

## GERMANY

It is the largest country in the Rhinelands region that became one after the unification of East Germany (communist) and West Germany (capitalist) when the Berlin wall crumbled down.

Its located  $55^{\circ} 03' N$ - $8^{\circ} 24' E$  to the north,  $47^{\circ} 16' 12.39'' N$ ,  $10^{\circ} 10' 41.95'' E$  to the south,  $51^{\circ} 1' N$ ,  $5^{\circ} 53' E$  to the West and  $51^{\circ} 16' N$ ,  $15^{\circ} 2' E$  to the east.

Germany has a land coverage of about 357,021 sq.km with 349,223 sq.km is land and 7,798 sq.km is water having the highest point of 2,962 m at Zugspitze and lowest point of 3.54 m at Neuendorf-Sachsenbarde. Having a population of about 81.7 million people.

Germany is bordered by the Baltic sea and the North sea in the north, Poland and

Czechoslovakia in the east, Austria, Switzerland and France in the south and Luxemburg, Belgium and Netherlands in the west.

## Relief

Germany is subdivided in three relief regions, that is

- Northern lowland
- Central highland
- Southern highlands

## Northern lowlands

This belongs to the Great European plain rising to 210m above sea level comprising of young quaternary rocks of alluvial and moraine debris like sand, clay, leos, boulders. The lowlands are further subdivided into;

- Marcheland- comprises the coastal zone of land reclaimed from the North sea covering 121,000 hectares made of pasture land and cultivable land with marine silts.
- Geestland- comprises of infertile sandy soils with less organic matter established during

the quaternary ice period with fluvial-glacial material. Today, the area is covered by heather because the original vegetation was cleared by man

- Borderland- stretches southwards to Saverland hills, the Rhine valley as far as Bonn, that is, Westphalia-Rhineland bay. The area is very fertile with loam and leos soils plus minerals like coal, potash, iron ore, which have favored mineral-based industrialization.

### Central Highlands

This is sometimes referred to as Hercynian block that was formed due to folding and uplift. Due to continuous denudation/erosion, the anticlines were reduced to peneplanes whereas the synclines were filled with eroded materials forming sedimentary layers. The area is well drained with rivers like Rhine, Mosel and features like Rhine rift valley, Odenwald and Bohemian and Black forests.

The Central plateau comprises of granite and gneiss rock complex which are resistant to soil erosion.

Also between the Black and Bohemian forests, there is sand stone, limestone and alluvial layers. However, the area has infertile soils especially in the scarp lands being used for pastoral farming while the valley is used for cultivation.

### Southern Highlands

This stretches up to Switzerland bordered by river Danube in the west undulating from 300m-900m comprising of mollases, that is, clay, moraine and drumlins. This area is covered by pine and fir forests with agriculture for resistant crops like wheat and barley in the settled areas.

(Cross-section of relief)

(Sketch map showing relief)

### Climate

Germany experiences cool Maritime climate in the north and west parts due to the influence of the North sea.

The south and eastern parts experience cool Temperate Continental whereas the central upland areas experience local micro-climate due to their altitude, aspect and shelter.

Temperatures rise to 19° in summer from others around 3° and fall to -5° in the mountainous areas.

## Soil

The northern lowlands have poor acidic soils due to glacial erosion and deposition through leaching, giving rise to sandy and clay soils.

The Bordeland area has loam and leos soils coupled with the Rhine rift valley and the Danube valley with non-acidic soils.

## Vegetation

Germany originally had the deciduous forests in the low land and coniferous forests in the highland areas. However, man altered the

original vegetation in search for settlement, agriculture and industrial land.

## Drainage

Germany is drained by many rivers like Rhine and its tributaries- Mosel, Neckar, Main, Ruhr, Weser, Ems, river Elbe and its tributaries- neissel, spree, harvel, river Danube and its tributaries- Iller, Isar/ Amper, Lech and Inn.

Germany is bordered by the North sea and Baltic sea in the north.

(Sketch map showing drainage)

## Forestry

As noted earlier, Germany's natural vegetation is dominated by coniferous forests in Haardt mountain, Vosges mountain and Black forest mountain areas. There also exists temperate and deciduous forests in the low lying areas of the north.

