S2, 2020 Geography notes: Region The Rhineland: The Netherlands

- ***NB: Print the work and Copy notes in your note books.***
- ***If you are interested in the text book call 0775534057.***
- ***Use the same contact for explanations, send your questions through WhatAsp 0775534957***

THE NETHERLANDS.

The Netherlands, a small country in North-western Europe that faces the North Sea. It is the largest of the Low Countries, which also include Belgium and Luxembourg.

The Netherlands is often called Holland, but Holland is really the name of only the north-western part of the country i.e. the provinces of North and South Holland, which are in the coastal Polders

The Dutch have a saying that "God created the world, but the Dutch created Holland." ***About half the land in The Netherlands lies at or below sea level.***

Much of this land has been reclaimed from the sea. The Dutch built dikes around swampy or flooded land and then pumped the water out. The pumping was originally done with windmills, but today electric pumps are used.

The region resulted from Moraine depositions of the retreating ice sheets.

Location.
The Netherlands is a country located in the Northwest of Europe. It borders the North Sea on the west side, Belgium to the south and Germany to the east and across The North Sea lies the East coast of Britain.

The Netherlands is located in the Northern hemisphere between longitude 3°E and 8°E of Greenwich and latitude 51° N and 54° N of Equator.

The Netherlands has a land area of 41,562km² and population of 16,570,613. The overall population density is 491 persons per sq km, making.

The Netherlands one of the most densely populated countries in the world. The nation is heavily urbanized, with about 67 percent of the population living in urban areas.

Amsterdam is the capital and largest city. The seat of the government is at Hague. Rotterdam is the major Dutch port and the country's second largest city.

Limburg (province)

The Netherland's, southern most province of the Netherlands. The capital of the province is **Maastricht**. Limburg is 2,167 sq km in area. It is bounded on the north and northwest by the province of Noord-Brabant (North Brabant), on the east by Germany, and on the south and southwest by Belgium.

It is covered by very fertile loess (wind-deposited soil). In the northern part there are areas of sand and gravel, deposited long ago by floodwaters.

The Meuse River traverses the whole length of Limburg, and small adjacent sections of the province are covered with river clay. Much of ***the province is devoted to agriculture.***

Limburg became a province of the Netherlands near the end of the Napoleonic Wars (1799-1815),

The provinces of the Netherlands

- The Netherlands also consists of ***twelve provinces***", each under a Governor called a commissioner of Queen except for the province of Limburg where a commissioner is called a Governor.
- All provinces are divided into municipalities, 430 in total.
- The country is also sub-divided in water districts governed by a water board, each having authority in matters concerning water.

12 Provinces of the Netherlands		
Province	Area km²	Population
Drenthe	2,641	490,981
Flevoland	1,417	387,881
Friesland	3,341	646,305
Gelderland	4,971	1,998,936
Groningen	2,333	576,668
Limburg	2,150	1,122,701
North Brabant	4,916	2,444,158
North Holland	2,671	2,669,084
Overijssel	3,325	1,130,345
Utrecht	1,385	1,220,910
Zeeland	1,787	381,409
South Holland	2,814	3,505,611
Total	33,751	16,574,989

THE RELIEF OF THE NETHERLANDS

The country is generally lowland, except for Limburg in the southern part. The relief is composed of three zones: the Sand dunes, Rhine Delta and Uplands and the lowlands.

a. The Coastal Lowlands.

It has the following characteristics:

- The region has polders between the Hook of Holland and Den Helder. Has a group of islands and peninsulas separated by long, shallow tidal inlets of River Rhine tributaries that form at a delta. The tributaries are Ijssel, Waal Lek, and Maas.
- A bout a half the country lives no more than 1m above sea level, ¼ of this land is below sea level.
- The coast has sand dunes and bars. These act as natural defences for the land below the sea against sea inversions.
- The coastline has dykes/barrier walls (dams) especially in the south to protect the land against sea incursions. (polders).

The Interior Netherlands (45-90m).

It has the following characteristics:

- These are extensive undulating tracts of sand and gravel. It has alluvium deposited by floods of river Maas.
- As one moves further to the east, the land becomes slightly higher and flat to gently rolling hills. These hills do not exceed elevation of 50m.
- The lowlands have the major towns and cities of Holland which include Amsterdam, Rotterdam, The Hague, Meus, Maas, Tric and Groningen.

The land below the sea level.

It has the following Characteristics:

- A large part of western Holland lies below sea level. Above 25% of the area lies below sea level.
- Most of the land has been reclaimed either from the sea or from the lakes that were previously formed by moraine deposition of the retreating655 ice sheets.
- The coastline is composed of sand bars and dunes by the sea. This was severe between 11th and 13th centuries when the sea was swallowing up the land.
- In the 13th century the Dutch started to reclaim the land from the sea which they called Dyke to safeguard the land from sea waves.
- The land formed below the sea level is a home of 605 of the country's population.
- Zuidplas polder is the lowest point in Holland at 7 metres above sea level.
- The polder region forms over two fifths of the country. It has the country's most productive farmlands and cities.

The-Rhine-Meuse- Scheldt delta.

It has the following characteristics:

- This river delta is formed by confluence of the Rhine, Meuse and Scheldt rivers at the North Sea.
- It is formed by a multitude of islands, river tributaries and canals. The delta is entrance from the North Sea to the central Europe hinterland through the estuaries and canals.
- It has major ports such as Rotterdam, Amsterdam that are connected by the *Amsterdam-Rhine canal*. Antwerp (Belgium) and Ghent through the Ghent-*Terneuzen canal*. The Delta lands are protected from sea floors by dykes (delta works).

(a) **Sand Dune Belt.**

This was formed by wind and wave deposition. It has an average height of about 4.6m-7.6m above sea level and helps to protect the interior against flooding by the sea. In the North, the line consists of Western Frisian Islands, broken by wide river inlets in the south.

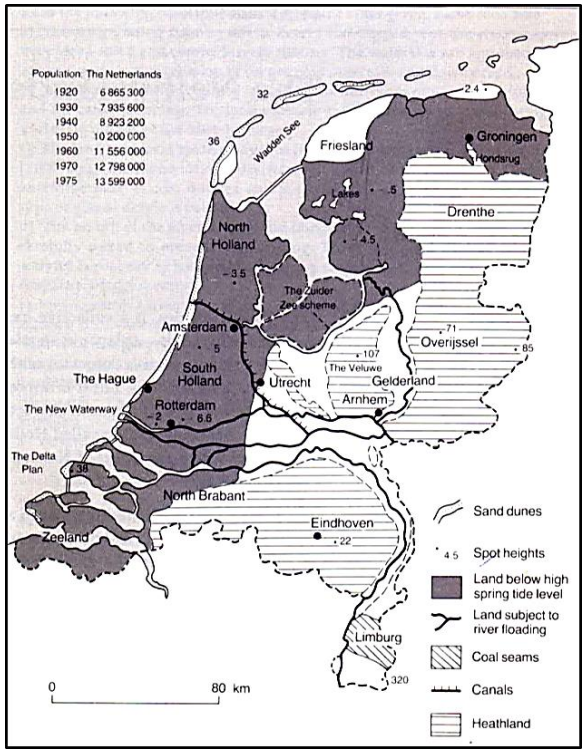
(b) South upland.

East and south of Holland is higher land with minor hills, the area is mostly flat. It is only in the extreme south that the land rises above sea level at 323m. Vaalseberg in the foot hills of Ardennes Mountains. There are several foothill mountains in the central parts.

Plateau (90-180m):
South Limburg is a plateau that rises 90m to 180m a.s.l. the land raises to the south to a rounded summit of Vaalseberg an altitude of 320m. This is the highest point in the Netherlands.

SOILS
Netherlands has a variety of soils which include; sandy marine clay soils that was deposited by the sea or was under lake or mashes. The sandy soils are mainly found in the East, Central and South. They usually suffer water shortages.

