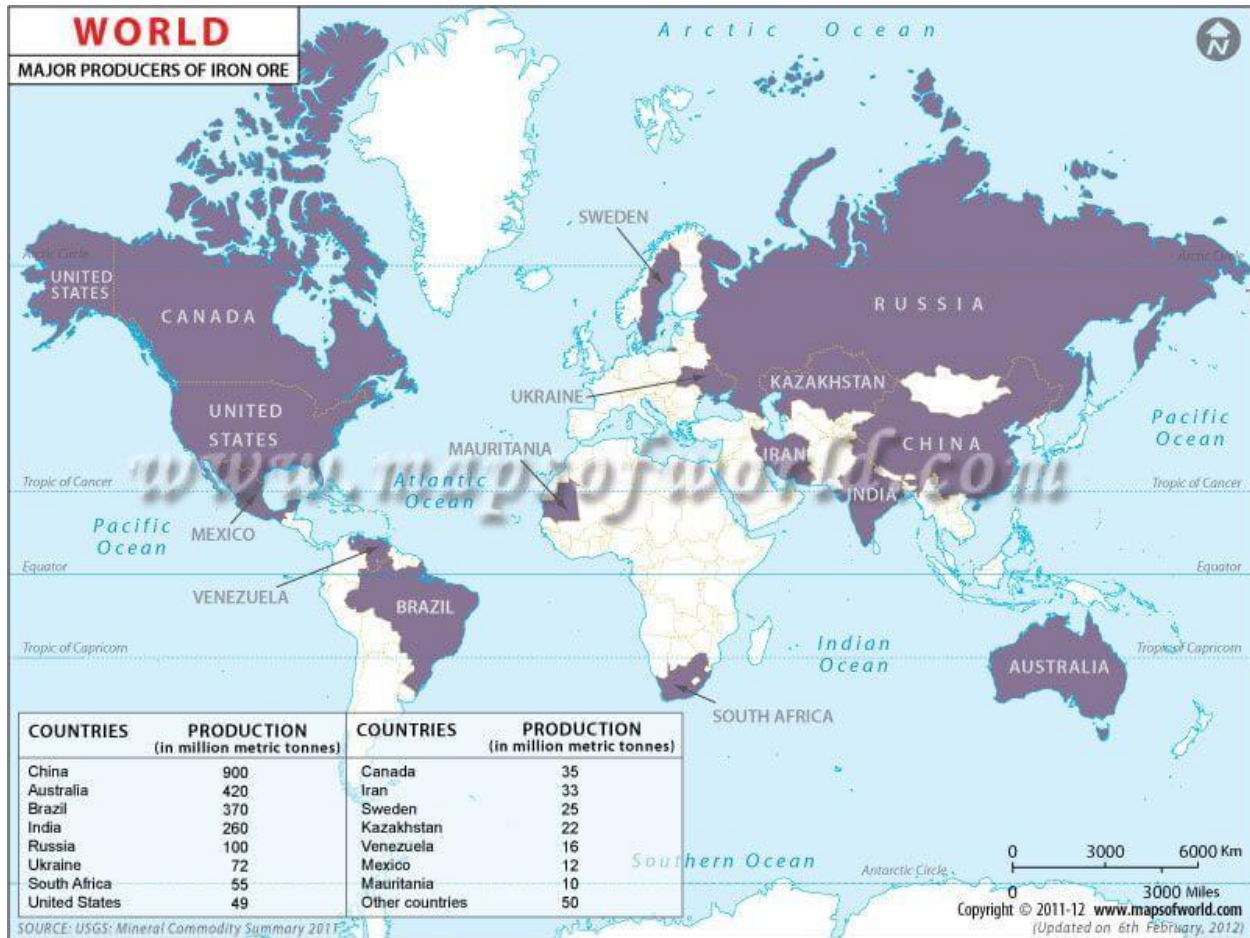


Module VI: Regional and Economic Geography of the world

2.Resources and their classification

- Distribution and production of minerals and energy resources
 - ❖ **A resource** is a source or supply from which benefit is produced.
Resources are **vital to the existence of people**.
 - ❖ Natural resources are **materials people obtain from Earth** that have economic value or are important for human life.
 - ❖ **Lumber, minerals, and even fossil fuels** are three resources that serve people well.
 - ❖ Mineral Resources and their Distribution
 - Iron Ore



- Iron ore-producing areas are widely distributed in the world. There are about **60 countries in the world, which produce iron ore.**
- **China, Brazil, Australia, India, Russia, Ukraine, USA, South Africa, Canada, Sweden, etc.,** are the main producers of iron ore.
- **China is the world's largest producer of iron-ore followed by Brazil and Australia at the second and third position respectively.**
 - ★ China – Manchuria, Sinkiang, Si-kiang, Shandog Peninsula
 - ★ Europe – Ruhr, South Wales, Krivoy Rog, Bilbao, Lorraine
 - ★ Africa – Transvaal, Liberia
 - ★ South Africa – Postmasburg area, Transvaal

- ★ Russia, Kazakhstan – Ural region [Magnitogorsk, Novotroitsk, Zlalous, Nizny Taghil, and Seerow], Tula region [Kursk Magnetic], Angara and Krasnoyarsk.
- ★ North America – Great Lakes [Mesabi Region], Labrador
- ★ South America – Carajas, Itabira, Minas Gerais
- ★ Brazil – Minas Gerais Region (Itabira hills)
- ★ Australia – Pilbara Region, Koolyanobbing, Iron Duke, Iron Knob.