## Factors

- Presence of highland areas with very steep slopes
- Nature of climate especially cool temperate continental
- Presence of acidic soils suitable for coniferous trees
- Move to conserve nature or eco-system
- Government policy to protect the physical and natural heritage
- Abundant labour to work in the lumbering industry
- High altitude in central and southern Germany limiting other economic activities
- On-going afforestation programs
- Capital to invest in the forestry sector
- Political stability following the reunification of East and West Germany
- Increasing level of industrialization needing raw material
- Good transport and communication networks linking forest centers to market areas for timber

Uses of forests

- Provides raw materials for forest related industries like paper and pulp, saw mills, etc
- Fuel wood for the natives of Germany
- Climate modification through evapo-transpiration
- Gaseous exchange in the environment by absorbing carbon dioxide and releasing oxygen through photosynthesis
- Habitat for fauna promoting tourism
- Controls soil erosion through shading off leaves reducing intensity of rain droplets and roots bind soil particles together
- Wind breakers reducing the effect of destructive air masses
- Soil formation as roots break down rocks into small particles mixed with decomposed matter
- Recreation grounds for vacations
- Water catchment areas where rivers stream from like Mosel from Haardt forest and Danube from the Black forest
- Provides materials for electrification and construction thereby improving people's standards of living



- Avenues for research and study in zoology, micro-biology, botany, etc

### Problems facing forestry sector

- Fire outbreak during summer where temperatures rise to 19° C
- Limited labour especially during tree harvesting
- Difficulty in cutting and transporting logs because during winter the motorable roads get covered with snow while the rivers get frozen
- Rugged nature of landscape as forests are located in the mountainous areas like Vosges, Haardt, Saverland and Black forest
- Limited transportation networks due to remoteness
- Forest encroachment by people for settlement, agriculture, industry, etc
- Accidents during the lumbering process leading to loss of skilled labour
- Over exploitation of forests especially for coniferous trees that are on high demand

- Illegal cutting of trees leading to loss of valuable tree species
- Limited capital due to the on-going industrialization

### The Rhine Rift valley

This is an outspoken physical feature in the western part of Germany extending from Basel in the south to the northern regions of Mainz. It extends for 290-300km long with a varying width of 32-40km.

It is bordered by the Vosges and Haardt mountains in the west and Odenwald and Black forest in the east.

The valley bottom is composed of soft rocks, clays, loams and considerable deposits of alluvium.

The Rhine gorge extends from Bingen to Bonn with a distance of 110km.

### Formation

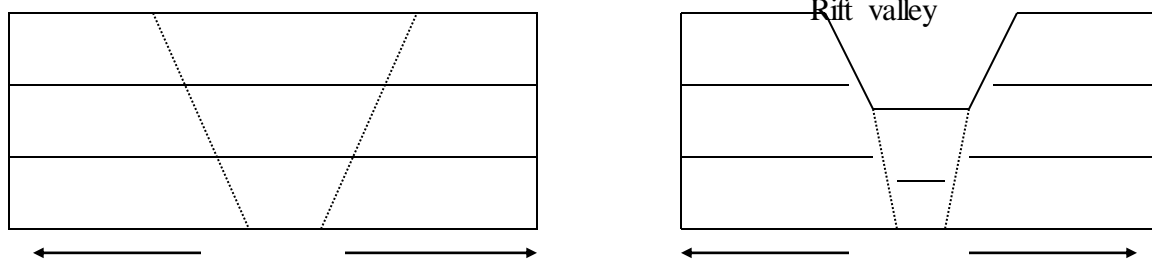
The Rhine Rift valley was formed by tectonic forces particularly faulting which can be explained in three basic theories;

- Tensional force by Gregory
- Compressional force by Waylland
- Differential uplift by Dixey and Troupe

### Tensional force theory (Gregory)

The earth's crust is acted upon by tensional forces that pull away the earth's core forming normal lines of weakness. The crust is subdivided into blocks where the adjacent blocks are forced to rise while the central block forms a trough called a rift valley.