MAP OF THE NETHERLANDS SHOWING RELIEF AREAS



CLIMATE

a) These soils are mainly used for growing scotch fir, larch and Douglas spruce.
b) In the low lying areas the sandy soils are used for grazing.
c) They support bulbs, tulips grown between Leiden and Haarlem.
d) Alluvial soils have been deposited along river banks; the marine clays are suitable for arable farming, grazing and fruit growing.
e) Peat soils (soft black or brown soil) are scattered in various locations in the West and North and are suitable for grassland and vegetable growing

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 characterised 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 Atlantic Ocean, during the winters daytime temperatures differ from 0 to 6°C in winter and 17 to 22°C in summer. Though, the weather can be easily changed around.
2. The influence of the prevailing Easterly winds from the North Sea gives the Netherlands leads to:

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+°C and winter temperatures can go far below 0°C.
d) The average temperature is 2°c in January 19°C in July, with an average annual temperature is 10°c, clouds generally appear every day and so is fog in the winter months, rainfall occurs frequently.
e) The average annual 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 southwest, 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^{o}C warmer in winter or cooler in summer than places in the southwest of the Netherlands.

3. **Influence of the ice days (period);** the maximum temperature below 0^{o}C that usually occur *from December to February* with the occasional rear 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^{o}C experienced between April and September. The maximum temperatures in summer days go up to 25^{o}C experienced *from May to August* tropical days (maximum temperature above 30^{o}C are rear and usually occur only from June to August.
- Generally, precipitation is received throughout the year and is relatively equally shared by each month.

THE NETHERLANDS DRAINAGE.

The Netherlands is drained by;

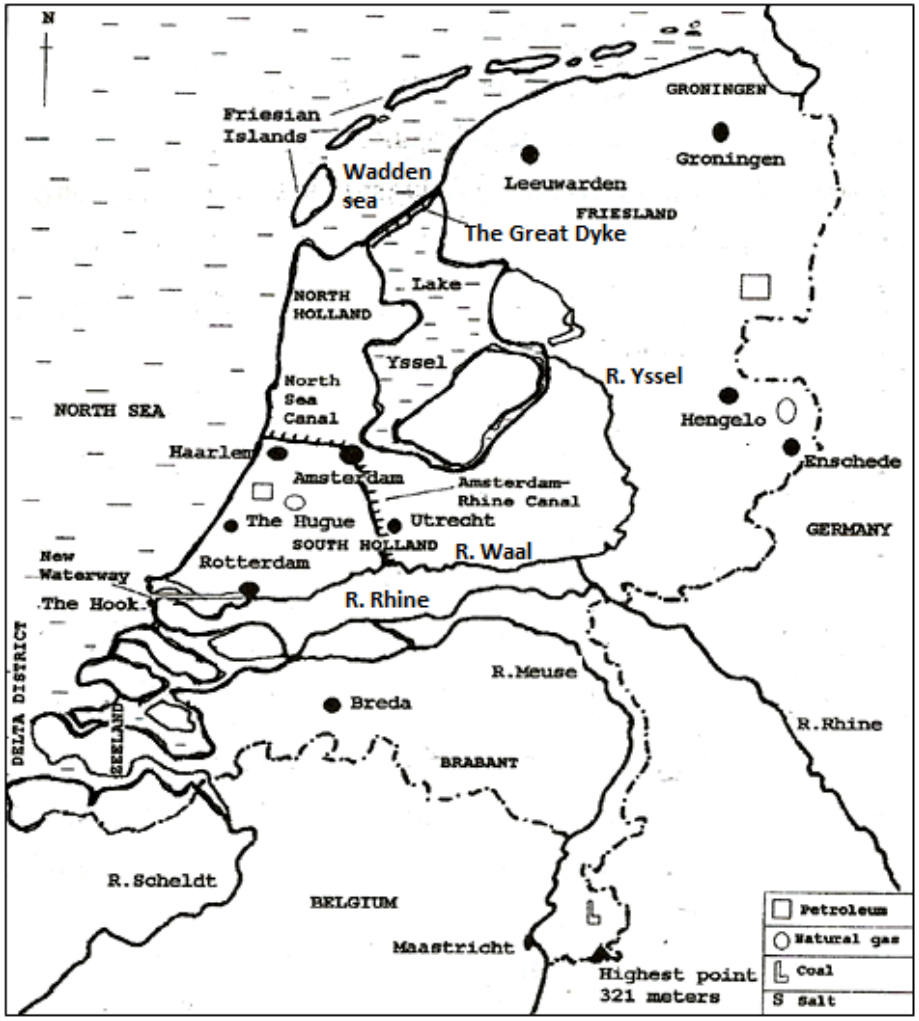
1. Rhine River, system,
2. Meuse river system,
3. the Scheldt river system and
4. Yssel river system which drains into Lake Yssel in the centre of the country.

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 Atlantic Ocean (North Sea) with the floating sand dunes underlying the coast.

MAP OF THE NETHERLANDS SHOWING DRAINAGE, CITIE AND CA NALS.



The major towns and cities of The Netherlands.

In the Dutch law the general consensus is a city should constitute a population of not more than 30000 to 50000 inhabitants.

1.The Hague;

- Is the third largest city of the 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: The Hague is the seat of the Dutch parliament, government and Royal Court. Queen Beatrix of the Netherlands lives and works in The Hague.
- An administrative centre, Home of all foreign embassies, government ministries as well as the Supreme court of justice, council of state and many lobbying organisations.
- The Hague is 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 de 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 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 industrial centre with ship building, sugar refinery, publishing, brewing, heavy machinery, paper products, textile, aircraft 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 The Hague.
- Amsterdam is a financial and business capital of The Netherlands.
- Amsterdam stock exchange (AEX) is part of the Euronext and is the world's oldest stock exchange.
- Amsterdam is the province of the North Holland, Rotterdam and The Hague in the South Holland; Utrecht is the province if Utrecht join up to form a metropolis called Ramstad, a largest Metropolitan area in Europe.

3. Maastricht.

- The city is located in the Southern Netherlands, as capital of Limburg province and the Maas River, near the border with Belgium.
- It an industrial centre, has textile, chemical, ceramics and glass industries.
- It is 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 16th 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 cite of historic summit meeting where leaders of the 12 European community nations agreed on a treaty to speed up their economic and political integration (the Maastricht Treaty)

Groningen.

- Groningen, city in the north-eastern Netherlands, capital of Groningen Province, on the canalized Hunze River.
- 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 oilseed.
- In addition, many goldsmith, silversmith, and book-printing shops are located in the city.
- A tourist centre with the places of interest like; Saint Martin's Church (13th to 16th century), the Aa Church of 13th century, and the New Church of 17th 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 Desiderius Erasmus, annotated by the German religious reformer Martin Luther.

1. ROTTERDAM PORT.

- Located in the south western Netherlands in Zuid Holland (South Holland) province. It is a major port on River Maas near The Hague.
- Rotterdam is one of the major seaports of the world, directly linked with the commercially important Rhine River.
- It's is the principle centre of overseas trade for the Netherlands and heavily industrialised Ruhr region of Germany.
- Rotterdam port once suffered destruction by bombing during world war II(1939-45). A modern planned city was built after.
- The chief residential and commercial centre, areas are located on the Northern bank of the Maas River. The west of the Hoogstraat coolsingel is the spacious shopping centre called The Lijnbaan is open to only pedestrians and the stock exchange traverse.
- Tourist centre with the attractions like Boymans-van Beuningen Museum, Blijdorp Zoological Garden is an outstanding European example of such grounds, the popular "Euromast" stands at 186m tall, Europe skyline Top, New Orleans Tower, etc.
- An educational centre that has a popular Erasmus university at Rotterdam.
- A deep-water channel known as the New Waterway, opened in 1872, was constructed (1866-1890) to allow access by large oceangoing vessels from the North Sea.
- This channel, and the expansion of trade it allowed, was largely responsible for the city's economic boom in the late 19th century.
- Europort, a large harbour area at the western end of the channel, was built in the 1960s, chiefly for the unloading and storing of oil from large tankers.
- Other extensive port facilities and major industries, including oil refineries, shipbuilding 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.