➤ **Manganese**

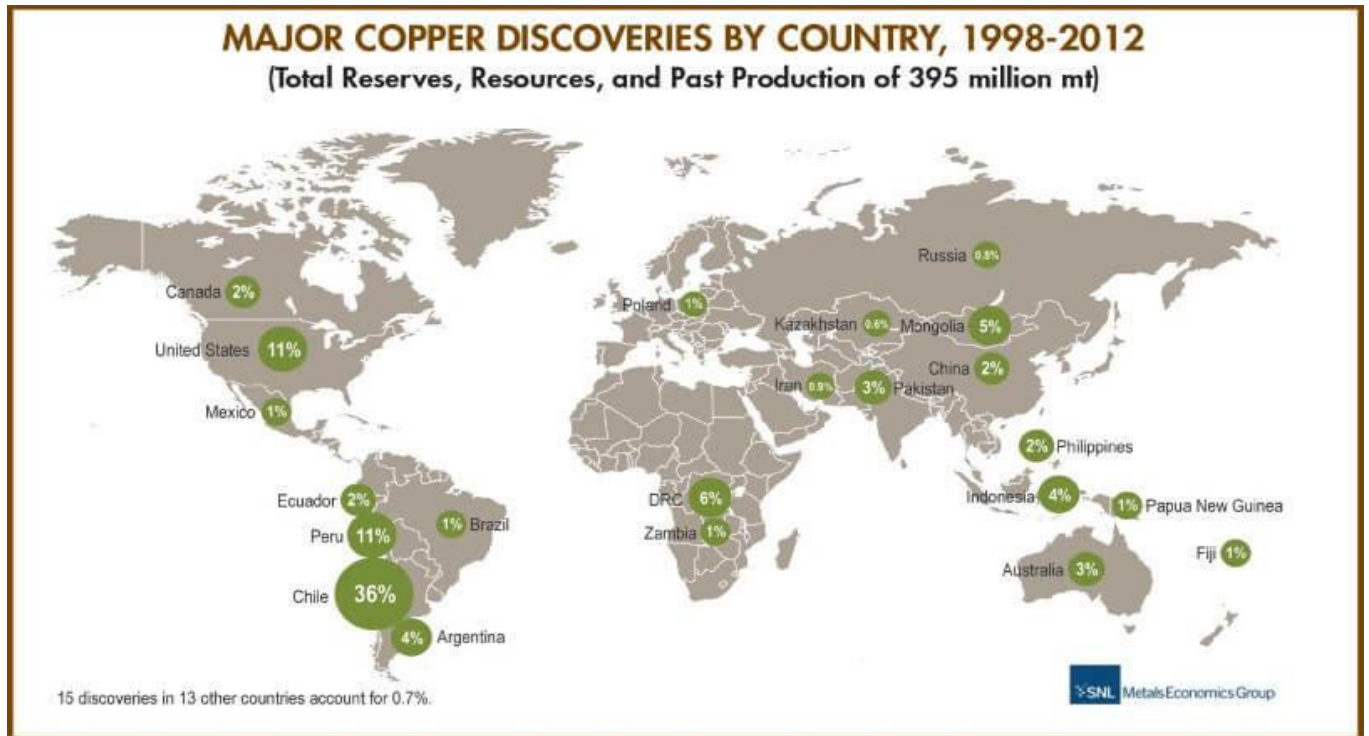


→ The main producers of **manganese** in the world are **South Africa, Australia, China, Gabon, Kazakhstan, Brazil, India, Ghana, Ukraine, Georgia, and Mexico.**

- ★ China: Kiangsi, Hunan, Kuangsi, Kwangtung, Kuangsi and Kwichou.
- ★ South Africa: Cape Province (Krugersdorp, Postmasburg, Manganore)
- ★ Gabon: Moanda mine
- ★ Brazil: Amapa region
- ★ Australia: Leonara, Victoria, Queensland, and Woodie Woodie.

★ India: Odisha, Madhya Pradesh, Chhattisgarh, Maharashtra, Jharkhand(Damodar valley), Andhra Pradesh, and Karnataka.

➤ **Copper**



→ In the Earth's crust, the **copper content is about 0.01%**. Only in a few copper deposits, the copper content is found at up to **3%-5%**. Copper in nature often exists in compounds. The world reserves of copper metal are assessed at **720 million tonnes** of copper content.

→ **Chile has the largest share accounting for about 29.2%** of world reserves followed by **Australia (12.2%)**, **Peru (11.4%)**, **Mexico (6.4%)**, **USA (4.6%)**, and **China & Russia (4.2% each)**

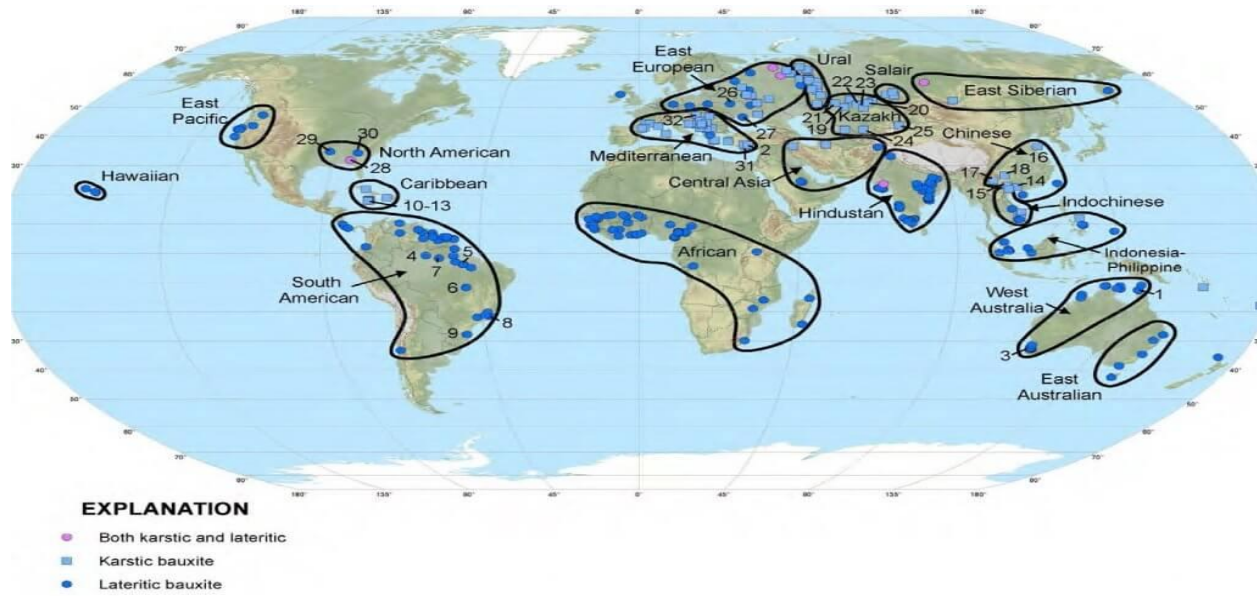
→ As per world mine production of copper, **Chile was the largest single producer of copper in 2014 with 31.28%** share followed by **China (8.9%)**, **Peru (7.5%)**, **USA (7.4%)**, and **Australia (5.3%)**.

