large skilled labour supply from Belgium and neighbouring migrants from France to work in the coal fields.
- Availability of alternative sources of energy e.g. nuclear, thermal etc. which supplemented coal and hydroelectric power wasintroducedto run machinery in processing coal.
- The presence of large market for coal as raw material and source of fuel for industries from both within and outside Belgium.
- Availability of adequate sums of capital to invest in purchasing of mining equipment (development of related infrastructure from both within and outside) payment of labour force among other things.
- Presence of advanced technology employed in the mining and processing of coal e.g. the introduction of automated operations which eased work and ensured effectiveness and efficiency.
- Availability of plenty of water supply from R. Sambre and R. Meuse for cooling machines, processing coal and transport provided by the navigable R. Meuse to transport coal to market centres.
- Presence of favourable government policy which encourages the coal mining for self-reliance in energy for industrial development.

EXPLAIN THE PROBLEMS FACED BY COAL MINING IN BELGIUM.

- Exhaustion of coal in the mines which has left behind dilapidated buildings.
- Increasing costs of mining with increased depth of mines.
- Increasing competition with other forms of energy like oil, HEP, solar, nuclear energy, etc.
- Unemployment due to closing of some mines after exhaustion of the mineral.
- Stiff competitions from cheap imported coal from coal producers whose productions costs are relatively low e.g. U.S.A.
- Environmental degradation due to large pits and holes from digging the minerals lead to destruction of scenic beauty and breeding places for dangerous pests and diseases.
- Pollution from burning coal with much gas carbons to environment.
- Development of slums and high rates of crimes.
- Traffic congestion due to busy mining and trade around with coal fields.

OUTLINE THE STEPS BEING TAKEN TO SOLVE THE PROBLEMS.

- Recycling of industrial wastes.
- Strict legislation on waste management has been under taken.
- Undertaking massive re-forestation programmes / green belts creation.
- Encouraging raw material and labour saving technology.
- Importation of raw materials like iron ore France and Sweden.
- Diversification of the economy to reduce over dependence on industries.
- Treatment of industrial of industrial wastes before disposal.
- Vertical expansion / building sky scrapers to solve the problem of limited land.
- Use of alternative sources of energy especially oil and natural gas which have less pollution effects on environment.
- Construction of subways/underground tunnels to reduce congestion.
- Refilling of old mines/ pits.

MAP SHOWING BELGIUM TOWNS

BRUSSELS CITY

Brussels (French Bruxelles), city in central Belgium, capital and largest city of the country. Bilingual Brussels became one of Belgium's three federalregions. In 1993, along with Dutch-speaking Flanders (Flemish Region) and French-speaking Wallonia.

The city is located on the Senne River and Boast tree-shaded boulevards, splendid parks, imposing monuments and beautiful buildings.

Brussels is the hub of the Belgian railway system and is linked by canal to the national network of inland waterways and the sea.

The city's port areas is situated the north near Vilvoorde. Among the chief exports are nails, iron, marble, coal, candles, glass and sugar, imports include minerals, palm oil and coffee.

The city has long been known for the production of fine lace, called Brussels lace and for tapestry weaving.

Other industries include printing, brewing, distilling, sugar refining, iron and brass costing and the manufacture of textiles, electronic equipment and furniture.

The dukes of Brabant. By the terms of these documents the imposition of taxes was strictly limited and the people were given a voice in the government.

Trade and industry in Brussels benefited from the promulgation of the charters of 1312 and 1356.

ANTWERP CITY

Antwerp (city), city in northern Belgium, administrative centre of the province of Antwerp is located on the Scheldt River, near the North Sea and Brussels. Antwerp is one of Europe's major seaports, the chief port and second largest city of Antwerp.

FUNCTIONS OF ANTWERP

COMMUNICATION CENTER:it is connected with the industrial regions of south eastern Belgium by the Albert canal, which links it with Liege.

COMMERCIAL CENTER;Antwerp also trades actively with the Ruhr district in Germany. Grain and unrefined metals are major imports, exports include machinery, textiles and other manufactured products.

INDUSTRIAL CENTRE:such industries as diamond cutting, ship building, auto mobile assembly and the manufacture of metal goods, electronic equipment, chemicals and dyes.

TOURISM CENTRE:the most interesting edifice in Antwerp is the Gothic-style Cathedral of Notre Dame (14^{th} and 15^{th} century).