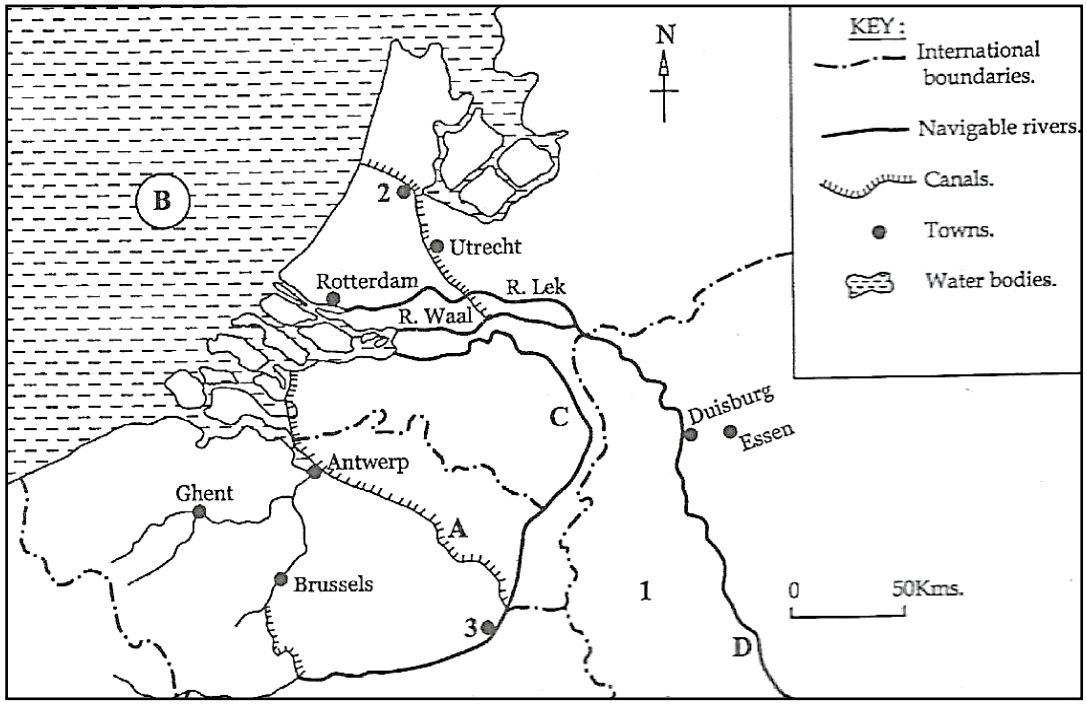
Study Sketch map showing the location of Rotterdam port and neighbouring cities and answer the questions that follow.

a) **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-** Liege.

a) Explain the factors which influenced the location of Rotterdam Port or Basel.

- The location of Rotterdam at the Rhine River, as an important waterway to the interior of Rhineland countries.
- Presence of deep natural harbour 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.
- Existence on relatively flat landscape 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 waterway 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, etc for export at the port.
- Existence of ice free conditions enables the use of the port all the year round.
- Presence of low tidal range that prevents the occurrence of accidents by water vessels.
- Presence of deep water canals to create "the new Rhine waterway canal" after dredging, that allows large ocean going vessels to sail easily.
- Availability of adequate skilled manpower to work in the construction, maintenance and management 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 waterway, canals and dredging canals and the port.
- Favourable Dutch government policy in relation to the development of the Rotterdam into a modern port through investment of more resources into a modern port.
- Availability of adequate capital invested to modernize the port and all western Europe contributed to development of Rotterdam inform of capital and manpower to handle exports and imports.

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 port is a great transport and communication centre, with the Rhine waterway 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 the Netherlands e.g. the Montevideo tower (160m tall)
- 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.
- Rotterdam is a commercial centre with well-known streets as shopping centres like the Lijnbaan, the Hoogstraat, the coolsingel with the city hall and the Weenie. The stock exchange traverse.

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 a busiest port in the whole of 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 New waterway leading to high costs of dredging.
- High levels of unemployment as a result 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 for low income inhabitants.
- Shortage of fresh water supply as the port grows and expands.
- Frequent Flooding of rivers 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 exports and imports to overcome congestion.
- Vertical expansion of the port facilities is being encouraged to overcome the limited space, construction of skyscrapers is in progress.
- Time tabling freight to minimise delays and congestions both on water and land.
- Construction of by-pass canals to minimise congestion and delays of traffic.
- Encourage regional cooperation among the Rhinelands 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 in-coming ship when there is fog to minimise 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.

Sample question. UNEB 2018

Study table below showing the weight of goods (000s) tonnes handled by selected maritime Rhinelands ports in 2014 and answer questions that follow.

Cargo port	**Weight of goods (000s) tonnes**
Rotterdam	421,600
Antwerp	180,400
Hamburg	126,000
Amsterdam	97,100
Bremerhaven	53,600

Adopted: ec Europa. Eu/Eurostat news release No 184/2016 28 september 2016.

a) Draw ***a pie chart*** to show the relative importance of the Rhineland maritime ports.

b) (i) identify the port with the highest tonnage of goods.

(i) Describe the factors that have favoured export and import trade in the port named in (b) (i) above.

(c) Explain the problems faced by sea ports in the Rhineland region.

(d) Outline the measures being taken to improve import and export trade.

b) (i) Rotterdam port – **421,600,000 tonnes**

(ii) **Describe the factors that have favoured export and import trade in the Rotterdam port.**

- Presence of a large market due to increasing population led to more imports and exports.
- Presence of a deep natural harbour to handle large ocean vessels / ships.
- The widening of the harbour after 1952 provided large accommodation for big ships.

- Existence of a strategic location of Rotterdam port facing at the North sea give it an access to major international markets.
- Availability of efficient transport to connect to the rich hinterland for goods.
- Presence of ice free conditions because of the North Atlantic drift helps the port to operate throughout the year.
- Availability of advanced technology for the construction of the port facilities to encourage international trade.
- Rotterdam port is well sheltered by the hook of Holland that prevent it from strong winds.
- There is a low tidal range that allows docking of the vessels loading finished goods and raw materials throughout the year.
- Presence of large land for construction of infrastructure.
- Availability of skilled labour to operate port activities for easy trade.
- Presence of large sums of capital invested in the construction and expansion of the port facilities.
- Availability of supportive government policy that encourages the construction of port.

(c) Problem faced sea ports in the Rhineland region.

- The area below sea level suffers from occasional flooding leading to destruction of infrastructure.
- Silting due to the flat landscape thus reducing the depth of the sea limiting area for anchoring the vessels.
- Congestion leading to delays in shipment due to fog leading poor visibility hence accidents.
- Limited land for expansion due to other competing land use activities.
- High costs of dredging due to siltation of the waterway.
- High levels of pollution due to industrialisation in the hinterland.
- Development of slums and associated evils like high crime rates.
- Occasional sinking of port facilities especially on reclaimed land thus destroying the infrastructure.

(d) Measures being taken to improve import and export trade in the Rhineland.

- Containerisation to ease loading and offloading of goods / Roll on – Roll off facilities controlled environment pollution through legislation / setting up laws / treatment of industrial wastes.
- Improve loading and off-loading through timetabling to avoid congestion.
- Mechanisation of port activities through use of cranes, loaders etc.
- Use of alternative means of transport like air to reduce congestion.
- Reclaiming of more land for industrial expansion.
- Use of radars / flood lights to solve problem of poor visibility.
- Introduction of a common currency like Euro to ease trade transactions.
- Regional Cooperation e.g. EU, Benelux countries to promote international trade.
- Intensified advertisement to widen the market base.
- Provision of the trade (on-line trade) to speed up trade transactions.
- Expansion of container terminals to accommodate more imports and exports.

LAND RECLAMATION IN THE NETHERLANDS

Land reclamation is the transformation of wasteland 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.

(i) in 1334 the sea broke through sand dunes to form Friesland island,

(ii) In 1421 the most fertile part of the country around Dordrecht was submerged and 72 villages were destroyed.