→ The main producers of copper in the world are **Chile, Peru, USA, China, Australia, Indonesia, Russia, Canada, Zambia, Poland, Kazakhstan, and Mexico.**

- ★ Chile: Mt. Chuquibambilla, El Teniente, El Salvador and La-Africana.
- ★ Perú: Cerro de Pasco, Morococha, Casapalca and Toquepala.
- ★ USA: Arizona, Utah(Bingham Canyon Mine), Montana, Nevada and New Mexico (El Chino Mine) states.
- ★ Canada: Ontario(Sudbury district), Manitoba, Quebec and Saskatchewan.
- ★ Zaire: Katanga region
- ★ South Africa: Transvaal, Cape province.

➤ **Aluminum (Bauxite Ore)**

- The world bauxite reserves are estimated at **28 billion tonnes** and are located mainly in **Guinea (26%), Australia (22%), Brazil (9%), Vietnam (8%), Jamaica (7%), Indonesia (4%), Guyana & China (3% each).**
- The important bauxite producers are (their percentage in **world's production** is given in bracket): **Australia (31.34%), China (18.41%), Brazil (13.93%), Guinea (8.36%), Jamaica (3.98%), Russia (1.64%), Venezuela (2.39%), Surinam (1.99%), Kazakhstan (2.44%), Greece (1.09%), Guyana (0.60%) and Vietnam (0.01%).**



- ★ Australia: Cape York Peninsula(Queensland), New South Wales, and Western Australia
- ★ China: Hunan, Guichou and Sichuan
- ★ Brazil: the central region is the main producing area.
- ★ India: Madhya Pradesh, Chhattisgarh, Jharkhand, Odisha, Maharashtra, Andhra Pradesh, Tamil Nadu and Gujarat
- ★ Jamaica: St Elizabeth and St Mary region
- ★ USA: Saline county region of Arkansas state
- ★ Erstwhile USSR: Kola peninsula
- ★ Guinea: Boko and Baruka island
- ★ South Africa: North Natal Province

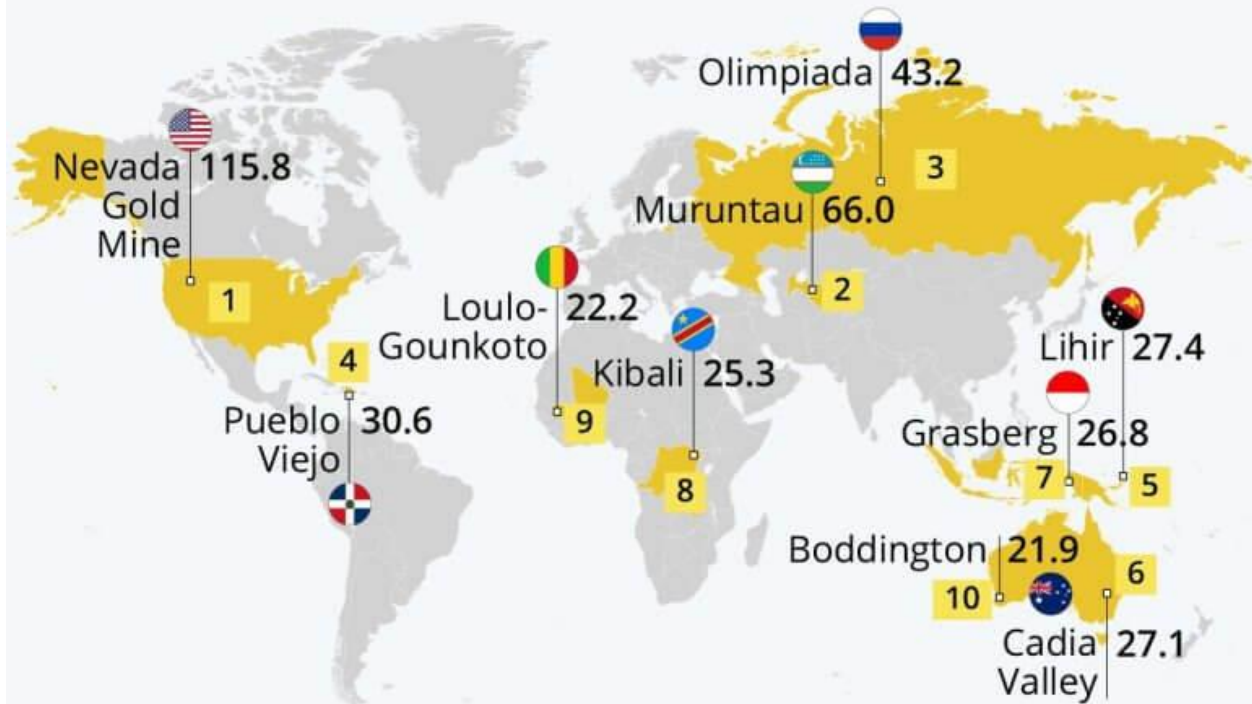
➤ Gold

→ Until **2006 South Africa** was the world's largest gold producer. In **2007** increasing production from other countries and declining production from South Africa meant that **China** became the largest producer, although no country has approached the scale of South Africa's period of peak production during the late 1960s and early 1970s.

