

THE NETHERLANDS

The Netherlands is one of the Benelux countries commonly referred to as the Low Countries. This is because they lie at a low altitude in relation to the sea level. Netherlands is found in the Northern part of the Rhine lands and is sometimes called Holland.

Netherlands is bordered by the following countries:

In the west by Belgium, east by Germany, north and Northeast by the North Sea.

Rivers mainly design Netherlands landscape for example River Rhine and others like Ijssel (Yssel) in the north, Meuse and Scheldt in the south.

The Netherlands is where the Rhine enters the North Sea forming an enormous delta.

Netherlands lies between 51°N – 54°N.

It has most of its land reclaimed from the sea that is man has been able to make use of the land through reclamation.

Amsterdam is the capital city.

Factors that have been responsible for the make-up of Netherland's relief

- **Ice sheets:** these led to glacial deposition of moraine, silt, sand and boulder clay as the ice advanced.
- **River action:** deposition by the major rivers for example River Rhine where the silts and the clays carried by the rivers were deposited on top of the glacial sands. River action also led to the formation of the delta at the coast like the Rhine delta.
- **Inundation by the sea:** as a result of flooding, much of the west and the north were affected because they lie below the high tidal level.
Flooding of the sea leads to deposition of marine clays and sands.

This explains why there are so many sand dunes along the coast of the North Sea.

The highest point of the Netherlands is 321m (1063 feet).

It is called Maastricht and the lowest point is found north of the port of Rotterdam for example 6.7 m below the Sea level

CLIMATE OF NETHERLANDS

The climate of Netherlands is characterised by the following;

- Mild or cool marine summers (19-23°C in July)
- Less severe winters for example 1.5°C in January.
- Average annual rainfall (Precipitation) is 750mm.
- Winter precipitation may at times be in form of snow.
- Annual average temperature is 10°C.
- Rainfall is evenly distributed all year round.

NB: Netherland's climate is of a temperate kind mainly influenced by moist westerly winds due to the nearness of the North Sea and Atlantic Ocean.

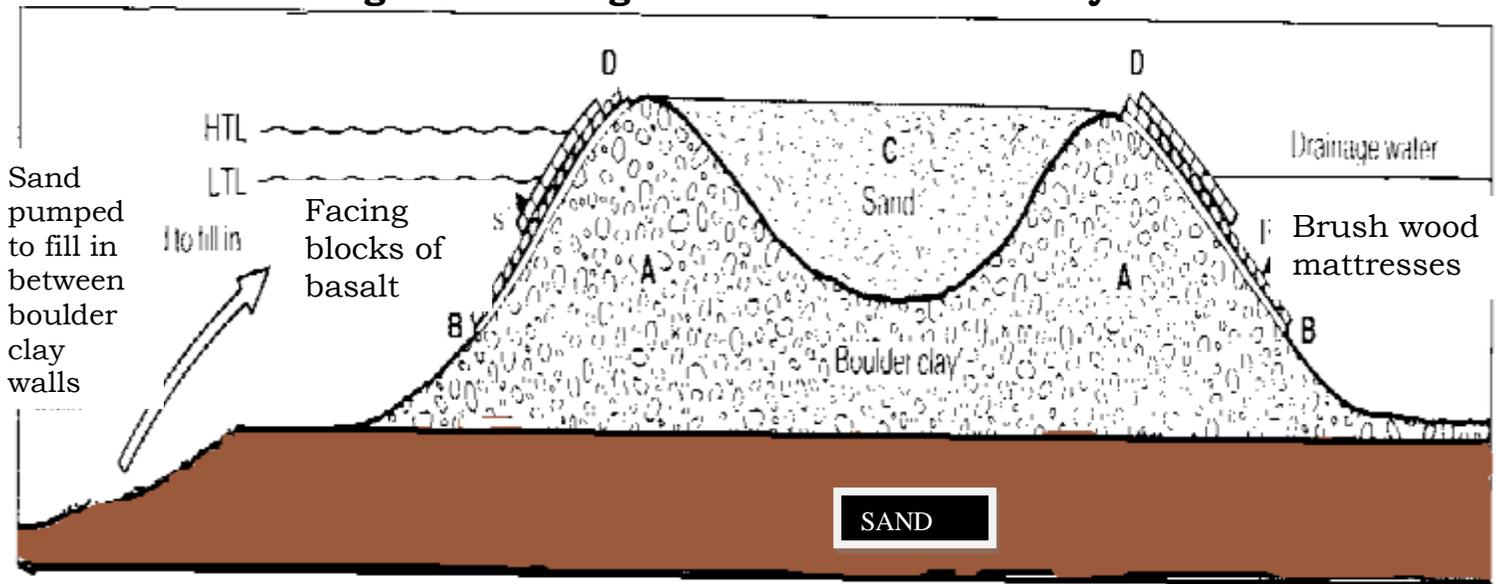
This also sometimes referred to as Mild Marine climate.

DYKE: is a barrier wall built to prevent water from the sea from reaching the land. This means that a dyke is used to separate reclaimed land from the sea.

Steps taken for the construction of a dyke

- Soft layers of soil (mainly composed of clay) are removed from the sea floor by dredging.
- The channel that has been created is then filled with sand and boulder clay.
- The dyke is then covered by brush wood mattresses, which help prevent erosion and wave action on the dyke.
- Stones or gravel are placed on the side to cover the dyke and keep the brush wool in place.

Diagram showing the construction of a dyke



POLDER: is land reclamation from the sea.

There are different types of polders which include;

- Marine polder: that is land reclaimed from the sea.
- Riverine polder: that is land reclaimed from rivers.

Terrestrial polders are barren lands that have been reclaimed.

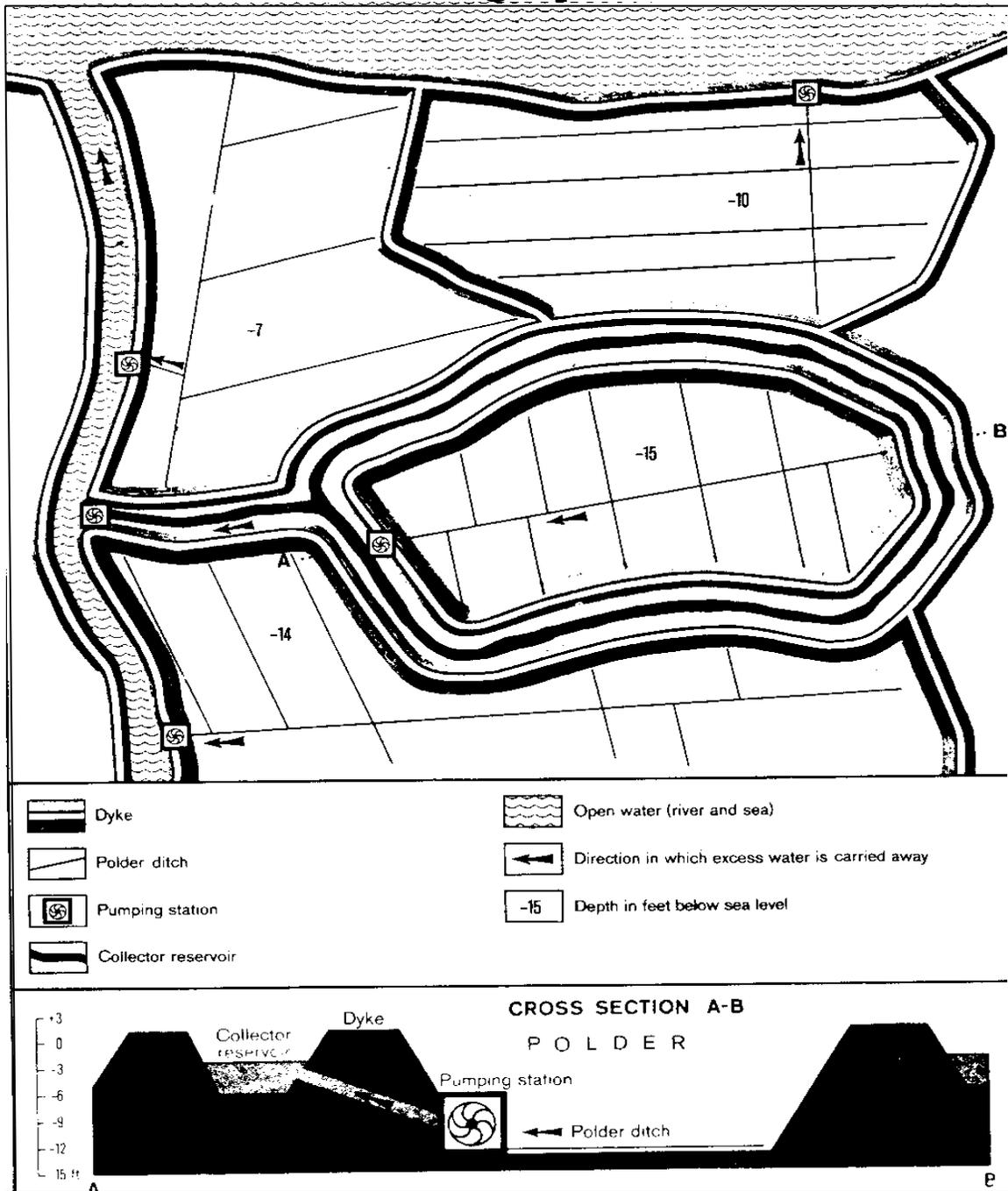
Steps taken in the construction of a polder

- + A ring dyke is constructed around the proposed reclaimed land.
- + The water is pumped out of this enclosed area using energy from windmills or other sources.
- + Reeds are planted in the enclosed area to drain and dry the land further. Reeds also help in desalination of the soil (removing salinity).
- + Reeds are then cut and burnt in the field to provide potash or nutrients for the soils.
- + Ditches and drainage pipes are constructed or installed to keep the land dry.
- + Deep ploughing is done on the land using tractor ploughs, a responsibility of the government. The main aim is to mix the soil layers for improvement.
- + The first crops are planted in order to test the quality of soil on all polders.
- + Lime and other fertilisers are applied to the soil to enhance fertility for cultivation.
- + Farms are laid out on the polders and settlement is established and transport systems are set out.