(iii) In 1530 the centre of the town Reimerswaal disappeared under the sea,

(iv) In 1953, the sea broke through Southern Netherlands in 67 places, four hundred hectors of fertile land were flooded, many people were drowned and thousands of cattle were lost.

Note: Dykes begun to be built in 1000 AD to protect land from sea attacks. Some towns have their names from towns built on rivers e.g. Amsterdam on river Anutel, Schredam on River Schie.

CONDITIONS WHICH LED TO LAND RECLAIMATION FROM THE SEA BY THE DUTCH.

Two major reclamation projects the Zuiderzee and Delta plan were undertaken to work on the Land reclamation in Holland.

- ***To protect the land by 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.

- Land reclamation was aimed at ***creation of more land for settlement*** of the large /dense population of The Netherlands.

- There was need to ***create more land for cultivation*** around the coastline with the polders today most intensively farmed parts in Western Europe. E.g. Flevoland.

- The desire ***to protect the soils from Salination*** by the salty sea water at the coastal farmland. There was need to enclose the low-lying areas, drain away the salty water in order to boost the productivity of the soils.

- Land reclamation was undertaken to ***provide fresh water*** for; agriculture, horticulture and livestock at Amsterdam, Zwolle, Friesland, Leystad. This was done by building a barrier dam to cut off the North Sea and create freshwater lake- Ijssel (Yssel).

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

- Sea reclamation is on-going 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.

The Rhine Delta project.

The Rhine Delta 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 southwest 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 of the Rhine, Maas and Scheldt rivers with dykes linking the inlands of Walcheren, Noord-Bevrlands, Schouwen, Goeree, and Voorne and created what amounts to several freshwater lakes that are free of tides.

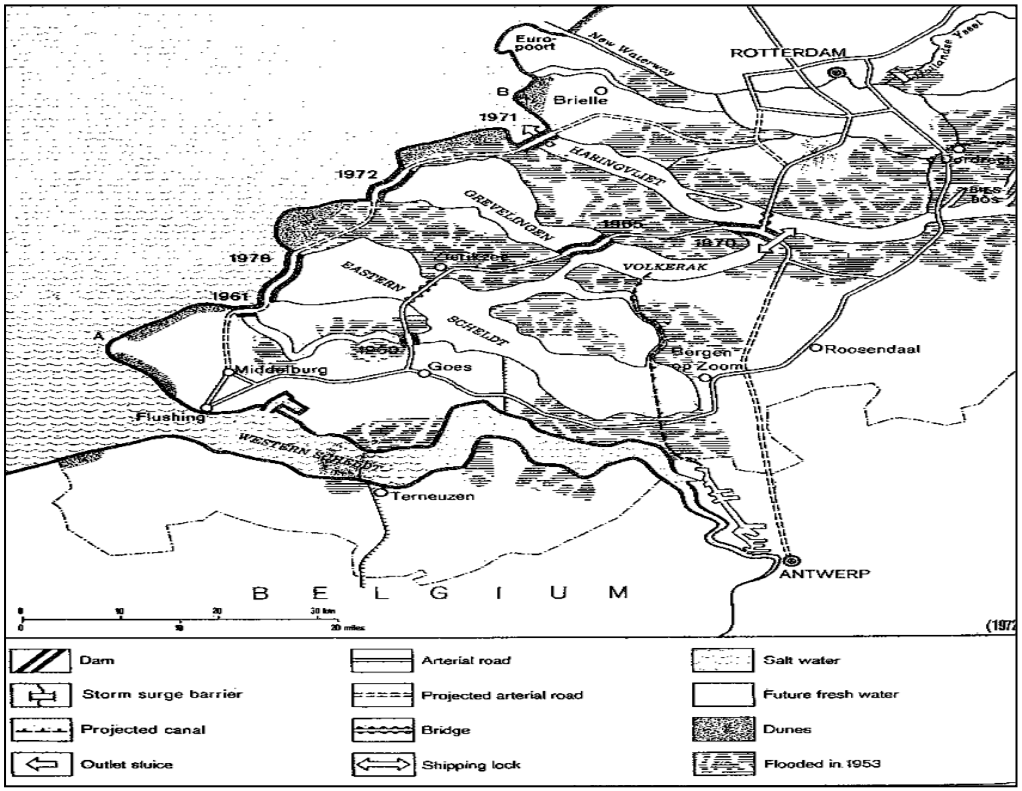
- To shorten the Dutch coastline by about 700 km distance developed a system of dikes; and built dams, sluices, bridges, locks, and a major canal.
- The dykes created freshwater lakes and joined some islands.
- To protect a large area of land around the Rhine-Meuse-Scheldt delta from the sea. The delta works in series of construction projects between 1950 and 1997 in South west of the Netherlands
- To reduced the length of the dyke exposed to the sea. The plan consisted blocking the estuary mouth of the Oosterschelde, the Haringvliet, and Grevelingen.
- The mouths of the Nieuwe Waterweg and the Westerschelde were to remain open because of shipping routes of port Rotterdam and Antwerp. The dykes along this 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.

See the table: Showing the works that are part of the Delta plan works, listed in the order with their years of completion.

Table showing list of Dams constructed by the The Rhine Delta project (Delta plan) between 1950 to 2010

YEAR	DAM
1950	Brielsergatdam
1958	Hollandse Ijssel storm Barrier
1960	Zandkreekdam
1961	Veersegatdam
1965	Grevelingendam
1969	Volkerakdam
1971	Haringvlietdam
1971	Brouwersdam
1983	Makiezaatskade
1986	Eastern Scheldt storm Surge Barrier Oosterscheldekering
1987	Oesterdam
1987	Bathse Spuisluis
1997	Hartel Barrier Hartelkering
1997	Maeslant Barrier Maeslantkering
2010	Harlingen water retaining wall

A Map Showing The Delta Plan Works and Dams constructed (1950-2010)



CONDITIONS THAT LED TO THE DEVELOPMENT THE DELTA PLAN.

- Much of the area was low lying below sea level which necessitated protection from sea incursions.
- Existence of massive floods / sea incursions of 1953 which killed more than 1800 people forced the Dutch government to set up The Delta plan.
- Availability of a positive government policy towards land reclamation for more land from the sea for agriculture and settlement of large population.
- There was a need to control Salination necessitated the development of the Delta plan.
- The success of the Zuider zee project in construction of polders in the North encouraged opening up the Delta plan.
- Availability of skilled labour that had technical skills in land reclamation eased the establishment of the Delta plan.
- Presence of advanced technology that eased the construction of canals and dykes.
- Availability of large capital invested in paying of labour and purchase of machinery.
- There was political stability in The Netherlands provided a concussive atmosphere for Land reclamation.

Benefits of the Delta project to the Netherlands.

- It led to successful control / regulation Salination of soils through spreading of salt water from the sea.
- Provision of fresh water for irrigation and domestic use.
- The Great dykes were used as bridge point between islands, thus improving communication.
- It improved navigation / transport between Rotterdam port (Netherlands) and Antwerp port (Belgium).
- The project promoted tourism lead to generation of foreign exchange.

- It improved recreation facilities for leisure activities for the Netherlands.
- Generation of employment opportunities leading to improved standards of living.
- The project created more land for settlement and industry.
- Development of urban centres with associated advantages like increased trade and commerce.
- The project created more land for agriculture leading to increased food production for large population.

THE ZUYDER ZEE PROJECT

The Zuider zee was a shallow bay of the North Sea in the Northwest of The Netherlands, extending about 100km inland and at most 50km wide, with an overall depth of about 4 to 5 metres and a coastline of about 300km. It covered 5,000km^2.

In the 20th century, the majority of the Zuiderzee 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 dike had been built across the entrance to the Zuider Zee.
The dyke turned the waters behind it into a freshwater lake within five years. By the early 1980s about three-quarters of the area had been drained, but the project to reclaim the last polder was cancelled by the early 1980s.
The freshwater lake left behind is called the Ijsselmeer.

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

(a) **The closure proper.** This was to be accomplished by building a massive dam between the shores of the provinces of North Netherlands and Friesland.