Illustration

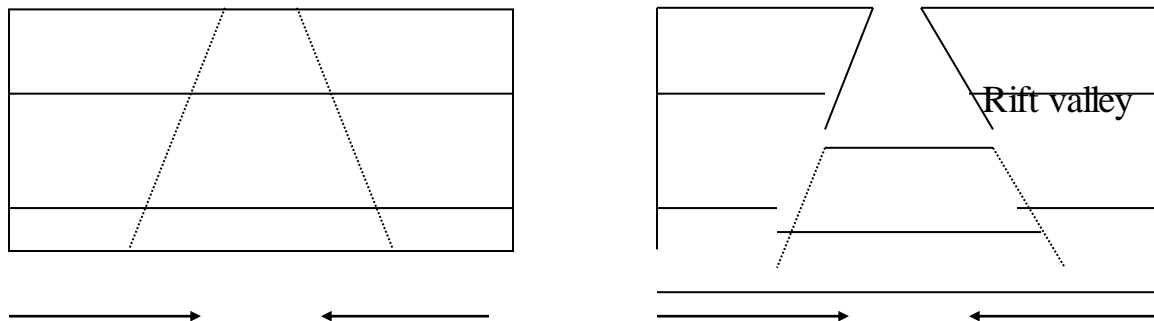


### Compressional force theory (Waylland)

The earth's crust is acted upon by compressional forces that pull towards the earth's core forming reverse fault lines. This sub-divides the earth's crust into blocks where

the adjacent blocks rise with projected scarps which are acted upon by denudation forming a well structured rift valley.

Illustration

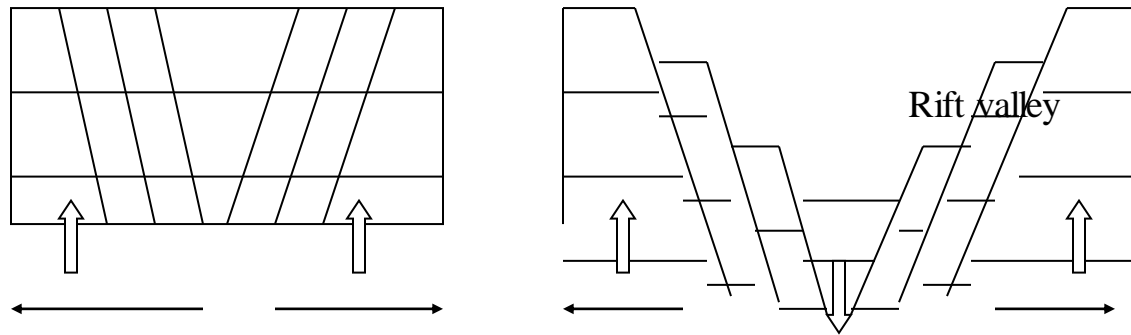


Differential uplift theory (Dixey and Troup)

The earth's crust is acted upon by severe tensional forces forming various lines of weakness which are also supplemented by up-warping and down-warping raising the adjacent blocks to different heights. This leaves the central block at a lower elevation forming the rift valley.

This theory best explains the Rhine rift valley of Germany with the Vosges mountain in the west and the Black forest mountain in the east.

Illustration



(Sketch map of the Rhine Rift valley, with major relief, rivers and towns)

## Agriculture

It is well developed in the western part of Germany particularly in the Rhine rift valley areas with farming practices like;

- Mixed farming- is the growing of crops like oats, potatoes and fodder crops coupled with animal rearing
- Market gardening- is the growing of vegetables and fruits for the urban market centers like grapes, apples, peaches, orchards, pears, in southwestern Germany

- Arable farming- is the growing of cereals like barley, wheat, sugar beet, etc

After the Second World war (1945), Germany's agricultural sector was modernized from peasant family holdings of about 12 hectares to a mechanized farming practice which helped reduce land fragmentation.

About 34% of Germany's land is cropland and various measures have been taken to improve on agriculture.