Examples of polders

- Wieringermeer polder (1930),
- North East polder (1942),
- Eastern Flevoland polder (1957),
- South Flevoland polder (1967) and
- **Markerwaard polder – Markermeer** has never been drained due to the **need to conserve the environment**

Draining a polder



THE ZUIDER ZEE PROJECT

Most of the land in Netherlands was covered by water, so the government thought of reclaiming the sea so that they could get enough land on which people would settle. The government used a Dutch man, Cornelius Lely, to produce a scheme, which would enable the enclosing and draining of the Zuider Zee, hence the Zuider Zee project. This project is located in the northern part of Netherlands in a place called Yssel (Ijssel). It means South Sea because this sea is found south of the North- Sea.

Aim of the Zuider Zee project

The plan of the Zuider Zee project was aimed at ensuring dryness of the old project and to reclaim more land.

It was divided into two sub-sea projects and these included;

i) The closure proper.

This was the first phase of the project and it was achieved by building a massive dam (barrier wall of about 30 km long)

ii) The reclamation of the **four** polders.

This was the second phase where four polders were reclaimed such that they would no longer be affected by tidal movement after the completion of the dams.

It also led to the creation of a fresh water lake resulting from the out flow of the Ijssel River, a tributary of the Rhine.

The work of the project began in 1927 after a storm disaster in 1916, which inflicted a lot of destruction on crops and villages, and it was completed in 1932.

Benefits of the Zuider Zee project

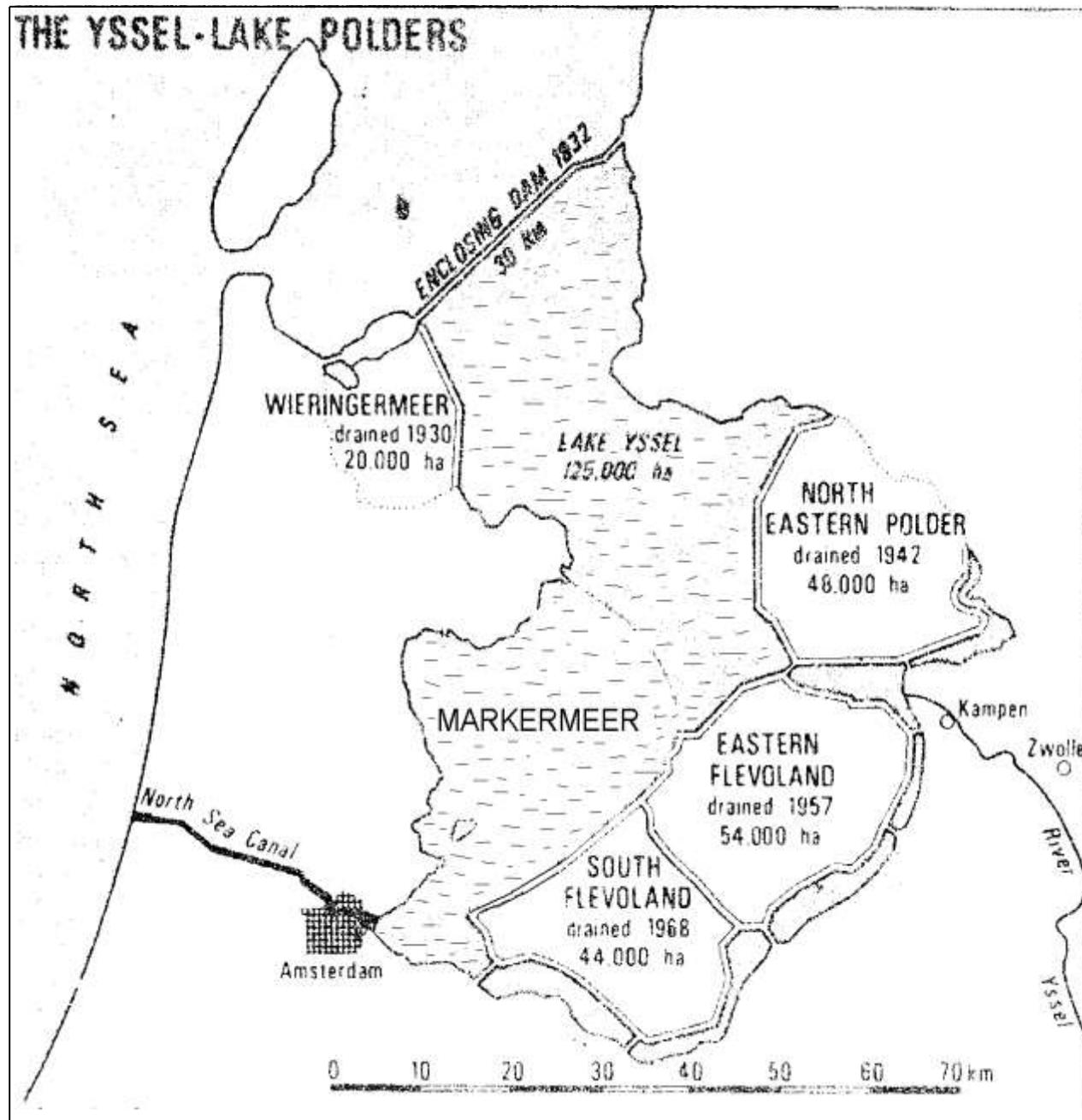
- It has led to creation of a fresh water lake. Lake Ijssel supplies the surrounding area with fresh water for domestic, agricultural and industrial use.
- Ensured a better drainage system as a result of the construction of dykes, canals and ditches in the polders using advanced engineering techniques.
- Zuider Zee has brought about flood control like the barrier dam and the dykes built around the polders have helped protect the land from floods.
- It has helped shorten the coastline by road by about 320km like the 30km barrier dam has a road built over it connecting to the provinces of northern Holland.
- Increase in the coverage of land for example more than 2000 hectares of agricultural land has been created.
- The lake has turned out to be a tourist attraction for recreation for example swimming and sport fishing.
- The lake is also a catchment basin especially during winter like formation snow is concentrated in the lake.
- Fresh Water Lake has helped reduce salinity in the soils of the older polders.

Uses of the polders

The polders of the Zuider Zee project have been used for the following purposes;

- **Farming/ Agriculture:** there is dairy and arable farming, horticulture and fodder crop production.
- **Settlement/ Residential purposes:** villages or settlements have been established in the polders.
- **Urbanisation:** towns have developed for commercial purposes in the area.
- **Industrial development:** industries have been set up or constructed in the polders.
- **Transport and communication:** railway lines. Roads and canals have been constructed across the polders.
- **Forestry:** Forests and woodlands have been conserved in the area.
- **Recreation:** polders have been used for leisure, pleasure and other tourist activities.
- **Fishing:** fishing especially of water eels is carried out and mainly in the Eastern Flevoland polder.

SKETCH MAP SHOWING YSSEL LAKE POLDERS IN NETHERLANDS



Competitive land use in the polders

Polders have been subjected to competitive land use and this has been reflected through the following;

- i) The first two polders were used entirely for agricultural purposes.
- ii) The new polders have been used mainly for industrial purposes, urban growth and for recreation.
- iii) The biggest demand for the polders has been more land for urban development especially by the residents of Amsterdam for example Eastern Flevoland was used for farming but small areas have been used for industry and recreation. In Southern Flevoland, the land is used for non- agricultural purposes.

Land use percentages on the polders

Land use/ percentage	Wieringermeer	North East Polder	Eastern Flevoland	Southern Flevoland
Farmland	87	87	75	50
Forestry, woodland and conservation	3	5	11	26
Urbanisation	1	1	8	18
Industry and others	9	7	6	6

Farming in polders

Agriculture has been widely practised in the polders and agricultural activities include; Animal rearing as well as cultivation of crops and animal feeds.

Agriculture has been dominant because of certain advantages of polders for this land use.

Factors that have favoured farming in the polders

- Fertile soils due to the good mixture of clay and sandy soils.
- Fresh water in the soil because the chlorine and saline conditions have been reduced.
- Adequate fresh water for the crops and animals for example from Lake Yssel.
- Land is relatively flat that has facilitated mechanisation.
- The polders have better drained soils.
- The soils are generally manageable since they were first operated by the state.

Problems of the polders

- Instances of poor drainage especially when the canals and ditches are over grown with weeds.
- Silting of the canals, drainage ditches and trenches.
- Loss of soil fertility due to the intensive nature of the agriculture i.e. soils exhaustion.
- Strong winds especially in eastern Flevoland tend to be destructive to crops and other property
- High costs of maintaining dykes.
- Some parts of the polders still have saline soils, which are not conducive for cultivation.
- Winter frosts still destroy crops.
- Pests and diseases that attack the crops and animals.
- Instances of periodic floods.
- Pollution of the land and water by industries and other activities.

Solutions to the problems

- Constant drainage and mandatory inspection of drainage systems and clearing of canals and ditches.
- Application of fertilisers and use of scientific means of cultivation for example crop rotation.
- Afforestation that is planting rows of trees to act as wind breaks.
- Streamlined system of allocating land only to those bound to manage them well and those who fulfil certain conditions.
- Government has budgeted or set aside funds to maintain the dykes.
In addition, higher and stronger dykes have been erected to prevent possibilities of floods.

- Planting reeds or adding lime as well as fresh water flushing of the soils in order to desalinate the polders.
- Spraying of crops and animals with necessary drugs to guard against pests and diseases.
- Recycling of waste and treatment of waste before disposal to minimise pollution.

THE DELTA PLAN

This was a project or a reclamation scheme in the Rhine region, in the South Western Netherlands meant link the various Islands and headlands to protect the land from the menaces of the sea.

Damming some of the estuaries did this. The delta region is characterised by distributaries with estuaries of River Rhine and River Meuse (Maas).

Historical background of Delta plan

The work on the preliminary studies for this plan started in 1950.

However, from 31st January 1953, a storm and high tides caused serious flooding in the delta region.

This was due to breaching of the dykes in a number of places.