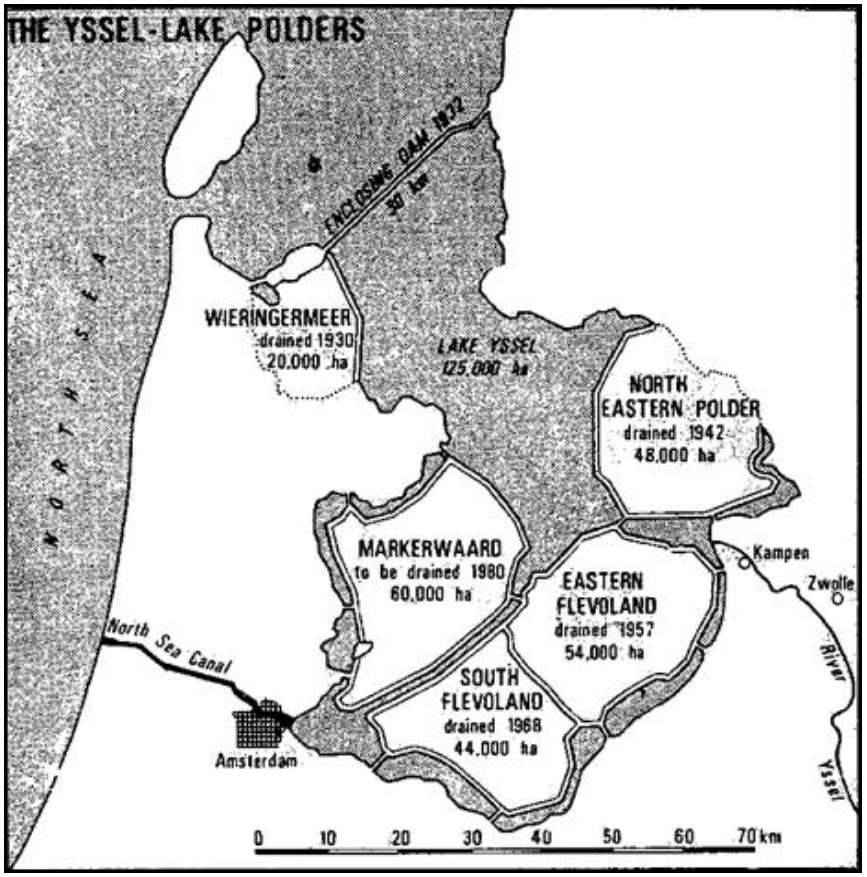
(b) **The reclamation of five polders** in the Zuyder Zee to protect the Netherlands from the effect of by tidal movements of the North Sea. After completion of the dam and creation of a fresh water lake, mainly resulting from the outflow of Yssel River, a tributary of the Rhine.

Name of polder	Area in sq. kms	Year of start	Year of Completion.
Amsterldiepdijk	**2.5**	**1920**	**1924**
Afsluitdijk	**32**	**1927**	**1932**
Weiringermeer	**18**	**1927**	**1929**
Noordoost polder	**55**	**1936**	**1940**
Eastern Flevoland	**90**	**1950**	**1956**
Southern Flevoland	**70**	**1959**	**1967**
Houtribdijk	**28**	**1963**	**1975**

The L. Yssel polders are;

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

Site map of Lake Ijsselmeer



The goals of the Zuiderzee 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 former uncontrolled salt water inlet.
- To shorten the distance along the Dutch sea coastline (between North and South Holland)
- To create more land for the excess population.
- To control frequent floods from the North sea.

Describe the factors which have favoured the establishment of the Zuider Zee polders.

- Existence of highly developed technology to construct 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.
- Presence 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 to run the wind mills for further draining of the sea.
- Presence of supportive government policy towards land reclamation in Netherlands.
- Existence of large population that needed land for settlement and farming practices.
- Availability of the narrow land between Wadden Sea and L. Ijsselmeer that was easy to connect with The Great Dyke / barrier dam.

The need to have fresh water for both domestic and industrial uses

Explain the benefits / Significance of The Zuyder 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.
- The enclosing dam carries a first class road, thus improving communication between North Netherlands and Friesland.

- Lake Yssel supplies fresh water for Northern 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. Dykes 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 contents of the surrounding land has been reduced.

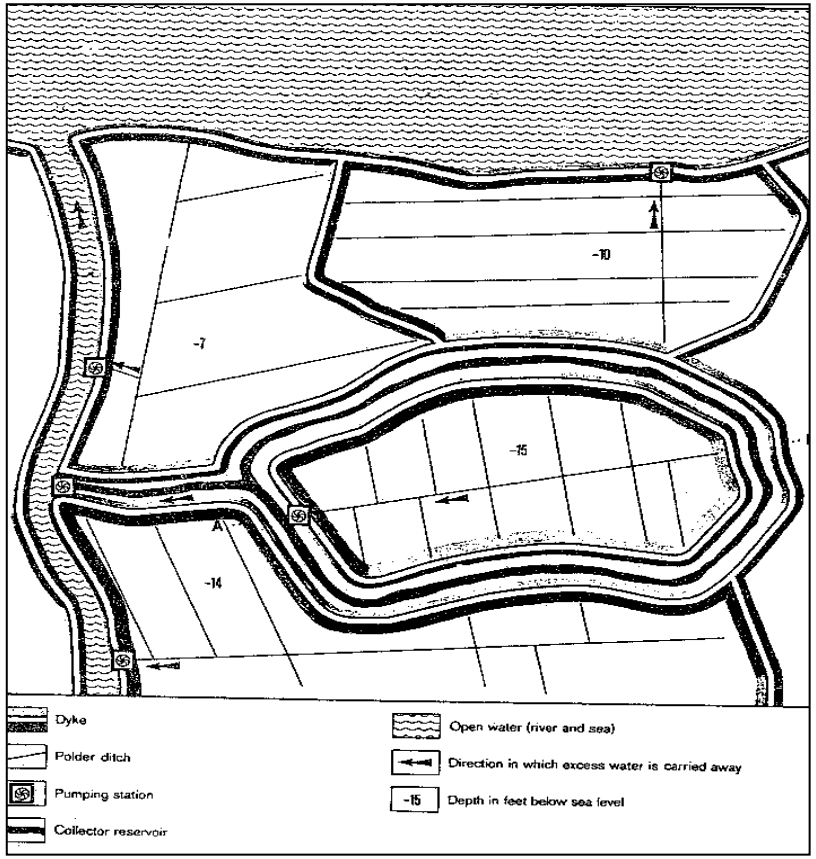
POLDERS

A polder is land below sea level reclaimed from the sea. The word polder is a Dutch word meaning reclaimed land. Not all polders are protected from sea winds because it is so expensive to build concrete all along the coast of Netherlands. There are only short stretches of concrete (dykes) made of basalt blocks facing short stretches of the sea. A dyke is a ring canal made of bush wood, stones and concrete. It is constructed around the areas to be reclaimed.

How a Polder Is Made.

- Survey / exploration to establish the nature of rocks/ soil depth are done.
- Ring dykes are constructed / built around the area to be drained using materials such as concrete blocks, clay and sand to enclose part of the sea to be 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 are is divided into regular portions (5 polders) using inner dykes and ring canals.
- Desalination of the land using reeds planted to help dry out the soil by transpire 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 lake Ijsselmeer to further reduce the saline conditions.
- Pumping out water from the polders is 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 industrialisation.

STRUCTURE OF A Polder



LAND USE IN THE POLDERS.

- Land has been created ***for agriculture***;

1. **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.
2. **Poultry rearing.**
   Poultry is raised throughout the Netherlands especially in areas of infertile sandy soils. Beef and pork is important.

3. **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.
   Dairy farming provides milk used in the making of cheese and other products like yoghurt, ghee, condensed milk / powder, etc.

- Land ***for settlement*** has been created e.g. Utrecht and 17 cities with population of 100,000 inhabitants are concentrated in the western provinces of North Holland, South Holland, and Utrecht.
- The polders are used ***for industrial development*** e.g. Utrecht has heavy chemical, aluminium rolling and zinc sheet. Refineries in the south bank of the New waterway west of Rotterdam, mobile refinery in the North Sea Canal near Amsterdam, Nijimegen, Breda, Velsen and Delft.