→ Countries with significant deposits: **South Africa, Australia, Indonesia, Canada, Ghana, Chile, China, USA, Russia, etc.**

The World's Biggest Gold Mines

Top gold mines by tonnes of gold produced annually*



* Latest available data as of September 2020

Source: World Gold Council via BBC

- ★ South Africa: Johannesburg, Boksburg and Orange free state, Kimberley
- ★ USA: Salt lake region and Alaska.
- ★ Australia: Mount Morgan, Kalgoorlie and Coolgardie. (Newcrest's Cadia Valley mine in New South Wales, Boddington Gold Mine, Fosterville Gold Mine)
- ★ Russia: Polyus Gold's Olimpiada gold mine in the Krasnoyarsk region of Eastern Siberia, Blagodatnoye gold mine, Kupol gold mine in the Chukotka region of Far East

Russia, Natalka gold mine(northern Pacific coast in the Magadan Region), Verninskoye gold mine, Sukhoi Log gold mine.

➤ Silver



- The chief ore minerals of **silver** are **argentite, stephanite, pyrargyrite, and proustite.**
- It is found mixed with several other metals such as copper, lead, gold, zinc, etc.
- Used in chemicals, electroplating, photography and for coloring glass, etc.
- **80 %** of all silver produced in the world comes as a by-product of Industrial processes and so silver mining is concentrated in only a handful of countries.
- Mexico is the world leader in terms of silver production.
- Major silver producing countries are **Mexico, Peru, China, Russia, Chile, Canada, USA, Australia, Bolivia, and South Africa.**
 - ★ Mexico: Chihuahua, Hidalgo
 - ★ Canada: Ontario, British Columbia, Quebec
 - ★ USA: Utah, Montana, Arizona, Colorado

- ★ Australia: Mt No, Kalgoorlie, Broken bill
- ★ Bolivia: Potosi
- ★ South Africa: Transvaal, and Natal Province

➤ **Tin**

- The tin-producing areas of the world are limited in certain pockets and very unevenly distributed around the world.
- Nearly **75 percent** of the total output comes from China and Malaysia
 - ★ Malaysia: Selangor, Penang Island, Kinta valley, Klang valley, Jelevu valley
 - ★ Indonesia: northern coast of Sumatra including Bangka, Billiton, and Singkil and there are also marine deposits in the Strait of Malacca.
 - ★ China: Yunnan, Nanking mountains, Kiangsi and Hunan.
 - ★ Peru: San Antonio de Palo is the main tin-producing area in Peru.
 - ★ Bolivia: high plateau of Bolivia is the main tin-producing area
 - ★ Brazil: Borborema plateau
 - ★ Myanmar: Shan plateau, Kayinni plateau

➤ **Lead (Galena)**

- Major lead producing countries are China, Australia, Peru, United States, and Russia.
 - ★ Australia: Broken bill, Mt. Isa(Queensland)
 - ★ Canada: Sudbury
 - ★ Peru: Cerro-de-Pasco

➤ **Zinc**

- Since lead and **zinc so often occur together**, the major zinc producers are much the same as for lead.

- The main producers of zinc in the world are China, Peru, Australia, USA, Canada, India, Kazakhstan, Ireland, and Mexico.
- China: Yunnan Province
- Peru: Cerro de Pasco, Huaraz and Ayacacho
- Australia: Broken Hill in western New South Wales, Reed Elsevier, Western Queensland and Captains Flat
- USA: Arizona, Idaho, Colorado, Missouri, Oklahoma, Kansas, New Jersey, Tennessee, Virginia, Illinois and New York
- Canada: British Columbia is the largest mining area not only in Canada but also in the world. Kimberley in British Columbia, Flin-Flon in Manitoba, and Saskatchewan are the main areas of zinc mining.
- **India: Rajasthan state is the leading producer of zinc**

➤ **Diamond**

- **The leading producers of natural diamonds are Russia, Botswana, Canada, Australia, South Africa, Russia, and Zaire [Congo].**
- Other important producers include Namibia, Ivory Coast, Sierra Leone, Venezuela, Brazil, etc.
- The US is the largest producer of synthetic industrial diamonds
- **Russia holds what is believed to be the world's largest and richest diamond resource.**
- Botswana is the leading diamond-producing country in terms of value, and the second largest in terms of volume. The two important ones are Orapa and Jwaneng, two of the most prolific diamond mines in the world.
- Botswana's resources produce the full range of diamonds, in all sizes, colors, and clarities.