Over 152,000 hectares of land was flooded; 1,835 people drowned and 10,000 houses destroyed as well as thousands of livestock lost.

This disaster convinced the government that the accomplishment of the delta plan was necessary.

Conditions that led to the development of the Delta plan

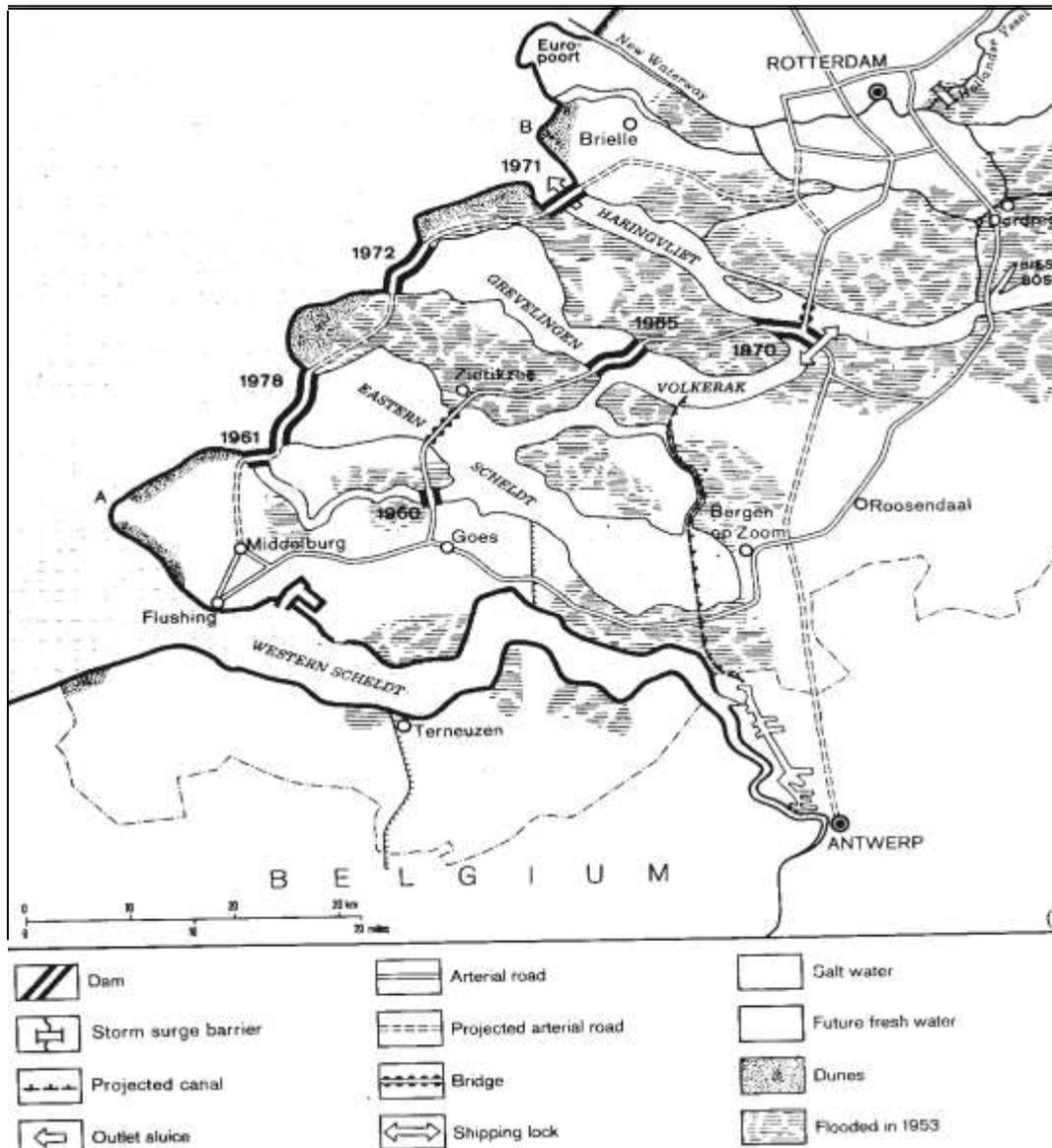
- + Much of the area was lying below the sea level which necessitated the protection from the sea incursions.
- + The massive flood/sea incursion of 1953 which killed more than 1800 people forced the Dutch government to set up the delta plan.
- + Positive government policy of reclaiming more land from the sea for agriculture and settlement.
- + The need to control salination necessitated the development of the Delta Plan.
- + The success attained in the construction of polder in the North/Zee encouraged opening up of the Delta plan.
- + Availability of skilled labour that had technical knowhow in reclaiming land eased the establishment of the Delta plan.
- + Advanced technology that eased the construction of canals and dykes.
- + Large sums of capital that was used in paying of labour and purchase of machinery.
- + Political stability in Netherlands provided a conducive atmosphere in the land reclaiming.

Aims of the project – Delta plan

- To protect the delta region against future floods.
- To reduce salinisation of the Islands in the delta region.
- To construct dams that could shorten the distance by road.
This could also enable or improve on the accessibility of the under developed regions.
- To reduce the coastline by 700km.
- To provide areas of sheltered water for recreation and fresh water for drinking, industrial use and agricultural use.
- To provide some new land for industrial purposes that reclaiming more land for the establishment of industries.
- To increase fresh water fishing in the area.

- To use the areas of deposition in front of the dam as natural reserves.
- To allow access for shipping and to make their journey easier.

The Delta Plan



The works of the Delta plan

Five primary dams were built to seal off the estuaries and several secondary dams were built to improve the road transport.

The dams were built 1 metre higher than the level of the 1950 floods.

Between 1955 and 1971 Haringvliet sluice gates were constructed to allow water from the Rhine and R. Maas to escape into the North Sea.

The tidal action made the final blocking of the dams difficult and this was by using concrete blocks with hollow centres known as caissons enabling them to be floated into different positions.

Two final schemes at the Phillips dam (1985) and the eastern Scheldt dam (1974) were established.

The eastern Scheldt dam was built mainly to protect the livelihood of the fishermen.

This dam was therefore, described as a storm-surge barrier.

The Phillips dam was designed to separate the salty water from the fresh water.

Achievements of the Delta plan

- Floods were controlled, especially the Mouth Sea floods due to the construction of dykes and dams.
- Provision of fresh water for domestic use, industrial and agricultural use.
- The project created more land for agriculture leading to increased food production
- It led to the development of urban centres with associated advantages like increased trade and commerce.
- The project created more land for settlement and industrial development.
- Generation of employment opportunity leading to improved standards of living.
- The dykes were used as bridge points between islands, thus improving communication.
- The project promoted tourism leading to generation of foreign exchange.
- Trade and commerce have been promoted in the region due to the improvement of the transport network and also boosted industrialisation.
- The area has been developed for recreation due to the existence of sand dunes, sandy beaches and water for sporting activities like swimming. It has attracted several tourists thus boosting the tourist industry.
- The coastal distance by road has been shortened for example the distance from Rotterdam has been reduced from 150km to 110km.
- The entire coastline has also shortened by a road distance of 700 km.
- Water reserves have been created behind the dams and have been used for fishing.

Problems of the Delta plan

- Over use of the land by unexpected increase in tourism.
- The construction works has tampered with the natural environment thereby creating ecological problems.
- An increase in ice as a moderating influence of the sea has been reduced.
- There has been growth of second homes in the Dutch society thereby undermining the traditional values.

Problems resulting from the establishment of the Delta plan project

- Decline in the soil fertility due to loss of silt on the agricultural lands
- Siltation of the canals in the reclaimed lands calls for costly constant dredging.
- High cost of constant maintenance of the delta project
- The project led to destruction natural beauty/ bio – diversity.
- The process of water control interfered with fish breeding ground.
- Occasional sinking of reclaimed land leading to destruction of infrastructure
- Pollution of air, water and land as result of industrialization and agricultural practices.
- Occasional floods leading to destruction of dykes and infrastructure
- Salination of the reclaimed of the reclaimed land due to seepage of sea water.

Revision questions:

1. (a) (i) What is meant by a “Marine Polder”?
(ii) Mention any **three** polders found in the Netherlands.
 - (b) (i) Describe the relief of the polders
(ii) Describe the process in the formation of Polders.
 - (c) Explain the importance of Polders in to the Dutch.
 - d) Identify the problems faced in the Polders of the Netherlands.
2. (a) (i) What is meant by the term ‘Polderisation’?
(ii) Identify three polders in the IJsselmeer region of the Netherlands.
 - (b) (i) Describe the process in the formation of a marine polder in Netherlands.
(ii) Explain why the Markerwaard ‘polder’ of the Zuider zee project has not been drained or fully reclaimed.
 - (c) Outline the importance of the polders to the Dutch economy.
 - (d) Describe the problems faced in the polders of the Netherlands.
3. Study the table below showing Land reclamation in the Netherlands and answer the questions that follow:

Land reclamation in the Netherlands (Km²)

Century	Land Reclaimed (Km ²)
1400 – 1500	430
1500 – 1600	730
1600 – 1700	1,150
1700 – 1800	510
1800 – 1900	1,200
1900 - 2000	730

Adapted: Gibbs C.W. The Rhine lands; Revised Edition, EAPH page 96

- a) Draw a line graph to show the trend of the land reclamation in the Netherlands.
- b) (i) Identify the century when the largest area of land was reclaimed.
(ii) Describe the factors which led to an increase in the area reclaimed during the period identified in (b)(i) above.
- c) Explain the benefits of land reclamation to the Netherlands.
- d) i) Name any **two** areas in the Netherlands where land has been reclaimed
(ii) Outline the problems which have resulted from land reclamation in the Netherlands.

AGRICULTURE IN THE NETHERLANDS

Agriculture is a very important activity in the Netherlands.

70% of the country's total area is used for agriculture.

Agriculture accounts for about 6% of the Dutch economy.

A quarter (¼) of the working population is directly or indirectly employed in the agricultural sector.

About 10% of the country's exports in terms of value are agricultural products.

The nature of the agriculture is intensive.

This is because of the high population density of the country such that land has to be intensively worked.