Measures taken to improve agriculture (1955-65)

- Small family holdings were merged together
- Mechanization was introduced using tractors and combined harvesters
- Fertilizers were applied in farmlands
- Irrigation was introduced using canals
- Dykes were constructed in low lying areas to control flooding and erosion
- Government provided financial assistance through loans

- Co-operative unions were established to organize farmers and buy improved seeds plus selling agricultural products
- Information was provided to the farmers relating to crop management, animal husbandry and farm management
- 1955, an Agricultural Act was passed so as to modernize Germany's agriculture. This was supplemented by the Green Plan

(Sketch map showing agricultural patterns)

## The Green Plan

This came about following the Agricultural Act of 1955 aimed at modernizing agriculture in Germany to be competitive as that of other states of the European community.

## Aims

- To enlarge the farms that were originally small family holding
- To compensate farmers who were willing to offer their land for consolidation

- To resettle farmers whose land had been merged or consolidated
- To encourage better animal husbandry by setting up large livestock farms
- To give tax concessions like subsidizing agricultural products
- To improve on farm management since large agricultural land was attainable

The Green Plan has brought about comprehensive mechanization where by Germany food requirements are now almost catered for at home is.

### Agriculture in the Rhine Rift valley

This is the most productive land in Germany particularly the valley floor and the western part of the rift valley.

Arable farming is practiced in the rift valley growing wheat, barley, maize, sugar-beet and also fruit growing for lettuce, onions, tomatoes, orchards, pears, peaches, etc.



## Factors

- Presence of fertile soils in the valley floor deposited by wind and running water
  - Relatively flat valley slopes favoring cultivation and mechanization
  - Improved transport particularly the Rhine water way and railway
  - Cheap skilled labour by the Germans and refugees particularly Jews
  - Aspect- the south facing slopes receive direct sun light providing warm conditions
  - Increasing level of industrialization necessitated agro-raw materials
- Positive government policy aimed at reviving Germany's economy that was destroyed during the Second World War (1939-45)
- Availability of large sums of capital for accessing farm in-puts
  - New trend of science and technology favoring mechanization
  - Presence of abundant water from river Rhine providing irrigation water in summer.

- Presence of co-operative unions which mobilize farmers to buy and sell inputs
- The valley is sheltered from strong winds by the Vosges in the west and Black forest in the east.
- Large market for agricultural products within Germany and outside.

### **Vine growing in the Rhine valley**

This is a vital activity in the Rhine valley stretching from areas of Basel up to Koblez. The major producing area is Pfalz with a research center at Geisenheim growing breeds like kernner, scheurebe and enrenfelser.

(A cross section through the Rhine Rift valley)

### **The Vine calendar**

Activities involved from vine growing to marketing can be categorized as follows;

- December to March- pruning of vines, applying fertilizers and filtering last year's wine
- March to April- stretching vines on stakes along rows and carry the grapes

- May to June- vines are sprayed, weeds removed and last year's wine is bottled
- July to September- grapes form and later ripen due to conducive sunny summer conditions
- October to November- ripe grapes are harvested, crushed into juice and collected in wooden barrels
- November to December- grape juice is then left to ferment giving rise to consumable wine

## **Wine processing**

- When the grapes are ripe, they are harvested and crushed.
- Juice is then led into wooden barrels or metal tanks
- Juice is then left to ferment for about 3 months
- Juice is then filtered to extract the wine and later bottled for the market

The major wine brands are

- Champagne

- Burgundy
- Beaujourns

Wine produced in Germany is consumed mainly at home and the rest is exported to countries like Austria, Switzerland, etc

## **Problems faced**

- Unfavorable climatic conditions especially frost during winter that delays production.
- Soil exhaustion due to intensive cultivation
- Presence of pests like moth, red spiders, worms and diseases like oidium, peronospera affecting leaves and the plant in general
- Limited labor especially during the harvest time
- Competition from other wine producers like France and Italy that lowers the market potential.
- Price fluctuation on the world market that discourages farmers.
- High costs involved in growing, maintaining the vine farms and making wine
- Delay in delivery due to congestion of the Rhine water way

- Steepness of the Rhine valley slopes limiting mechanization
- Adjacent landscape is very rugged like Vosges limiting mechanization
- Severe soil erosion that washes away the top soil leading to poor soil that does not support proper plant growth.
- Occasional flooding in the Rhine valley
- Limited land for expansion in vine growing leading to low production.
- Occurrence of natural hazards like hurricanes and other destructive air masses which destroy farms and drought during the growing season wasting away the grapes before ripening
- Perishability of the grapes before crushing and fermentation

### Rhine water way

This is a major water way in Europe with a 800km navigable stretch from Basel in Switzerland to the North sea via Rotterdam in Netherlands.