- **Democratic Republic of Congo (DRC) is also one of Africa's largest diamond producers.**
- **Australia is the leading producer of color diamonds.**
Australia is famous for its pink, purple and red diamonds.
- South Africa has the most diverse range of diamond deposits in the world. Deposits include open pit and underground kimberlite pipe/dyke/fissure mining.
 - ★ South Africa: Kimberley, Johannesburg, Cape town
 - ★ Zaire: Katanga plateau
 - ★ **India: Parag and Golconda mines**
 - ★ Angola: Catoca

➤ **Nickel**

- Russia: Kola Peninsula, Southern Urals
- Canada: Sudbury

➤ **Tungsten**

- China: Nanking, Hunan, and Jiangxi

➤ **Antimony**

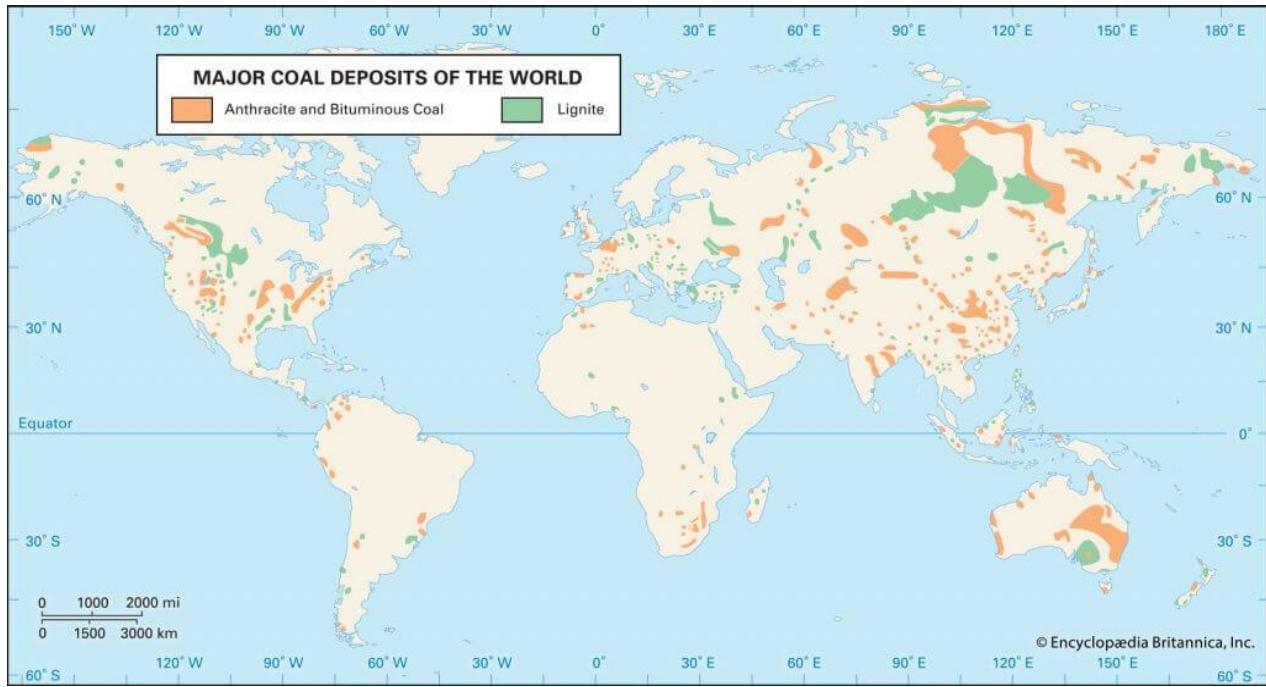
- China: Hunan and Guangxi-Zhuang
- South Africa: Transvaal

➤ **Mica**

- **India: Andhra Pradesh, Rajasthan**
- Brazil: Atlantic coast, São Paulo

❖ **Energy Resources and their Distribution**

➤ **Coal**



- **Coal is also the cheapest source of power if used near the coal mines.** Since it is bulky, its transportation to far-off places involves high costs. For this reason, the industries which consume a large quantity of coal are located near coal mines.
- **Coal is used as a source of power for running machines, trains, ships, etc. Coal is also essential for the manufacture of iron and steel and a variety of chemicals. Coal-tar and chemicals such as ammonia, benzol, etc. are obtained as by-products in the manufacture of iron and steel when coal is burnt to get the coke.**
- The coal deposits exist in nearly every part of the world, but commercially exploitable coal reserves are found mainly in **China, USA, India, Australia, Indonesia, Russia, Canada, South Africa, Colombia, Kazakhstan, and Ukraine.**
 - ★ China: Northern Shansi, Shensi, and Inner Mongolia, Heilongjiang, Jilin, Liaoning, Henan, and Shandong.

- ★ USA: Appalachian, Montana, Wyoming, Illinois, Indiana, western Kentucky, West Virginia, Alabama, Pennsylvania, Ohio, Missouri, Michigan, and Texas.
- ★ Russia: Donetskii in Moscow, Pechora basins in western Russia, and the Kuznetski, Kansk-Achinsk, Irkutsk, and South Yakutsk basins in Eastern Russia, Kansk-Achinsk Basin, and the Raspadskaya mine in the Kemerovo region.
- ★ Australia: New South Wales, Queensland, and Victoria.
- ★ Canada: Nanaimo, Bowser, Skeena, Moose River, Maritime, and Bowron River.
- ★ Germany: Ruhr Coal Basin in the North Rhine-Westphalia state, Saar Basin in south-west Germany, Rhineland region, and Garzweiler.
- ★ Ukraine: Donets Basin in Eastern Ukraine.
- ★ South Africa: Transvaal, Cape of Good Hope and Natal.
- ★ Kazakhstan: Kuznetsk, Karaganda, Ekibastuz, Turgay, Nizhne-Iliyskiy and Maikuben basin.
- ★ Colombia: Colombia has the biggest coal reserves in South America. Major coal reserves are in the Guajira peninsula. Cerrejon is the biggest coal mine in Colombia, followed by the La Loma coal mine.

➤ **Petroleum**

- The Arabian-Iranian sedimentary basin in the Persian Gulf region contains two-thirds of these supergiant fields.
- The remaining supergiants are distributed in the United States, Russia, Mexico, Libya, Algeria, Venezuela, etc.