Agriculture in the Netherlands is characterised by the keeping of dairy and beef cattle, piggyery, poultry farming, arable farming and horticulture.

The horticulture is mostly carried out under glasshouses.

Factors that have favoured agricultural development in Netherlands

- Conducive climate: the temperate climate is characterised by cool summers and mild winters with precipitation of about 750mm evenly distributed throughout the year. Average temperature is 10⁰c and there are adequate hours of sunshine.
- Fairly fertile soils like the marine clay that is suitable for arable farming and alluvium clay that is suitable for both arable and fruit farming. The peat soils have favoured the growth of vegetables.
- Plentiful supply of fresh water from the rivers, canals and lakes such as Yssel.
- Existence of flat land that has been conducive for mechanisation.
- There has been agricultural knowledge by the farmers like farmers have been trained in better methods of farming.
- Availability of agricultural extension staff to assist the farmers where necessary such as agricultural skills are available.
- Ready and available market for agricultural products especially in agro-based industries such as food processing. There has been large external market for Dutch agricultural products in the European Union.
- Easy and efficient transport and communication for the transportation of agricultural products like there is good network of roads, rail, and water transport.
- Existence of co-operative societies which assist farmers in the marketing, transportation, storage as well as provision of credit facilities for example co-operatives assist the farms with loans, farm equipment and processing of products.
- Dutch generally are hardworking people.
- Good storage facilities, which have helped in marketing of products.
- Advanced technology, which has enabled the growing of crops in glasshouses during winter and during unfavourable conditions.
- Supportive government policy like teaming up with European Union countries as well as providing incentives and agricultural advice to farmers.
- Traditional/ history of specialisation among the Dutch farmers for example specialisation in market gardening since (17th century).
- Scientific research, which has led to the development of better breeds and systems of farming.

TYPES OF FARMING

Dairy farming:

Dairy farming involves the rearing of cattle for milk and milk products.

In the Netherlands, this is carried out in the North and Northwest near the fresh water lakes. It is also a kind of practice mainly on the low-lying clay and peat soils, which don't support cultivation.

Main types of cattle kept on dairy farms

- The Friesian Holland breed (black & white)
- The Meuse-Rhine Ijssel (Yssel) breed (Red and white)

The Netherlands is one of the world's highest milk producing countries where each cow produces about 4,400 litres of milk a year.

The population of cattle is about 4 million of which $\frac{3}{4}$ are the Friesian breed and $\frac{1}{4}$ are the Meuse-Rhine Yssel breed.

In winter, the animals are kept indoors and fed on fodder while in summers the animals graze on the pastures.

Milking is done by machines and marketed through the co-operative societies. The main products of dairy farming include;

- | | | |
|------------------|-------------|---------------------------|
| - Fresh milk | - butter | - Ultra heat-treated Milk |
| - Tinned milk | - yoghurt | - powdered milk |
| - Condensed milk | - ice cream | - cheese. |

Holland is the largest exporter of cheese in the world.

It is also one of the leading exporters of condensed milk in the whole world.

It is the 4th leading exporter of butter in the world next to New Zealand, Denmark and Australia.

Conditions that have favoured cattle rearing

- Availability of pastures that is the animals are grazed during summer since the pastures are artificial and nutritive.
- Availability of feeds for animals especially during winter when they are stall-fed for example on silage and special concentrates.
- Agricultural knowledge in animal husbandry. The farmers are skilled in the scientific rearing of animals.
- The efficient transport and communication network for the provision of inputs and movement of products to the market.
- Ready market for the products e.g. the Netherlands is the largest exporter of cheese in the world.
- Advanced technology. Management of animals is mechanised. For example, the milking of the cows is done by machines.
- Organisation of dairy farmers into co-operatives to facilitate the marketing and acquisition of inputs.
- Availability of enough fresh water for the animals.
- Positive government policy that has favoured agriculture and cattle rearing in particular.

Importance/benefits of Dairy industry in Netherlands

- Provides employment for example about 3000 people are directly employed in the dairy industry.
- Products are marketed or exported, thus bring in income. Netherlands is the biggest cheese and condensed milk exporter in the world, and 4th in butter. Most are exported to the tropical and sub-tropical countries.

- It has effectively utilised the areas of poor soils that may not support cultivation.
- It is a food source to people.
- Source of animal manure for horticultural arable farming.
- Source of market for goods from other sectors like machinery and drugs.
- Source of raw materials for industrial developments of creameries or milk processing plants.
- They have also acted as tourist attractions. Tourists may visit dairy farms for study, research, and leisure.

In addition to cattle rearing, the **other forms of livestock farming** include;

Piggery farming:

This has improved due to the increase on the European Union market breeds. They grow very fast and have been introduced and generally the cost of products has been low and this has promoted the export of pork.

Poultry farming:

This is the intensive rearing of chicken. Several hundreds of chickens are kept on farms using in door feeding rooms at controlled temperature. The products have been eggs, chicken meat and bones.

These products tend to be exported. Live chicken is also exported.

Arable farming:

This is practised in the fertile well drained sea clay lands of the North East and South West, crops grown include cereals such as wheat, barley, oats and others like potatoes and sugar beets.

The main places of Arable farming are Groningen, Haarle and Meer.

The arable farms are generally large and the average size of plots is about 25 hectares.

Arable farms tend to be mechanised.

Arable farming in the Netherlands has been promoted by the following factors

- The government through the European Union has promoted market for cereals. Agricultural policy for farmers is established like farmers are offered minimum prices and also imports of sugar and cereal have reduced.
- Increase in the land acreage under reclamation.
- Scientific methods like introduction of more productive and more resistant varieties and carrying out soil research.

Horticulture

Horticulture is carried out near the urban centres where there is ready market provided for the products.

Horticulture in Netherlands is characterised by an intensive form of farming and capital intensive.

It is characterised by an intensive form of farming carried out under glasshouses.

There has been an increase in the production of horticultural crops in the Netherlands especially under glasshouses than any other country in the world.

Horticultural products contribute about 20% of all the agricultural production in terms of value.

Dutch horticulture is divided into a number of branches and these include;

- **Vegetable growing:** involves the growth of vegetables such as lettuce, tomatoes, cucumber, cauliflower, and spinach. This is important in South Holland glass district. The important production centres are the Westland on the Kring.
- **Fruit growing:** include; apples, pears, plums, cherries, and apricots.

Fruit growing is important in the province of Guelder land (between rivers Rhine, Meuse and Waal).

- **Floriculture:** is the growing of flowers or cultivation of flowers that are used for decoration, for gifts and for celebrating occasions. Floriculture is important in Aalsmeer near Amsterdam.
- **Bulb growing** like onions. This is important in the coastal areas.
- **Arboriculture:** involves the production or scientific cultivation of trees and shrubs.
- **Horticultural seed production:** is a branch of horticulture for carrying out research in order to produce better variety seeds.

Horticultural production under glasshouses:

Glass houses are agricultural houses constructed of glass material in which all necessary conditions for plant growth are provided like light, moisture and warmth; So that by the end of the harvesting season, maximum output is obtained.

Crops grown under glasshouses are vegetables, fruits, flowers, and production are carried out almost throughout the year since conditions like temperature and humidity are controlled.

Heat is provided using heating pipes.

In winter, furnaces provide heat with tall chimneys.

The plants are also irrigated using irrigation pipes.

Fertilisers are applied and plants are sprayed.

Glasshouses are usually sited along canals to facilitate transportation of products and inputs.

Production under glasshouses has the following advantages;

- There is controlled and managed growing conditions for the crops like crop growing doesn't depend on the dictates of nature.
- Crops can be grown throughout the year.
- Crops that wouldn't otherwise survive in temperate regions can be grown under controlled growing conditions.
- Attacks by pests and diseases are easily controlled.
- Destruction of crops by natural hazards is minimised.

Factors that have favoured horticulture in the country

- Geographical position of the country in Western Europe among the densely populated countries thus providing market for the farm products.
- Readily available domestic market.
- Efficient transport and communication system by road, air, water and rail.
- Advanced technology like Glasshouses.
- Dutch traditional/ history of specialisation in market gardening since the 17th century.
- Abundant Skilled labour is available.
- Scarcity/ shortage of land has encouraged intensive agricultural practices.
- Availability of capital especially from industrial centres.
- Organisation of farmers into co-operatives.
- High level of advertising.
- Supportive government policy of co-operating with the European Union countries in terms of research for horticultural education.
- Mild climatic conditions of the environment.

Problems facing horticulture in the country

- Climatic hazards like frost and strong winds which tend to restrict horticulture to glasshouses.
- Crops grown are highly perishable leading to post harvest losses.
- Pests and diseases.
- Stiff competition for the market with other countries.
- Soil exhaustion.
- It is capital intensive.
- High dependence on external markets such as European Union market.
- Floods.
- Salinity of soils.
- Limited land for horticultural purposes.

Possible Solutions

- Refrigeration and cold rooms to preserve products after harvesting.
- Diversification of crops to suit different climatic conditions like tomatoes, cucumber, melons during summer and lettuce, cauliflower during winter.
- Spraying to fight pests and diseases.
- Use of fertilisers/manure.
- Planting reeds and application lime to reduce salinization.
- Research and development to improve technology of glass houses.
- Construction of dykes to control floods.
- Intensive farming and reclamation of more land to solve the problem of land shortage.
- Containerisation to facilitate transportation of exports and minimise damage.