- 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, recreation has become a pillar of

the economy in North Holland, National monuments, etc to generate foreign exchange for the country.

- The Polder lands have ***improved transport and communication systems*** East Holland like roads connecting between provinces 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 Tilburg Markerwaad form the green belt of the Netherlands. Friesland has forests of oak, birch, pine and ash. Afforestation has been done in the North Brabant.
- Polders have been ***used for recreation.*** They serve as green buffer zones and provide ideal recreational oriented country-side for the city dwellers.
- Polders encouraged the ***process of urbanisation.***

Polders like Weiringermeer, Haarlemmermeer, the North East, southern and East Flevoland; transformed from agricultural land to areas of dense population settlements that have built the Randstad (Ring city) starts at Dordrecht to Rotterdam, Hague, Leiden, Haarlem, Amsterdam, Utretct.

Polders and some special uses	
Polder	**Special use assigned**
North East polder	Beautification
Weiringmeer	Flood barrier
Eastern Flevoland	Flood barrier
South Flevoland	Flood barrier
Horstermeer	Watershed
Haarlemmermeer	Urbanisation
Zuidplas polder	Landscape beauty

Contributions 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 freshwater Lake Ijsselmeer for irrigation, livestock, domestic and industrial purposes.
- Led to shortening the road distance between North Holland and Friesland reduced the long coastline of 7000km to 320kms.
- Led to creation of more land from the reclaimed sea to increase farmland by 63,000km^2 of polder land that is intensively farmed reduce transportation cost of goods and service between Weiringermeer and Friesland.
- Helped to reduce Salinity of the soils due Lake Ijsselmeer, there has been less incidence of infiltration of salty water from the North Sea to affect productivity of soils.

- Helped to protect the Dutch lowlands from destructive sea incursions that were witnessed before the Delta Plan and Zuider-zee project of land reclamation, greater security with ½ the population of The Netherlands lays 1*m* a.s.l 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 the famous Alkmaar Cheese.

Problems facing Land Use in the polder Lands

- Continued Salination of the Subsoil as a result of underground seepage of salty water under the dykes which reduces the soil productivity in terms of quality of crops and grass produced.
- Fast growths 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 waterborne 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 uses due to increasing population e.g. building, agriculture etc.
- High incidence of pests and diseases as a result of damp weather conditions that favour the breeding of fungi, bacteria, nematodes which affect crops especially in the polder lands leading to high costs of maintenance using pesticides and fertilisers 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, fertilisers, herbicides, huge amounts of manures from the livestock industry, etc. has led to shortage of freshwater 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.

1. Constant by pumping out excess water from the polders to the canals using engines powered by windmills.
2. Erecting of stronger and higher dykes to minimise sea breakages by strong sea waves to reclaimed lands.

3. Specialization in agriculture by regionalising the country e.g. horticulture, arable and dairy farming zones.
4. Application of fertilizers and manures to minimize Salination and improve soil productivity for high yields e.g. planting reeds.
5. Spraying of crops and animals using chemicals like pesticides and insecticides to control pests and diseases.
6. Encourage mixed farming practices to improve soil fertility.

AGRICULTURE IN NETHERLANDS.

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

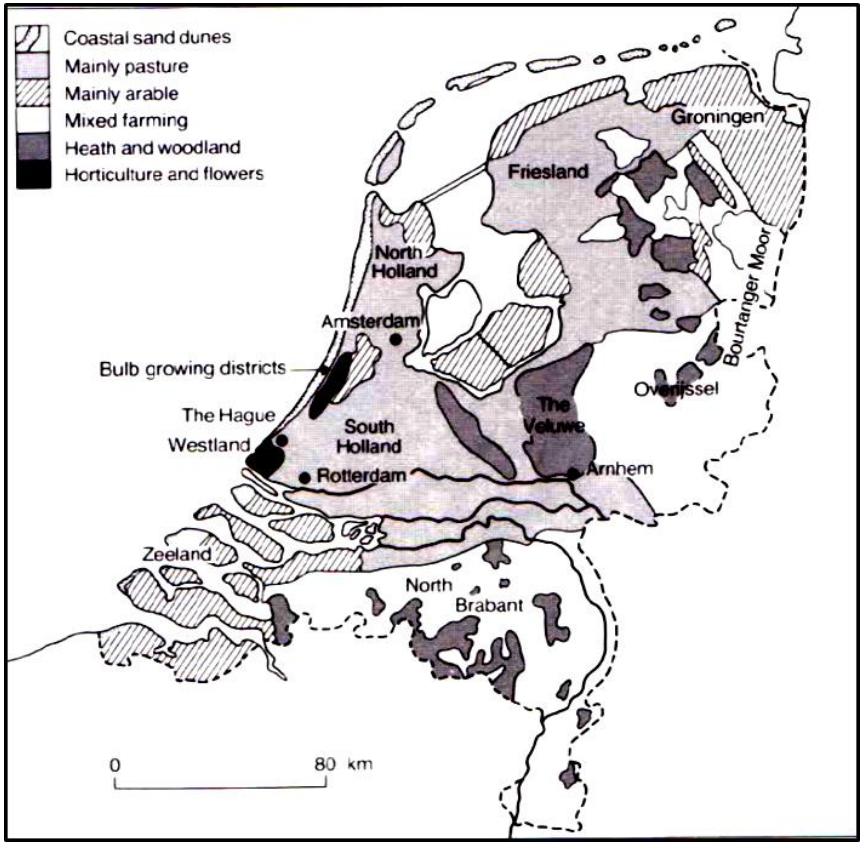
Most farms are small—less than 10 hectares (25 acres)—but every hectare is utilized to the utmost. The Dutch rely heavily on machinery and fertilizers, allowing Dutch farms to achieve some of the highest yields per hectare in the world.

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 is divided into 3 broad areas:

(i) crop production,
(ii) dairy farming
(iii) livestock production, and
(iv) Horticulture.

The nation's agricultural land is also divided into 3 broad types: **grasslands, farmlands, and horticultural lands.**



The main food crops are; barley, corn, potatoes, sugar beets, and wheat.

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

Dairy and livestock production is highly specialized and technologically sophisticated.

Characteristics of agriculture in Netherlands

- 2,000,000 *ha* of land in The Netherlands are used for agriculture

- There are 108,000 farms in total of which 1.5% cover more than 100 *ha*.
- The average size of a Dutch is 19 *ha*.
- 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 employees).
- Horticulture accounts for 42% of the total value of the total value of the Netherlands agricultural production.
- Exports of cut flowers are of particular significance (16% 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.

Factors influencing the development of Agriculture in Netherlands

- Existence of a generally flat landscape that encourages the application of agricultural mechanization easy. 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 and reliable rainfall received throughout the year that enables the proper growth of the crops.
- The 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 loan facilities for buying agricultural inputs and help in marketing the farmers 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 flooded.
- 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 contaminate 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 demoralise farmers.

- Severe cold winter conditions reduce on the growing period for crops and other farmers activities.
- High incidence of pests such as arthropods, nematodes, and diseases like 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 pollution from heavy use of fertilisers 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.

Solutions to problems facing Dutch farmers.

- Dutch farmers are organised in cooperative societies such as the Marker gardener to access credit to acquire necessary farm inputs.
- Farmers emphasise intensive production since the land is limited to grow high yielding crops which can mature fast.
- Organic farming is being emphasised by using farming techniques that do not harm the natural environment e.g. use of composed manure, crop rotation, etc.
- 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, beet, are grown to cut down the costs of milk and other animal products.
- Intensive research in disease and pest control is being emphasised to reduce pest and diseases outbreak on animals and plants.

Types of farming in Netherlands

Arable farming:

- This is the cultivation of only field crops to yield food, feeds, or fibre.
- Holland has 820,000 hectares of arable land mostly in Noordbrabant, Ginderland and Overijssel.
- 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;

(a)Cereals. 60% of the arable land in 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.