Other points of interest in the city include the town hall and the Gothic-style church of Saint Paul, both completed in the 16tth century and the many guild houses dating from the Middle Ages that still line the market place.

The city has a museum of fine arts with paintings by several of the Flemish masters and botanical and zoological gardens.

Antwerp is a port of commercial importance, developedwhen the first European stock exchange was founded in the city.

The city rapidly became one of the foremost trading and manufacturing centres of Europe. During the early 16^{th} century, the diamond industry was expanded by the arrival of Jewish crafts people expelled from Portugal.

CULTURAL CENTRES:the city was also an active cultural center, renowned particularly for the Antwerp school of painting.

CHARLEROI TOWN

Located in southern Belgium, in Hainaut Province, located on the Sambre River, near Brussels (with which it is connected by canal) the town was formerly the centre of the most important coal-mining region of the country, but all mines were closed by the early 1990s. Metal working and glass manufacturing ore principal industries.

LIEGE CITY

Located in eastern Belgium, capital of Liege province, on the MeuseRiver.

The city's one of the most important river ports in Europe and the transportation and industrial centre of eastern Belgium.

The chief industrial products include ornaments, chemicals, glass, rudders goods, electronic equipment and cutlery.

DESCRIBE THE FACTORS WHICH HAVE LED TO THE DEVELOPMENT OF URBAN CENTRES IN BELGIUM.

- Presence of a positive government policy towards development of urban centres e.g. approved Brussels to capital city status of Belgium and European Union to play numerous functions like administrative, industrial, entertainment, etc.

- Presence of a variety of mineral resources e.g. coal fields lead to growth of mining industry e.g. the Sambre-Meuse and Kempenland regions have become densely populated attracting growth of towns.

- Existence of high levels of technology inform of modern engineering techniques required in design and planning ports and city infrastructure like buildings, roods to connect to canals.

- Existence of growing industries attract people to seek employment and developed industrial infrastructure accelerate growth of towns e.g. Charleroi.

- Availability of well-developed transport and communication systems by roads, railways, waterways using rivers Meuse, Scheldt, canals like Albert canal, Bruges-Ghent canal, etc. to transport raw materials, goods and services.

- Strategic location to the North Sea and though R. Meuse that like up to R. Rhine water bodies has led to growth of ports e.g. Antwerp, Ostend, Zeebrugge, Liege, etc.

- Historical factors e.g. the world wars restricted settlements and farming to some areas due to presence of land mines in some areas e.g. Liege was a Fort.
- Strategic location in Western Europe with access to North Sea e.g. Ostend, Antwerp, Brussels and Ghent made access to overseas easy opened up the Belgian territories to invest from all over the world.

- Availability of adequate capital invests in development of city and port infrastructures to modern status e.g. Antwerp, Brussels and Ghent.

- Presence of improved international trade which brings in raw materials and taking out industrial goods encouraged port developments.

EXPLAIN THE PROBLEM RESULTING FROM URBANIZATION ON THE ENVIRONMENT IN BELGIUM.

- Pollution of air, water and land through improper disposal of urban wastes lead to environmental degradation.

- Competition for land with other economic activities (sectors) making it expensive.

- Traffic congestion in canals, roads, at ports lead to delays in delivery of goods, raw materials and services for growth.

- Easy spread of diseases due to high population increase in cities.

- Unemployment leading to crime rates in the city by urban dwellers.

- Development of slums due to shanty house conditions of low standards of living.

- Loss of vegetation covers for settlements and industrial development.

OUTLINE THE STEPS BEING TAKEN TO SOLVE THE PROBLEMS RESULTING FROM URBANIZATION IN BELGIUM.

– Treatment of industrial wastes before disposal to minimize environmental degradation.

– Environmental legislation on ‘‘Clean Air Act’’, and standards to help rectify environmental climate change disasters.

– Widening and dredging of canals to accommodate large ocean-going vessels.

- Building sky scrapers/vertical expansion to accommodate the increasing population.
- Enforce urban renewal to replace shanty housing unitsin slum areas.
- Expansions of markets through regional economic integrations-EU.
- Construction of tunnels, flyovers and sub-ways to increase accessibility routes to minimize traffic congestion.
- Time-tabling of voyages and flights to reduce on congestion on specific hours.
- Creation of green belts in urban centres and a forestation.