Revision questions:

1. (a) Draw a sketch map of the Netherlands and on it mark and name:
 - (i) River Rhine
 - (ii) Lake Ijsselmeer
 - (iii) Towns: The Hague and Amsterdam
 - (iv) Any **two** areas under horticulture. *(6 marks)*(b) (i) Mention any **two** crops grown under horticulture in the areas named in (a)(iv) above. *(2 marks)*
(ii) Describe the factors which have led to the development of horticulture in the Netherlands. *(6 marks)*
(c) Explain the problems affecting the horticultural industry in the Netherlands. *(6 marks)*
(d) Outline the measures being taken to solve the problems in (c) above. *(5 marks)*
2. (a) Draw a sketch map of the Netherlands and on it mark and name:
 - i) The North Sea
 - ii) Lake Ijsselmeer (Yssel)
 - iii) River Rhine
 - iv) Towns: Utrecht and Rotterdam
 - v) Dairy farming provinces: South Holland, North Holland and Friesland. *(08 marks)*(b) Name any **two** types of dairy cattle breeds reared in any **one** province named in (a)(v) above. *(02 marks)*

- (c) Describe the conditions which have favoured the development of the dairy farming industry in the Netherlands. (08 marks)
- (d) Explain the benefits of dairy farming to the people of the Netherlands. (07 marks)
3. a) Draw a sketch map of the Netherlands and on it mark and label the following:
- North Holland dairy farming region
 - North Sea and Lake IJsselmeer
 - Towns: Rotterdam, Amsterdam, and Groningen
 - North East Polder. (07 marks)
- b) Describe the conditions that have favored the development of dairy farming in the Netherlands. (08 marks)
- c) Explain the contribution of dairy farming to the economy of the Netherlands. (08 marks)
- d) Mention any **one**:
- Dairy product produced in the Netherlands. (01 mark)
 - Country where the Netherlands exports her dairy products. (01 mark)

MINING IN THE NETHERLANDS

The major minerals mined in Netherlands include;

Natural gas

Netherlands has one of the world's largest gas fields. It is mined in the northern part of the country; in Groningen, around Rotterdam and East of Hengelo. Natural gas has replaced coal as the major source of fuel. This is because it has the following advantages over coal;

- It is economical to use.
- It is easily transported using pipelines.
- It is easily produced and mined.
- It causes less air pollution.

Overtime, there has been a general reduction in the production of gas mainly because of the fear of exhaustion.

Coal is mainly mined in the South at Limburg (Maastricht). However, production has declined due to a fall in demand for coal and an increase in demand for natural gas.

Petroleum is mainly mined in Rotterdam, The Hague, and North Eastern areas.

It is mainly used as a raw material in the chemical industry. Generally, oil deposits are in limited quantities therefore most of the petroleum requirements of Netherlands are imported. A major problem in mining petroleum (and Natural gas) has been underground water.

Salt is mainly mined in the East and North of Holland and brine is pumped and processed in the Industries.

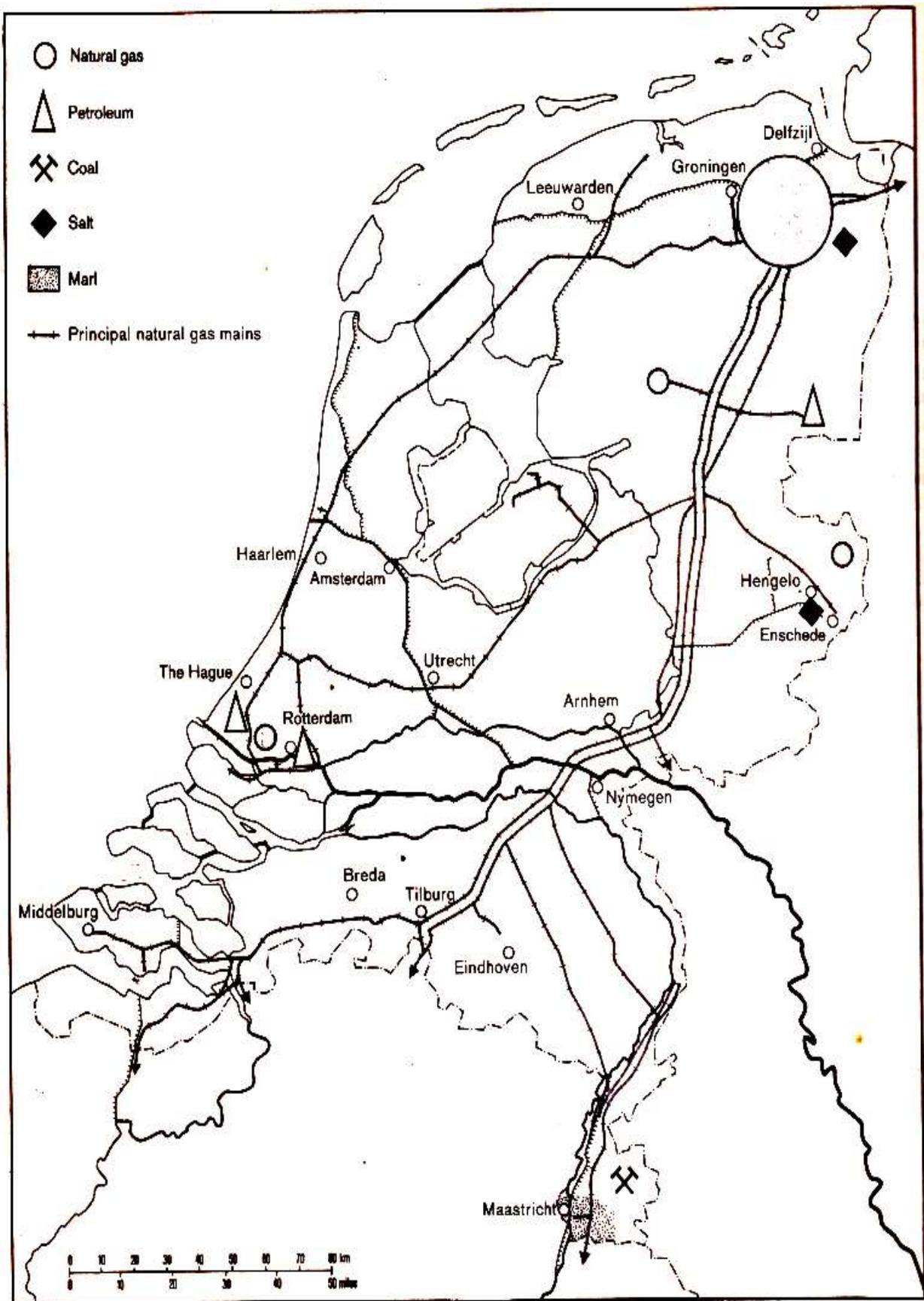
Peat is organic material that is partially decomposed by water action.

It is obtained in the South East at Drenthe and is mainly used on horticultural farms as well as a source of fuel.

Clay, sand and Gravel are mined in several places along the coast. They are mainly used for construction purposes.

Marl is a mixture of soil, clay, lime and carbonate. It is mined at Maastricht and is used to make cement and fertilizer.

Sketch Map of the Netherlands showing the mineral deposits



ENERGY IN NETHERLANDS

The main sources of energy include:

- Natural gas
- Petroleum
- Coal
- Nuclear power
- Hydro electrical power
- Wind Energy

The most important source of energy is natural gas, which is cheaper and more convenient. The main sources of natural gas within the country include Groningen, East of Hengelo and around the North Sea.

Industries that earlier on used coal have now switched to natural gas, which acts as both a source of power and raw material in some industries. Hydro Electrical Power are very limited due to inadequate natural resources.

INDUSTRY IN NETHERLANDS

This is the most important sector in the Dutch economy.

It contributes 4.2% to the GNP and employs 44% of labour force.

FACTORS FAVOURING INDUSTRIALISATION IN NETHERLANDS

- + **Location:** The geographical position of Netherlands in Central Europe has provided accessibility to the wide market of Europe; hence the industries are able to market their products effectively.
- + **Improved and efficient Transport:** The deep navigable waterways, roads and rail network have provided easy movement of finished goods and raw materials between industries and markets.
- + **Adequate Raw materials:** These are available from the farms within Netherlands as well as some minerals that are used as raw materials. Some raw materials are also imported.
- + **Constant Power supply:** There is a reliable source of power to run the industries. It is mainly got from natural gas that is produced locally. Thermal energy is also generated from petroleum and coal. Wind energy is also used.
- + **Abundant Labour supply:** The large population has provided a great human resource to work in the industries; both skilled and semi-skilled labour.
- + **Adequate Capital:** to finance industrial activities.
- + **Industrial Inertia:** The existence of several industries in one place has stimulated the growth of other industries.

INDUSTRIAL AREAS OF NETHERLANDS

• West Holland Conurbation, Randstad

It is the most industrialised region of Netherlands. It is made up of centres like; Amsterdam, Rotterdam, The Hague, Dordrecht. The major industries here include; Ship building, food processing, chemical industries, oil refining, electrical works, metal manufacture and paper industry.

• Eastern Industrial Region

The major centres are at Hengelo and Enshode.

The leading industry in this region is the textile industry (both natural and synthetic fibre).

• Southern Industrial Region

The major centres include; Maastricht, Eindhoven and Geleen.