1. Middle East

- ★ The countries in the Middle East region- Iran, Iraq, Saudi Arabia, Bahrain, Kuwait, UAE, Qatar, Oman, and Syria constitute the richest oil region on the earth.

2. Saudi Arabia:

- ★ Saudi Arabia has the second-largest proven oil reserves (Venezuela has the largest proven oil reserves).
- ★ Al-Ghawār oil field, Saffaniyah offshore field in the Persian Gulf.
- ★ Al-Burqan oilfield of Kuwait.

3.South America

- ★ Venezuela (Orinoco belt, Lake Maracaibo region) is the leading producer of oil in South America. Other countries with economical oil reserves in South America are Peru, Colombia, Argentina, and Chile.

4.North America

- ★ Oil reserves are found widespread in the USA. The states of Texas, Oklahoma, Kansas, California, Louisiana, Wyoming, and Pennsylvania are major regions with proven oil reserves.

5.Mexico

- ★ Tampico and Tuxpam — the two oil fields — started production as early as in 1901.
- ★ Among the newly discovered oil fields are Tehuantepec in the south and Campeche sound in the Gulf of Mexico.

6.Africa

- ★ The oil reserves are mainly found in North Africa. It is included in the part of the Middle East comprising the countries- Libya, Algeria, Egypt. Apart from this, African countries- Sudan, Nigeria, Angola have substantial oil reserves.

7.Caucasian region

- ★ The countries of the Caucasian region- Georgia, Armenia, and Azerbaijan have prominent oil reserves. The first oil well dug in the region was Mykope in the northern Caucasus in the year 1863. In subsequent years, oil was

also found at Baku. Later, another oilfield was discovered at Grozny.

8.Russia

- ★ The Volga basin lying west of the Ural range has been a leading producer of crude oil in Russia. Huge oil reserves have also been found in the north of the Caspian Sea, Kamchatka peninsula and Sakhalin Islands. Other prominent areas of Russia where oil reserves have been found are the Ob basin of western Siberia and Tainan.

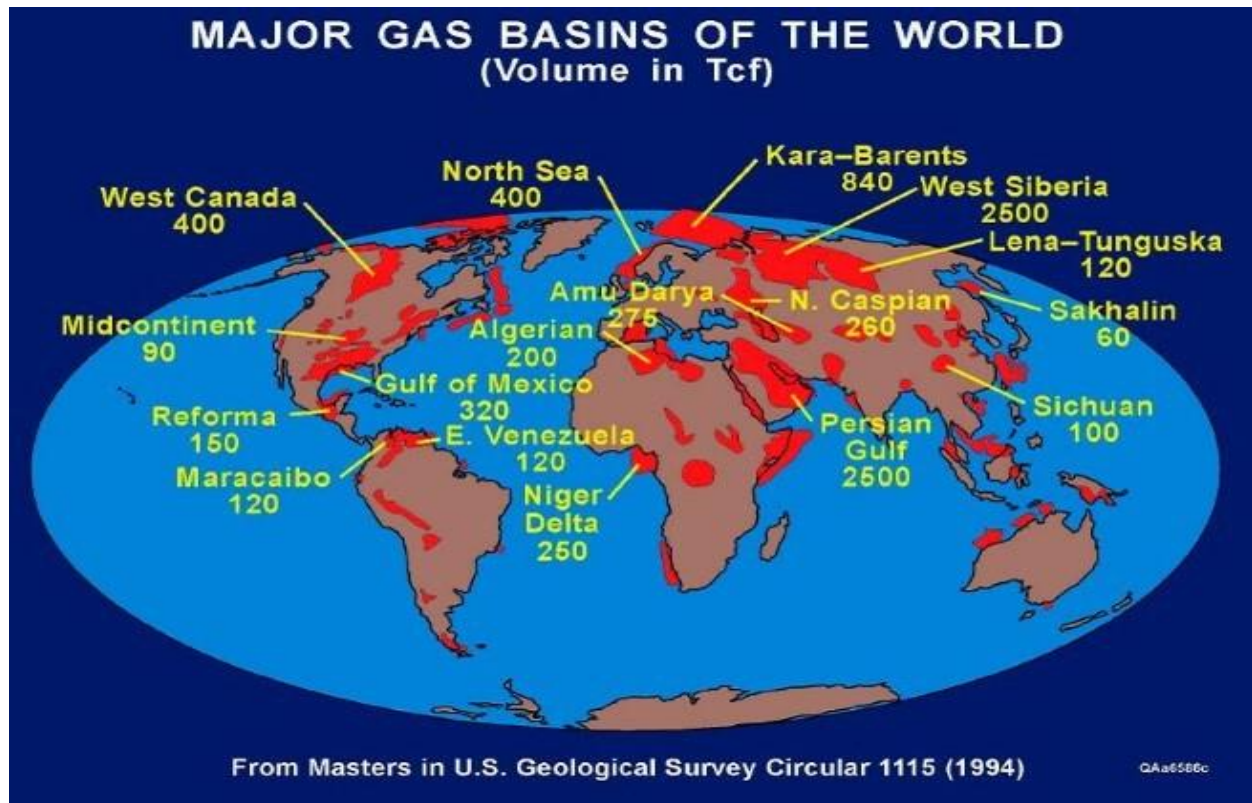
9.Europe

- ★ Major oil reserves in Europe are found in the North Sea, which is shared by the countries of the United Kingdom, Norway, Denmark, Germany, and the Netherlands.

10.Asia

- ★ Indonesia has oil fields in central Sumatra, Java and Kalimantan. Myanmar has proven oilfields in Irrawaddy and Chindwin valleys.
- ★ Vietnam and the Philippines also have offshore oil reserves in the South China Sea region. Japan has oil fields located in Hokkaido and Honshu islands. China has oil fields in the Chang Valley and Shanxi province.