(b) 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.

(c) 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 as livestock feed; 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 basis.

(d) Flax.

- Flax is grown in the districts of Zeeland and Groningen.
- Some of the flax is exported to Belgium for the textile industries.

(e) Food crops.

- Food crops 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.

HORTICULTURE:

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.

The Netherlands is a home to all aspects of horticulture from the laboratory where new crops varieties are manufactured and engineered for planting. Over 3000 companies are engaged in horticulture.

There is greenhouse system where these crops are grown under glasshouses and the fields 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 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;

(a) Vegetable growing.

- The most important 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.

(b) 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.

(c) Bulb growing:

- This is mainly carried out between Leiden and Haarlem, Hague and Rotterdam in the light sandy 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.

(d) 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 1900 hectors 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 landscaping.
- Flowers are sold in pots, for indoor use in offices, hotels and restaurants interiors.
- 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, lilies and daisies.
- Medicinal and Aromatic herbs grown for production of medicine and cosmetics.

(e) Horticulture seed production for flowers and vegetables for export.

(f) Arboriculture; the production of small trees for decoration of compounds.

Describe the Conditions that have favoured the Dutch horticulture farming.

- Existence of a mild maritime climate with relatively warm temperatures to support the growth and ripening of the horticulture 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 horticultural 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 posses 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 neighbouring 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, 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 of the farmers.
- Price fluctuations of horticulture products affect the farmers' 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 disturb the horticulture farmers.
- Flooding of the polders affect output.
- Overdependence on foreign markets like E.E.C 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 fertilisers to improve yields
- High Salinity of soils due to sea incursions and excessive application of fertilizers.
- High incidence of pests and diseases lead to high 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 minimise shortage of land for production.

- Building of strong embankments to minimise 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, water melon etc are introduced.
- Spray crops using chemicals to kill pests and diseases.
- Application of manures and fertilisers to improve soil fertility for high yields.
- Intensive research is being carried out to improve glass house technology and crop maintenance.
- Containerisation in refrigerated trucks and railway wagons or airplanes for easy transport 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 long cool winter periods.
- Importation of improved seeds by the cooperatives for farmers to buy at subsidised costs.

Livestock farming

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 growing on 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, Overijssel and North Brabant. Pig rearing is organised 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 the keeping of birds. The birds kept are chicken, ducks and turkeys. Poultry farming in some areas is organised 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 neighbouring 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 ice 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 *¾ are Black and white Friesian Holland breed, ¼ are Red and white Meuse –Rhine Yssel breed.*
- About 1/3 of the dairy products in Netherlands are exported.
- The dairy industry exports in Netherlands had built a reputation abroad by the 16th 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 whey is used for feeding livestock and is converted into whey powder in considerable quantities.

- The farms are mechanised 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 farms 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 mechanised with Milking machines, food stores, cattle sheds
- and milk parlours e.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 in-door during winter using pans controlled automatically.

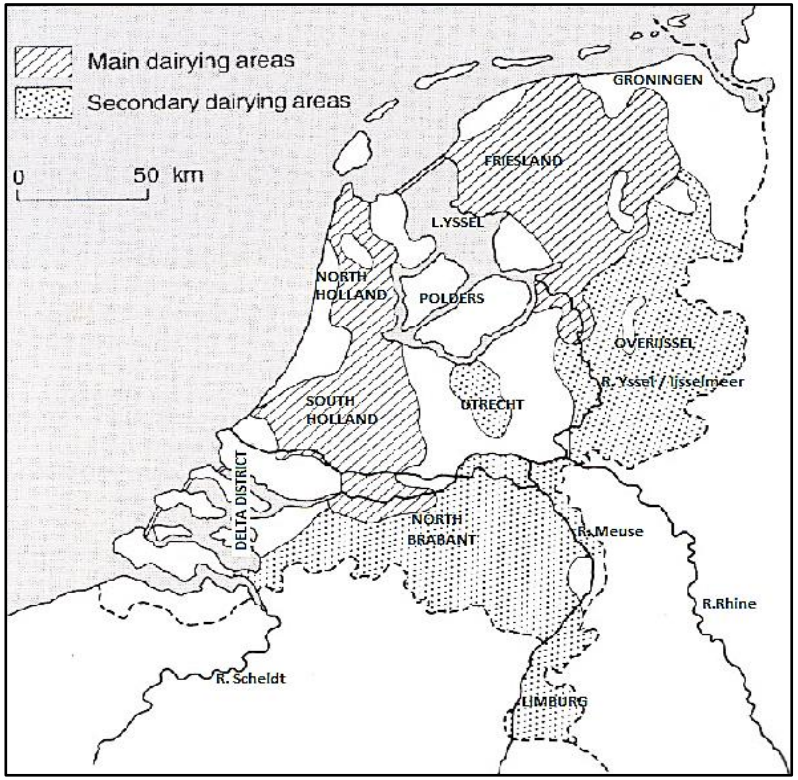
Major dairy farming districts/ provinces in The Netherlands.

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

Types of cattle kept

- Black and white Friesian ¾ called the Holland breed.
- Red and white Meuse ¼ called Rhine Yssel breed.
- Danish red – Jersey cow.
- Ayrshire cow.

A Sketch map of Netherlands showing Dairy farming districts



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 European Union.
- Availability of large supply of skilled labour to work in maintenance of animals in the farms.
- Presence of plenty of pasture and folder 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 containerised trucks, railway wagons etc. for the 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 breads leading to high milk and beef production.
- Increased specialisation 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.
- Provision 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 services to people.
- Generation of revenue Government through taxes imposed on dairy activities for provision of social services.
- Led to development of socio-economic infrastructure like roads, schools and hospitals to provide services nearer to the people.
- Dairy farming is a means of economic diversification thus reduce overdependence on one economic sector.
- Has led to improved international relations / regional cooperation through trade on exports 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 to people like administrative, commercial, banking, etc.
- Led to development of industries involved in making; cheese, condensed milk, butter, yogurt, powdered milk, etc. thus provide market for animal products.

Products from dairy farming.

1. Cheese / Ghee
2. Butter
3. Yogurt
4. Powdered/ condensed milk.
5. Whole milk.
6. Etc.

Countries where The Netherlands export her dairy products;

1. Belgium
2. Any African countries.
3. U.S.A
4. United Kingdom.
5. Any Asian countries.

Mixed Farming.

This involves the growing of crops and the rearing of animals. It is mainly practised in east and south Netherlands.

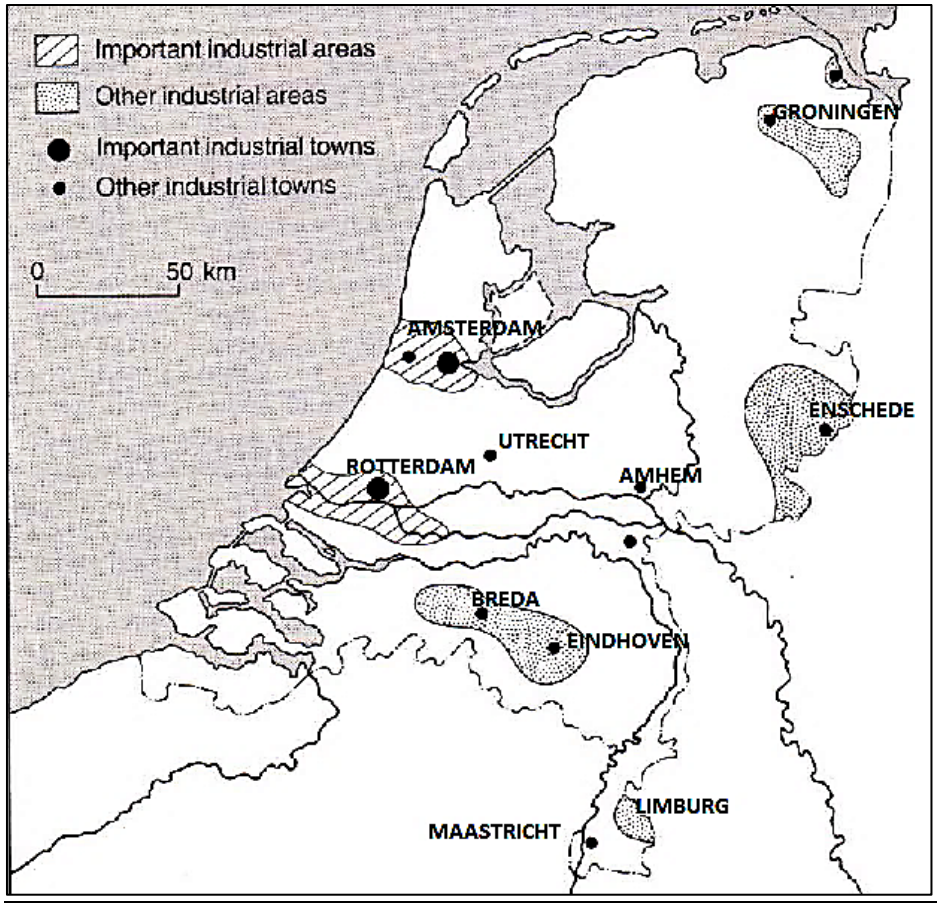
MANUFACTURING INDUSTRIES IN NETHERLANDS.