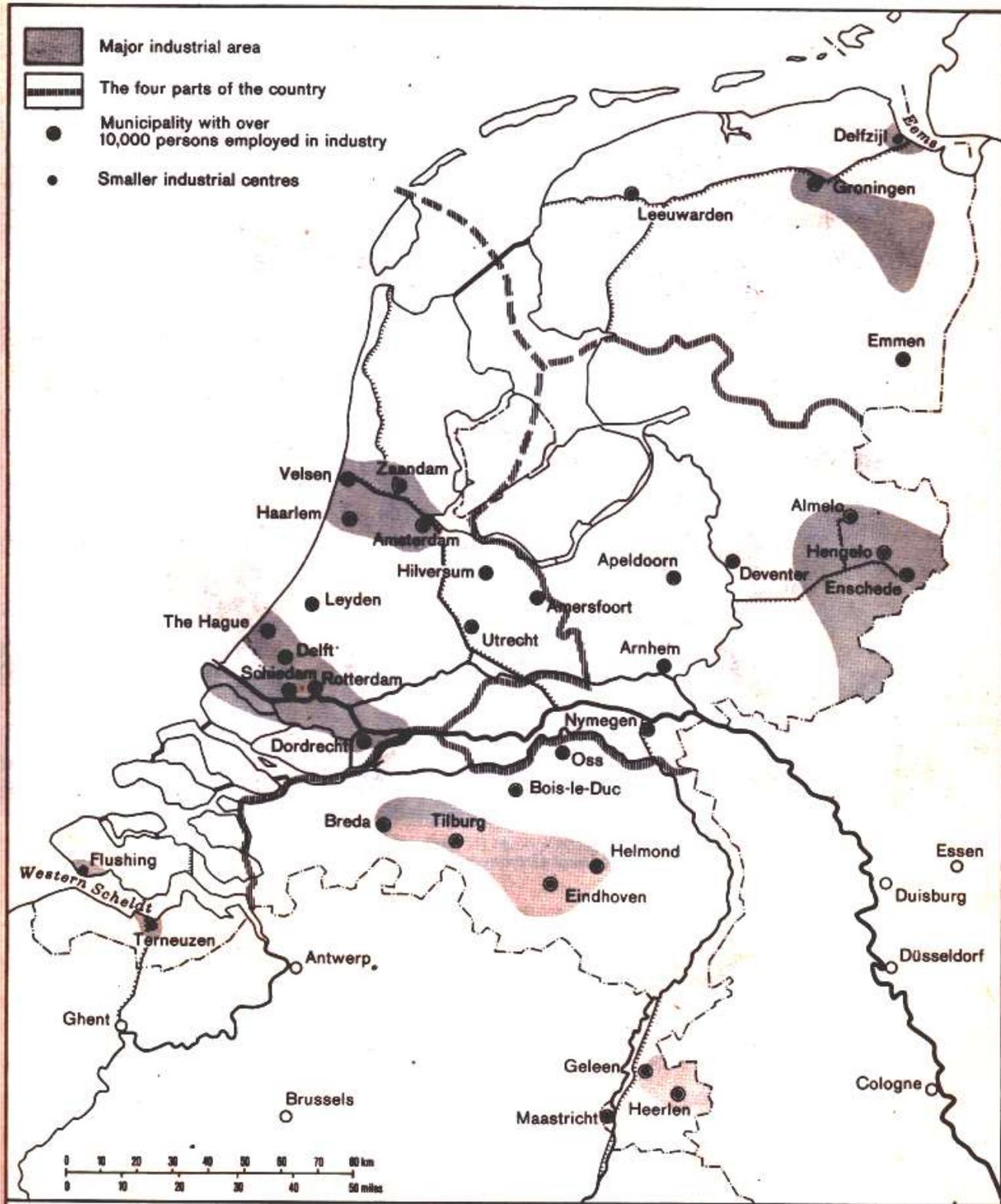
The main industries are; food processing and light engineering industries.

• **North Industrial Region**

The major Centres include, Groningen, Emmen and Delfzil.

The industries include; chemical, food processing, brewing and textile industries.

The Netherlands map showing the Industrial regions



MAJOR TYPES OF INDUSTRIES IN NETHERLANDS

CHEMICAL INDUSTRY

Most of the chemical industries are based on oil. A few others are based on salt and coal. Oil based chemical industries mainly use natural gas as their source of energy. Products of the chemical industry include; synthetic fibre, plastics, medicine, fertilizers, paints, detergents and cosmetics.

METAL MANUFACTURE

It involves production of pig iron. The raw materials include iron ore, aluminium, coking coal and limestone used in blast furnaces. The products include roofing materials, wires, cables, machines and household appliances. The important centre for the industry is at Eindhoven where the Dutch firm Phillips is located.

FOOD PROCESSING INDUSTRY

The products include, milk, meat, vegetables, tea, coffee and cocoa. Drinks are also processed like, soda, fruit juices, beer and spirits. The main centres include Rotterdam, Amsterdam, Leeuwarden and Deventen.

TEXTILE INDUSTRY

Mostly undertaken by large companies depending on natural and manmade fibre. Centres include; Maastricht for woollen textiles, Hengelo for cotton textiles, Arnhem for synthetic textiles.

DIAMOND CUTTING INDUSTRY centred at Amsterdam.

POTTERY for ceramic products like pots and cups at Delft and Gouda.

PROBLEMS OF INDUSTRIALISATION

- Pollution of air and water by industrial waste.
- Threat of exhaustion of minerals like natural gas.
- Competition for market with other foreign companies.
- Congestion in the area as a result of industrial inertia.
- High costs of importation of raw materials as a result of increased costs of production.
- Technical unemployment which causes idleness and increased crime rate.

POSSIBLE SOLUTIONS

- Treatment of industrial waste before disposal.
- Recycling of waste to avoid wastage of by- products.
- The government embarked on setting tough laws against environmental pollution.
- Seeking other market opportunities abroad. Netherlands took advantage of its membership with the European Union to attract other markets.
- Putting controls on the exploitation of minerals like natural gas and instead import what is needed.
- Industrial areas have been demarcated to avoid overcrowding or congestion.
- Setting up of new industries in other areas other than the already industrialised areas to ease congestion.

TOURISM INDUSTRY IN THE NETHERLANDS

The Netherlands is a country to which a number of tourists go.

The major tourist attraction includes;

- Towns and cities of historical and cultural value.
- Paintings
- Old windmill systems like at Kinder Dijk
- Land scape produced by reclamation such as the polders

- The barrier dams and dykes
- The delta works and storm surge protection facilities.
- Agricultural establishments like the extensive and colourful bulb fields, glasshouses and dairy farms.
- Wildlife at Zoological gardens for example the Blijdorp Zoological Garden, in Rotterdam, which features a large oceanarium (Aquarium for sea life)
- Industrial establishments or factories
- Mining centres
- The Rotterdam – Europoort and Amsterdam port facilities
- The drainage features like the IJsselmeer and the coastal beaches
- Vegetation types like the forests, grasslands and flowers.
- Sex tourism such as in the Red-light districts of Amsterdam.

PORT/CITY OF ROTTERDAM

It is located on a small creek formed by river Rote which is a tiny tributary of river Leek. These are small rivers associated with the Delta of River Meuse and the Rhine.

Rotterdam is connected to the North Sea by port referred to as Europoort.

Its development dates back to the 19th century and since then, it has become a major international seaport in Europe.

It is one of the busiest seaports in the world.

It is the largest and the busiest port in Europe and takes about 30% of the share market.

It serves as a gateway and transshipment harbour to the Rhine basin.

Functions of Rotterdam

Rotterdam serves the following;

- It forms a natural outlet for the Rhine basin which is a productive hinterland and this has favoured its development into a large seaport that is it serves the inland areas with oil by pipelines like from Rotterdam to Amsterdam and Flushing, and from Rotterdam to Antwerp and Brussels in Belgium. It also connects Frankfurt in Germany by pipelines.
- It is a port handling most of the imports of the region for example bulky goods like Petroleum coal, iron ore, and timber. However, petroleum is most important. It also handles several exports of the region and mainly manufactured goods and foodstuffs.
- It is a transit port or transport port. It handles 60% of the country's cargo while 40% is cargo that is exported after processing at the port.
- It is an industrial area. There is ship building and engineering industries. Its position on the North Sea at the mouth of the River Rhine and River Meuse has favoured its development as an industrial area.
- It is a major residential area. There are several settlements with a high population.
- It serves as a major distribution centre for Western Europe. It is a distribution centre for a variety of imported commodities. It serves more than 350 million people within a radius of 500km for example it serves as a centre of commerce and trade.
- It forms a direct and cheap route into the interior, which shortens the distance along the River Rhine connecting to the Ruhr region.
- It is a recreation and tourist centre. This has helped to bring in foreign exchange and helped create employment opportunities.
- It also serves as a cultural centre.

INDUSTRIES IN ROTTERDAM CITY

Rotterdam is one of the industrialised cities in the Netherlands.

A number of industries are based in this city.

Major industries include;

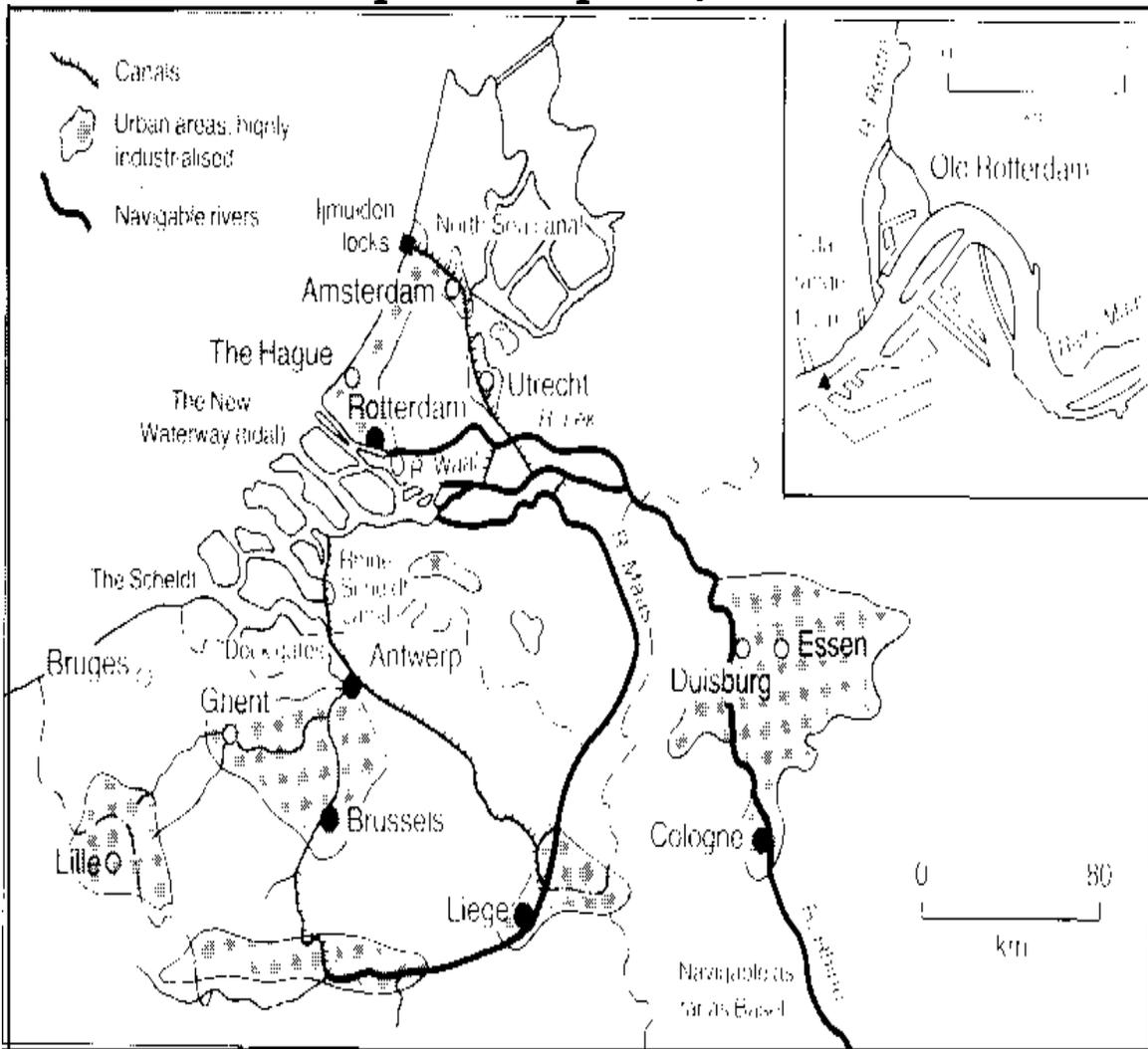
- Ship building and repairing industry.
- Marine and engineering industry, which involves the manufacture of lock gates or sluices and equipment for the manufacture of bridges.
- Vegetable oil refining industries and Consumer goods industries.