## Factors for development

- Presence of Rhine and its tributaries like Mosel, Ruhr, Lippe, Emscher, Maine, etc
- Ice free conditions almost throughout the year
- Large productive hinterland with exports and imports like grain, iron ore, coal, oil, etc
- High level of technology using concrete and brick sides with canals
- Skilled labour for manning the water way
- Availability of capital from the Rhine basin countries
- Industrialized region that needed transportation of the raw materials and products
- Cheap and ideal mode of transport for bulky products
- Inter-state co-operation in developing the water way

## Benefits

- Employment opportunities for many people of the region

- Urbanization in the region like Basel, Cologne, Dusseldorf, Rotterdam, etc
- Agricultural sector development especially vine growing and tobacco along the valley floor
- Stimulation of trade in the countries where it traverses
- Regional co-operation amongst France, Switzerland, Belgium, Germany, Luxemburg and Netherlands
- Foreign exchange through trade and tourism
- Improved standards of living in the areas due to income, transportation and industrialization
- Infrastructure development like canals, roads, railway and water ferries
- Revenue to the governments through taxation, trade and tourism

### Problems faced

- Silting of the water way affecting travel of large ships
- Traffic congestion at Rotterdam, Basel, etc
- Pollution from oil spills

- Poor visibility due to fog and frost
- Flooding at the lower Rhine delta region after Rotterdam port
- Narrowness at the Rhine gorge
- Accidents claiming lives and goods

## Solutions

- Containerization to avail more working space
- Utilizing other modes of transport like railway
- Timetabling of arrival and departure of ships
- Radar system to determine the direction, distance and size
- Regular dredging of the water way and canals
- Legislation of fumes to reduce pollution
- Building of concrete and brick sides for protection
- Co-operation among member states to maintain and manage

(Sketch map of the Rhine Water way)



# **Industrialization and Mining in Germany**

## **Ruhr industrial complex**

This is a major industrial and mining center in Europe comprising of over 5 million people in a conurbation of 5 towns.

The region is encompassed by river Lippe, and river Wupper extending for about 70 km eastwards. The Ruhr area is the biggest iron and steel center in Europe also with coal and chemical center.

## **Major industries**

- Iron and steel industries- dominant in areas like Essen, Bochum and Dortmund using iron ore extracted from Germany and that imported from Sweden, France and Liberia. By 1813, iron smelting was a traditional practice in the southern part of the Ruhr within the Wupper valley in the villages of Reinsherd and Solingen producing items like agricultural tools, surgical equipment, cutlery, etc

- Chemical industries- dominant in Dusseldorf, Mullen, Brunnen, Leverkusen using coal and oil from Elms and Saxony. The products are transported using pipeline linking up the Ruhr region
- Textile industries- dominant in Krefeld, Dusseldorf, Gladboch and Wuppertal using silk, cotton, rayon from Krefeld and Dusseldorf.

However there are other industries in the region such as oil refineries at Diusburg, petro-chemical industries at Cologne and food processing at Bonn, etc.

### Major industrial towns

- Diusburg-Ruhroft- at the confluence of river Rhine and river Ruhr being the biggest inland port in Europe with industries like iron and steel, petro-chemical, engineering, food processing, port handling, steel rolling, etc

- Dusseldorf- administrative capital of North Rhine Westphalia region with industries like iron and steel, textile, banking and insurance, railway and commercial centers
- Essen- largest city in the Ruhr conurbation with industries like iron and steel, textile, glass works, chemical, railway locomotives, furniture centers, etc
- Cologne- the biggest city in the Rhineland cities with industries like engineering, car construction, food processing, banking and insurance, cultural center, etc
- Wuppertal- located near river Wupper but outside the industrial center well known for the cotton industry making dye-stuffs, rayon and carpets
- Hamburg- regional capital of the North and was an entry port during the second world war with industries like steel and aluminium plants, banking and a major service center
- Wolfsburg- famous for making Volkswagen cars which started in 1938 east of Brunswick.