➤ Natural Gas



→ Russia:

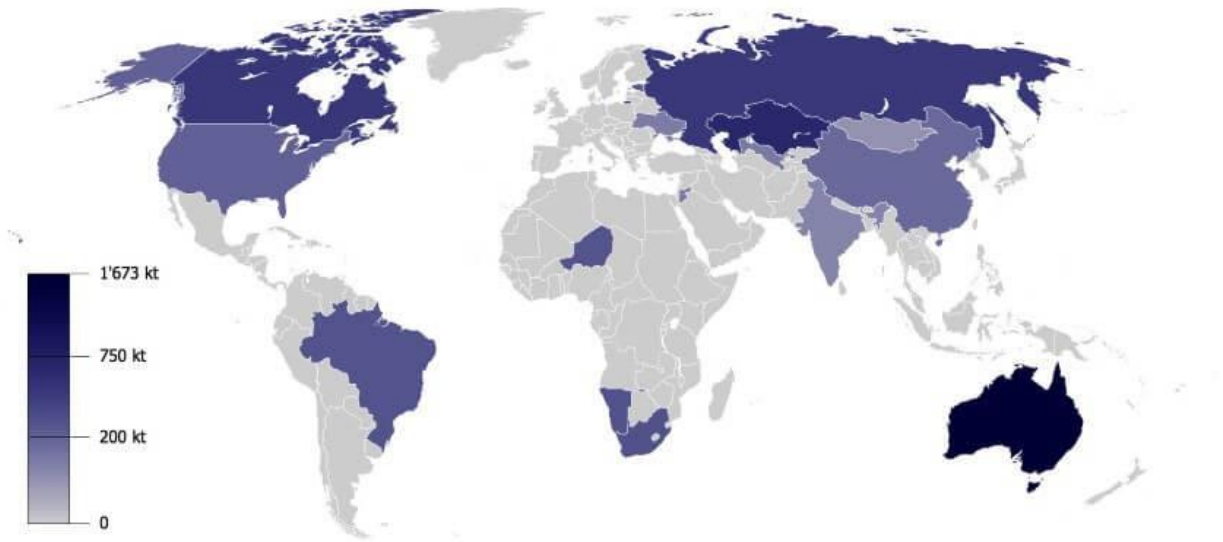
- ★ Russia is the **world's largest producer of natural gas** and **produces 21.30 percent** of the world's total natural gas production.
- ★ The country is developing the Saratov deposits of natural gas, which is carried to Moscow by an 835 km long pipeline. The Dashava Kiev line supplies gas to the capital of Ukraine.
- ★ Great deposits of natural gas have been discovered in Stavropol territory.
- ★ A gas line stretching for 1.280 kilometers has been laid between Stavropol to Moscow. It is the longest gasoline in Russia.
- ★ Other natural gas-producing regions of Russia are Estonia, Volga basin, Sakhalin Island, Pechora valley, etc.

→ USA:

- ★ The United States of America is the second-largest natural gas producer.
- ★ Appalachian Basin, McAlester Basin, Anadarko Basin, Denver Julesburg, San Juan Basin, California Area, Permian Basin, Gulf Embayment, Williston Basin, Pincher Creek
- Canada:
 - ★ Alberta and British Columbia States.
- West Asian Region:
 - ★ In West Asia, Saudi Arabia, Iran, UAE, Qatar, and Iraq are the main natural gas producers.
 - ★ Iran and Qatar have the second and third largest natural gas reserves in the world, behind Russia.
- Eastern and Southern Asian Countries:
 - ★ China has emerged as a major natural gas-producing country.
 - ★ Indonesia is another leading gas-producing country.
 - ★ Bangladesh is another leading gas-producing country. Here, huge natural gas reserves have been found in the eastern hilly region.
 - ★ **India also possesses natural gas which is mostly concentrated in Bombay High, Godavari basin, Barmer area of Rajasthan, etc.**
 - ★ Pakistan is also a surplus gas-producing country.
- Europe:
 - ★ In Europe Norway, United Kingdom, Italy, France, and Netherlands are the important natural gas-producing countries.
- Africa:
 - ★ Algeria is the leading natural gas producer.

★ Egypt, Nigeria, Gabon, South Africa and Tunisia are other natural gas-producing countries of Africa.

➤ **Uranium**



→ **Largest viable deposits are found in Australia, Kazakhstan, and Canada.**

★ Olympic Dam and the Ranger mine in Southern Australia are important mines in Australia.

★ High-grade deposits are only found in the Athabasca Basin region of Canada.

★ Cigar Lake, McArthur River basin in Canada are other important uranium mining sites.