These industries have provided employment and source of cheap commodities for people.

Factors that have led to the growth and development of Rotterdam

- Its geographical position/strategic location at the mouth of the Rivers Rhine, Meuse (Maas) and Waal. This has favoured the development of navigable waters; both natural and man-made give it an access to major international markets.
- Its proximity to the North Sea coast making it a gateway to Europe and the rest of the world.
- There are deep waters of up to 19 metres that can accommodate large ocean going fleet for example the presence of a deep-water harbour.
- Historical factors: It is an area of ancient settlements which gained importance over time through trade and establishment of industries.
- Existence of sheltered harbours. The port is sheltered from strong winds
- Low tidal range which allows the navigation of large ocean-going vessels
- Existence of flat landscape for the establishment of port facilities.
- Ice free conditions all year round due to the North Atlantic drift which allows for the function of the port throughout.
- Availability of a well-developed transport and communication networks, which has favoured a number of economic activities including industrial development. There has been a good linkage of different transport types like roads, rail, canal, and air transport for intra-hinterland movement.
- A rich hinterland which has encouraged a lot of trade and industrialisation leading to development of Rotterdam as an important centre for handling the products involved.
- Construction of canals like the development of the fine deep ship canal that was able to handle large ocean-going vessels encouraged the growth and development of Rotterdam.
- Availability of first-class facilities that were constructed at Europoort, which is also known as gateway to Europe further gave importance to the port of Rotterdam. Europoort is found at the sea-ward end at the Island of Rosenburg.
- Investing in strategic partnerships or cooperation in joint activities with other countries or companies (like Maersk) in order to expand route links.
- Expanding the ship handling facilities to accommodate more vessels construction of the Maasvlakte 2 and widening of the Amazone Haven.
- Availability of supportive government policy of focusing on reliable, efficient and sustainable activity based on advanced technology, research and innovation.
- Presence of vast land for the construction of the port through Polderisation.
- Presence of adequate capital for the construction and establishment of port facilities
- Availability of abundant supply of skilled and semi-labour has helped in the construction of the port facilities.
- Advanced technology for establishing such as dredging of shallow areas, construction of canals, locks, quays, dock gates and polders.

Site map of Europoort/Rotterdam



Problems faced by Rotterdam port

- Traffic congestion leading to delays in shipments.
- Too much cargo to be handled at a time because of the available port facilities may not accommodate this.
- Fog leading to poor visibility hence risk of accidents
- Limited land for expansion of port facilities and industrial establishments.
- Silting of the canals/waterways due to flat landscape, thus reducing the depth of the harbor limiting the anchoring of the vessels
- High levels of pollution of the environment by industrial waste as well as ships and automobile.
- Population pressure leading to overcrowding, unemployment and strain on public utilities.
- High crime rate due to high population, unemployment and influence of drugs.
- High costs of dredging due to siltation of the water way.
- The area below the sea level suffers from occasional flooding leading to destruction of infrastructure.
- Occasional sinking of the port facilities especially on reclaimed land thus destroying the infrastructure.

- Moral decay – drug abuse and prostitution.

How the problems are being solved

- Time tabling of the vessels to minimize delays and congestion.
- Containerization for quick loading and off-loading of cargo.
- Expansion of the port facilities to include Europoort. Also, construction of the Maasvlakte 2 and widening of the Amazone Haven to accommodate more ships.
- Construction of by-pass canals or waterways to minimize congestion.
- Execution of the Europoort project to shorten the coastline in order to minimize Sea incursion.
- Regional cooperation for joint development of the Rotterdam port and the Rhine water way.
- Use of strong fog lights and flood lights to improve on visibility
- Use of radar to detect incoming ships in case of fog
- Dredging of the canals and water ways to minimize effect of silting.
- Treatment or recycling of waste to minimize pollution.
- Use of roll on and roll off facilities at the port.
- Reclamation of more land around the port to create more room for expansion.

AMSTERDAM

It is the capital city of Netherlands and located on the arms of River Amstel.

It has a deep-water harbour, which can accommodate large ocean-going vessels.

It is connected to the North Sea by North Sea canal and to the River Rhine and to the Amsterdam Rhine canal.

Its outer port is called Ijmuiden.

Factors that have led to the growth and development of Amsterdam

- Its central position on the North Sea trade route. It has enabled development of trade and transit activities that has led to expansion of Amsterdam.
- Amsterdam has a large rich hinterland that it serves. It serves the major industrialised Rhineland countries.
- It has a deep-water harbour, which was opened way back in 1870 and allows large ocean-going ships right to Amsterdam port via the North Sea canal.
- The Dutch are hardworking people who have developed Amsterdam as a seaport.
- Availability of capital both in form of cash and in equipment to develop the port into a modern sea port to serve countries in central Europe.
- Availability of abundant skilled labour to set up the facilities.

Functions of Amsterdam

- It is a seaport that handles goods for the Rhineland countries.
- It is an important centre for export and import trade.
- It is an industrial centre such for ship building industry and oil refining industry.
- It is a commercial centre with commercial activities like trade, banking, insurance, and other industrial activities.
- It is an administrative centre. It is the capital city of the Netherlands.
- Tourist and recreational centre because of the various attraction sites in Amsterdam.
- Transport and communication network. There are all transport means centred in Amsterdam like rail, road, air, and water transport.
- Amsterdam is a major educational centre. A number of schools, colleges based in Amsterdam.

Problems of Amsterdam

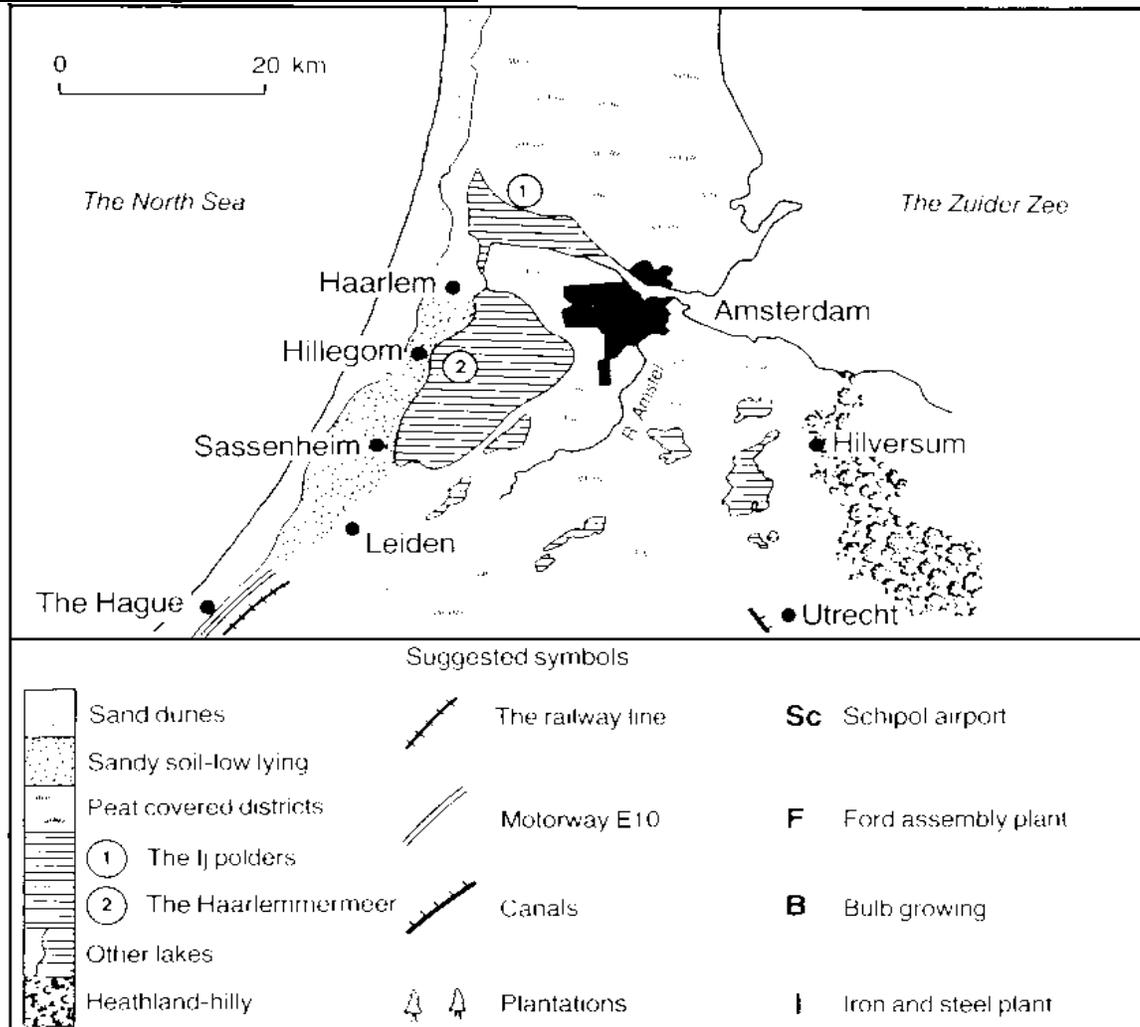
Amsterdam faces the following problems.