(Sketch map showing major industrial towns in the North)

## Importance

- Employment to many German people reducing human resource wastage both skilled and unskilled.
- A lot of income is earned by improving the standards of living of the workers.
- Self-reliance due to production of nearly all desired goods and services
- A lot of revenue to the government through taxation and licensing
- Attracting more investment in the region thus large capital base
- A lot of foreign exchange is earned through the export of industrial products
- Proper utilization of the would-be idle resources e.g. coal
- Urbanization with major industries like at Dusseldorf, Wuppertal, Hamburg.
- Infrastructure development especially road and railway supplementing the Rhine water way

- Industrial innovation, research and academic study plus training
- Skill acquisition by the industrial workers
- However, industries pollute the environment by discharging toxic wastes in the water bodies.
- Deformation of the landscape as land is destroyed to give way for construction of industries
- Natural vegetation in central Germany has been destroyed altering the eco-system and causing deforestation
- Rural-urban migration with its evils like prostitution and slum development.
- Increasing crime rate due to unemployment in the urban centers since the population is dense.
- Racism against non-Germans causing untold suffering and death
- Duplication of industrial products and importation of low quality goods in Germany.
- Over-utilization of natural resources like coal in south Ruhr

## The Ruhr Coal Fields

This is the largest coal mining center in Europe with 120 mining points producing over 150 million tons of coal per annum.

The fields are bordered by river Lippe in the north, river Wupper in the south and subdivided into the northern belt with deep coal deposits and the southern belt with shallow coal deposits.

There exists 3 major coal varieties in Germany, that is;

- Coke coal- for smelting iron, steel and making good burning coal
- Coal gas- for lighting and domestic use

- Anthracite coal- for heating in boilers due to its high carbon content

## Methods of Coal mining

- Shaft- especially in the northern belt where coal appears at a greater depth in the earth's crust. The method involves construction of tunnels to reach the coal seams/veins
- Open cast- especially in the southern belt where coal is near the surface of the earth's crust. The method involves the excavation of the top layer of the earth to access the coal deposits.

(Sketch map showing coal mining fields)

## **Factors favoring Coal mining in Germany.**

- Extensive coal fields in the northern and southern belts

- Advanced technology like shaft method that is used to extract coal that exists at a greater depth.
- Large sums capital used to buy mining machines, pay labor, etc
- Cheap skilled and unskilled labor to work in the mines
- Ready/wide market for Ruhr coal with in Germany and the outside world
- A variety of coal with domestic and industrial uses e.g. Coal gas, anthracite coal and Coke coal
- Rhine water way providing transportation of bulky coal and access to the world market
- Positive government policy aimed at utilizing the natural resources for the good of the people
- Prevailing political stability after the second world war attracted mining



investors and companies into the Germany-Ruhr region

- Occurrence of coal near the surface especially in the southern belt made it easy for extraction
- Various power sources like oil, natural gas and electricity helping in the processing of coal
- Increasing level of industrialization where coal acted as an energy source and raw material.

## **Problems faced**

- Exhaustion of coal especially in the southern belt
- Reduced demand for coal as new technologies require less of it in production
- Competition from other coal producers like China, Russia and

South Africa that limit their market potential.

- Presence of substitutes like natural gas, petroleum, electricity uranium/nuclear
- Limited unskilled labor for extraction and skilled labor for processing the coal which prefer working in industries
- High costs involved in mining and processing coal
- Closure of some mines in the south affecting quality
- Presence of other minerals of relative importance like iron ore which attracted government attention
- Inadequate capital to inject in coal mining which requires huge capital to realize profits

- High transport costs due to the bulkiness of the coal

## NETHERLANDS

This is one of the Rhineland's countries found in the northwest region mainly occupied by the delta of river Rhine and its tributaries together with river Scheldt. Netherlands refers to the Northern Province of Holland with a capital at Amsterdam (de jure capital) and The Hague (de facto capital) as the seat of government.

Following the joint customs union of 1947, Belgium, Netherlands and Luxemburg came to be known as the BENELUX countries.