The Dutch manufacturing sector is dominated by the following;

Types of industries.

(i) Agro-based industries,
(ii) Metal and engineering products,
(iii) Electrical machinery and equipment,
(iv) Chemical industries
(v) Petroleum industries,
(vi) Construction industry
(vii) Micro- electronics manufacturing.
(viii) Pharmaceuticals industries.
(ix) Food processing industries.
(x) Tobacco processing.

Netherlands Major industrial areas



Electronics manufacturing in the Netherlands is dominated by the **multinational corporation** Philips. The company makes lighting, consumer electronics, appliances, semiconductors, and communications systems. Philips is the ninth-largest manufacturer of semiconductors in the world.

Many of the manufacturing industries are based on the processing of raw materials or semi-finished materials into finished products.

Ccompanies in the Netherlands import materials such 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 ports 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, The Hague, 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 specialises in different materials like synthetic fibres e.g. nylon and natural fibres like cotton textiles are found in the east mainly in Hengelo while the Isool industry is located around Limburg

3. **Food processing industry**: This is an important industry because Netherlands is mainly an agricultural country. The food processing industry 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 widespread 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 Goude, the products are ceramic articles.

Major Industrial Regions.

1. **West Netherlands**: North of the Rhine delta and south of the Zuyder zee. This area has all the major ports of Netherlands i.e. Rotterdam and Amsterdam. This region became industrialised because of being near the North Sea which transport raw materials and manufactured goods.

2. **Limburg Region**: This region became industrialised because of availability of coal. It is situated in an agricultural region.

3. **East Netherlands**: The region became industrialised because of the presence of salt and natural gas. The most important industry in this region is the chemical industry.

Explain the factors which have favoured the development of the industrial sector in Netherlands.

- Amalgamation of small companies into one big company e.g. textile industries led to specialisation 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.
- Existence of developed transport and communication system of roads, 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 skilled labour provided by high population in The Netherlands to work in the industrial sector.
- Existence of ready market for industrial products 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 the industrial sector.
- Presence of abundant supply / plenty of water from the North sea, rivers Maas, Rhine, Waal and Ijssel, Rhine River, 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 of 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 industrialised 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 in The Netherlands.

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 1970s.

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

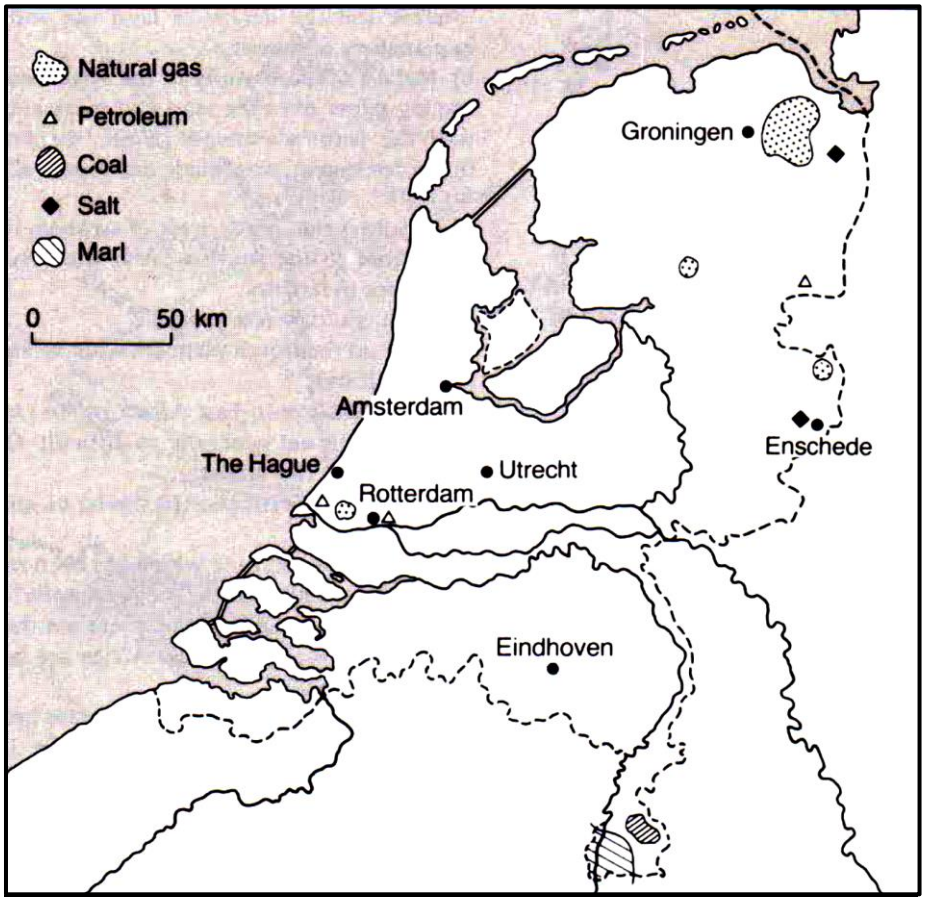
The Dutch do produce a limited amount of oil.

However, oil production peaked 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.**



Factors that led to the development of mining in the Netherlands.

- Availability of easy accessibility to the mines which is well served by developed network of; Rivers, canals, railways and roads to ease transport for imports and exports of the region.

- Presence of large skilled labour supply from the Dutch and neighbouring migrants from Holland, Belgium etc. to work in the mines.
- Availability of alternative sources of energy, e.g. nuclear, thermal etc. which supplemented coal and hydroelectric power was introduced to run machinery in the mines.
- The presence of large market for coal as raw material and source of fuel for industries from both within and outside Belgium.
- Availability of large sums of capital to invest in purchasing of mining equipment, development of related infrastructure, payment of labour force among other things.
- Presence of advanced technology employed in the mining and processing of natural gas, petroleum, coal, etc e.g. the introduction of automated operations which eased work and ensured effectiveness and efficiency.
- Availability of plenty of water supply from R. Rhine and R, Meuse / Maas for cooling machines, processing coal and transport provided by the navigable R. Meuse to transport coal market centres.
- Presence of favourable government policy which encourages the mining for self-reliance in energy for industrial development.

Explain the Problems faced by mining industry in the Netherlands.

- Exhaustion of coal in the mines which has left behind collapsing buildings.
- Increasing costs of mining with increased depth of the mines.
- Increasing competition with other forms of energy like oil, hydroelectricity power, solar, nuclear energy, etc.
- Unemployment due to closing of some mines after exhaustion of the mineral.
- Stiff competition from cheap imported coal from other coal producers whose production costs are relatively low e.g. USA.
- Environmental degradation due to large pits and holes from digging the mineral 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 crime.
- Traffic congestion due to busy mining and trade around the coal fields.

Outline the Steps being taken to solve the problems.

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