- Congestion at the port by the arriving and departing ships leading to delays
- Pollution by the industries, by the ships and other traffic forms.
- Limited land for expansion of the city due to other competing land uses.
- Population pressure on land. High population density leading to overcrowding and associated problems.
- Unemployment and under employment because of the high population.
- High criminal rate due to unemployment, over population and influence of drugs.

Possible solutions

- Extension of the port facilities in order to reduce congestion.
- Treatment of industrial waste and ensuring proper disposal and the enactment of anti-pollution laws.
- Population has been encouraged to move to reclaimed lands or polders for resettlements.
- People have been encouraged to engage in private productive activities and also the government has tried to secure market for Dutch products with aim of expanding industrial sector so as to create more jobs.
- Tough anti- crime laws have been passed and police has been strengthened, trained and well equipped to fight crime.

A site map of Amsterdam



THE RHINE WATERWAY

Location:

The River Rhine is the most important waterway in Europe.

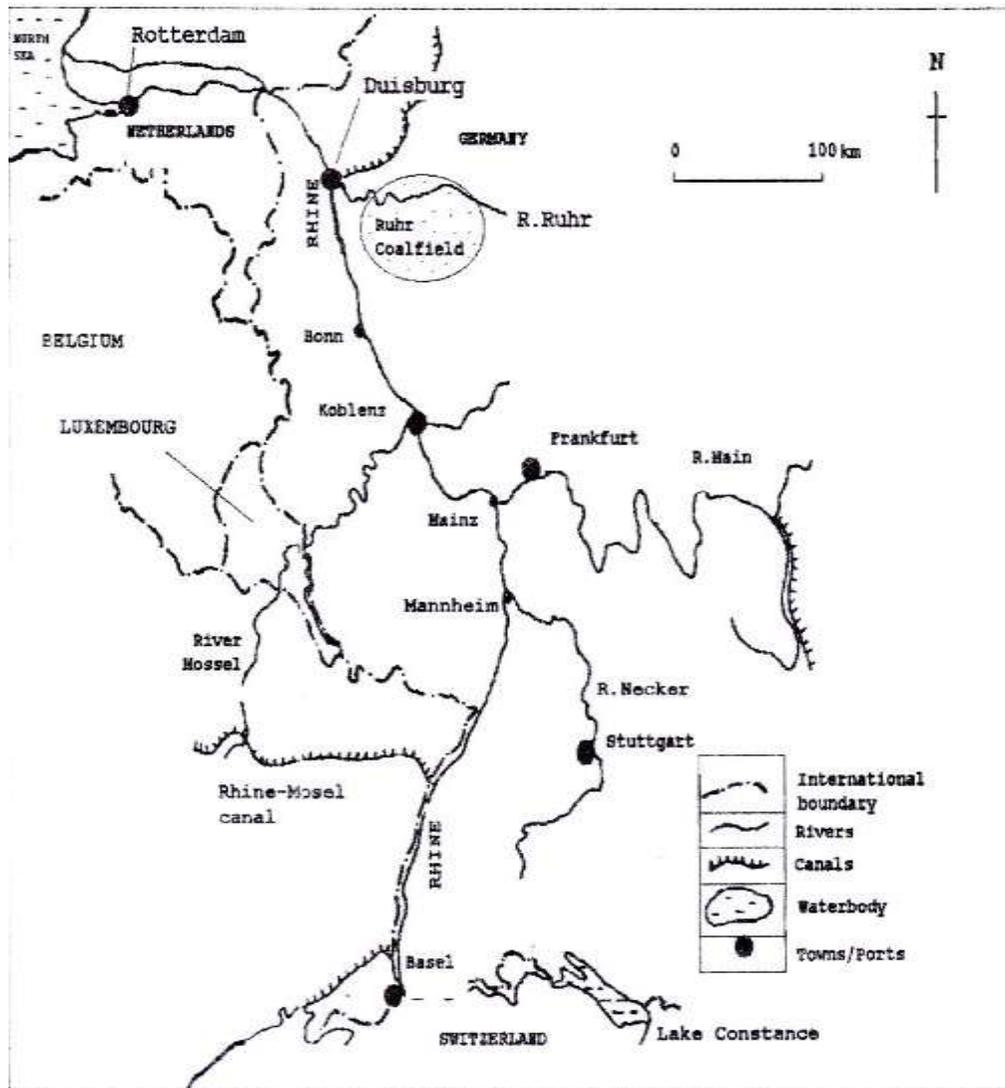
River Rhine flows from Basel in Switzerland, through Germany and the Netherlands to the North Sea. It covers a distance of about 800 km (500 miles).

Features of the Rhine River:

The river is linked to the various tributaries, such as the Neckar, the Main, Moselle, Ruhr, Emscher and Lippe rivers.

In addition to the above, the waterway has been greatly improved by the construction of several canals such as Dortmund-Ems canal, Rhine-Herne canal and Lippeseite canal as shown on the sketch map below:

THE RHINE WATERWAY



The upstream of the Rhine River flows through uplands such as the Vosges and Black forest mountains in southern Germany.

It also flows through the Rhine gorge a long narrow section about 50 km long.

Ports and town:

A number of ports and towns have developed along the Rhine River are Rotterdam, Duisburg, Cologne, Bonn, Frankfurt, Koblenz and Basel.

Factors which contributed to the development of the Rhine waterway

Physical Factors:

- Presence of River Rhine and its tributaries such as Mosel, Ruhr, Lippe, Emscher and Main.
- The rivers experience little seasonal fluctuations in the water level hence ideal for navigation.
- The waterway is ice-free hence could be used throughout the year.
- There was need to create sea routes for landlocked countries like Switzerland and Luxembourg found in the heart of Europe.
- The water way is strategically located draining into the North Sea (the busiest in the world) connecting Europe to other international ports such as New York.

Human Factors:

- Presence of large productive hinterland hence handling large exports and imports by highly industrialized countries such as Germany, Switzerland and Belgium.
- High level of technology which enabled the controlling of the river's course through dredging, the use of concrete and brick sides and the building of several canals linking to the river.
- Presence of a highly skilled labour force to control the river channel and building of canals and the straightening of the Rhine River.
- Regional co-operation between the Rhineland countries to develop the waterway.
- There was need for cheap transport for bulky raw materials such as iron ore and coal.
- Availability of adequate capital for modifying the waterway and construction of ports.

Benefits of developing the Rhine waterway

- The Rhine waterway has provided cheap water transport for bulky imports. Imports include iron ore, coal, and crude oil while exports or downstream cargo includes chemicals, fertilizers, machinery and automobiles.
- It has solved the problem of land lockedness of Switzerland and Luxembourg.
- It has led to stimulation of industrial growth due to the easy acquisition of raw materials and distribution of manufactured goods like in the Ruhr region.
- The Rhine waterway has stimulated trade between the Rhineland countries and the rest of the world.
- It has encouraged the development of the agricultural sector due to the large demand for agricultural products by the large population in the ports and urban centres in the Rhine valley.
- Foreign exchange for economic development is earned by the Rhineland countries, as the waterway is an important tourist attraction.
- It has promoted international relationships especially among the user countries for example it has helped to create political togetherness among the countries of Switzerland, Germany, Netherlands and France.
- Employment opportunities have been generated especially in the transport sector thus providing people with income.
- Various ports and cities have developed along the waterway like Rotterdam, Cologne, Dusseldorf, Duisburg and Basel, with developed infrastructure.
- The waterway has stimulated the exploitation of natural resources for example minerals and power resources in the Ruhr region.
- The waterway is a source of revenue for economic development for the Rhine countries through taxing of ships and other water vessels that use it.

Challenges faced by the Rhine waterway

- The Rhine waterway is one of the busiest in the world. There are therefore delays due to congestion especially at Rotterdam.
- There is silting of the river and canals especially in the lower Rhine valley due to deposition of sediments.
- Pollution of the water through oil spills and atmosphere through gas emissions from ships and other water vessels.
- The Rhine is liable to flooding especially in spring when the winter snows begin to melt and in early summer when glacial melt-waters come from the Alps.
- The Rhine gorge area is narrow which limits the size of vessels used on the route.
- Fog reduces visibility and sometimes causes delays and accidents like downstream from Mainz in Germany.
- The waterway has encouraged the growth of urban centers and their associated problems such as unemployment and congestion.
- Destruction of aquatic life in the river along the seaway.
- Poor visibility along the waterway due to smog.

Solutions to the challenges facing the Rhine waterway:

- Containerization is carried out to ease loading and unloading which ultimately reduces congestion and delays.
- There has been construction of the other modes of transport such as pipelines, roads and railways to reduce congestion on the waterway.
- Time-tabling of the arrival and departure of vessels is done to reduce congestion.
- Strong lights or flood lights are used to see through fog and avoid collision of water vessels.
- There is use of radar systems to determine the direction, distance, size and speed of other vessels when there is smog to avoid accidents.
- Regular dredging is carried out to deepen and widen the rivers and canals to control silting.
- Legislation or laws are being enacted against pollution.
- Building of concrete and brick sides or embankments is being done to control river flooding.
- There is co-operation among the member states to clean up the river.

Revision question:

1. a) Draw a sketch map of The Rhine waterway and on it mark and name:
 - i) The North Sea
 - ii) Basel and Mainz
 - iii) River Neckar and Mosel
 - iv) Netherlands
- b) Describe the factors which have contributed to the development of the Rhine River as an important waterway
- c) Explain the benefits of the Rhine waterway to the Rhinelands.
- d) Outline the problems faced by the Rhine waterway.
- e) What steps are being taken to solve the problems in b) i) above