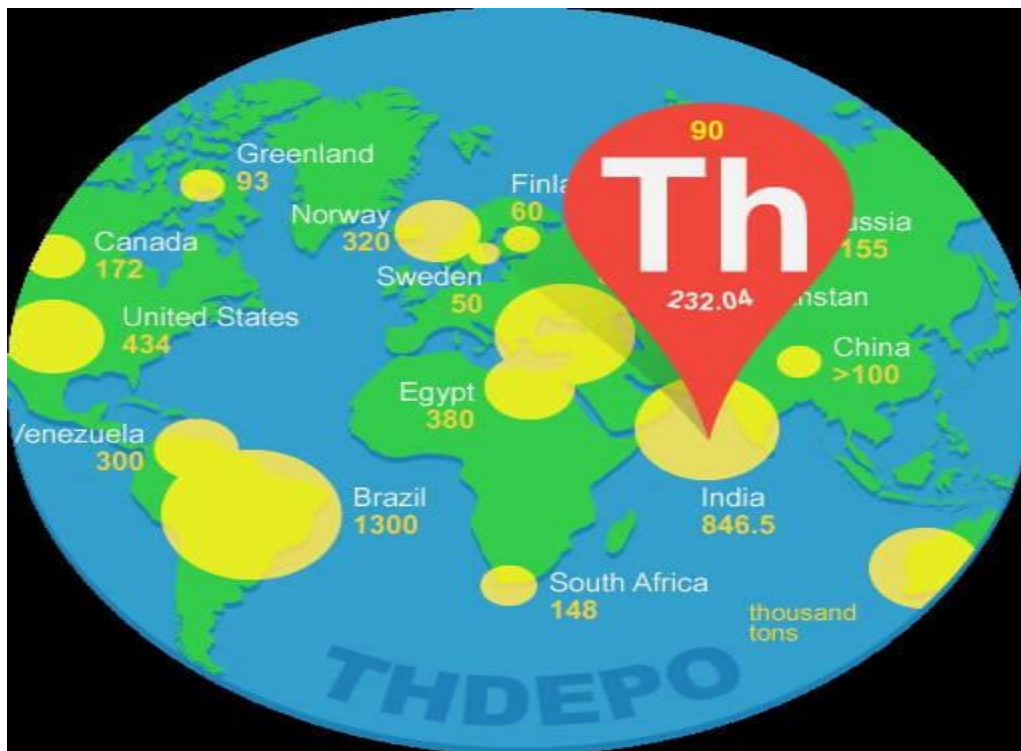
★ The Chu-Sarysu basin in central Kazakhstan alone accounts for over half of the country's known uranium resources.

→ As per 2016 data, Kazakhstan is the largest producer of uranium with 39% of world supply, followed by Canada (22%) and Australia (10%).

➤ **Thorium**

→ **Monazite** is the chief source of thorium in the world.

- The **United States, Australia, and India** have particularly **large reserves of thorium**.
- Commercially viable deposits of Monazite can be found mainly in the beach sands in the coastal tracts of India, Brazil, Australia, Ceylon, and Malaysia.
- **India and Australia** are believed to possess more than **half of the world's thorium reserves**.



➤ Hydro-Power

- Canada:
 - ★ **Canada is the highest producer of hydro-power.**
 - ★ The major generating areas are the Great Lake Region, Niagara Falls, British Columbia region.
 - ★ Some of the noted hydroelectric projects in Canada are Marie Rapid Project in Great Lake, Kitimat project in British Columbia, and Prescott, Kingston in St. Lawrence Valley.
- USA:

- ★ **The U.S.A. is the second-largest producer of hydro-power.**
 - ★ Appalachian Region – Tennessee Valley Project is an integrated large project producing a huge amount of hydro-power.
 - ★ North-West Region – Mountainous, rugged terrain and huge water volume of Columbia and Snake rivers provided ideal conditions for hydro-power generation.
 - ★ South-West Region – Colorado River provided excellent favorable conditions for water power development.
 - ★ Niagara – It is the largest hydropower project in the world, jointly developed by the U.S.A. and Canada. The Niagara River flows from Lake Erie to Lake Ontario and the Niagara Falls and the hydro-electric project forms part of the boundary between the U.S.A. and Canada.
- Europe:
- ★ The percentage contribution of hydro-power to total electricity production in few countries are Norway, Switzerland, Sweden.
 - ★ The other notable producing countries are France, Germany and Italy.
- Africa:
- ★ Africa has immense potential in hydro-power generation. Due to an underdeveloped economy and lack of technology and industrialization, much of it is yet to be tapped.
 - ★ Some of the important hydel power projects are Kariba Dam on Zambezi, Owen project in Uganda, Aswan Dam in Egypt, Sennar Dam in Sudan, Kafui Dam in Zambia etc.
- Oceania:

- ★ Australia is a leading hydro-power generating country. Most of its hydel projects are located in New South Wales and Victoria.

→ Asia:

- ★ China, India, Japan, Indonesia, N. and S. Korea.

1.China:

- ★ Three Gorges Hydro-electric Project on Chang Jiang (Yang-tze) river
- ★ Most of the hydro-power projects in China are located on the Yangtze Kiang, Sikiang and Hwang Ho rivers. Few important projects are San-men, Liu-chia etc.

2.India:

- ★ As far as the potential of hydro-power is concerned, North-Eastern states secure the first position, followed by Gangetic and Indus valley, South Indian Rivers and Central Indian Rivers.
- ★ **Damodar Valley Project — Bihar & W. Bengal**
- ★ **Bhakra-Nangal Project — Punjab.**
- ★ **Hirakud Project — Orissa**
- ★ **Chambal Project — M.P.**
- ★ **Ukai Project — Gujarat**
- ★ **Ramganga Project — U.P.**
- ★ **Parambikulam — Aliyar — Tamil Nadu.**
- ★ **Tunga-Bhadra Project — Karnataka & A.P.**
- ★ **Nagarjuna Sagar Project — Telangana & Andhra Pradesh**
- ★ **Mettur Project — Tamil Nadu**
- ★ **Idukki Project — Kerala**
- ★ **Bhivpuri and Khopoli Project — Maharashtra.**

- Agricultural resources and their distribution

❖ World Agriculture

- Agriculture is the most fundamental form of human activity. An area or region with similar functional attributes is termed an agricultural system as a widened term which emphasizes on the functional attributes. An agricultural system may be a single farm or a group of interrelated farms having similarities of agricultural attributes.
- **Farming in the world is not similar and equal.** It is difficult to identify and describe types of agriculture on the earth's surface. Agriculture is the sum total of physical agriculture, social techniques, economic and cultural factors.
- **"Agriculture is defined as the purposeful tending of crops & livestock."**
- "Region is that place on the earth surface which has some homogenous criteria." – **D. E. Jong**
- "Agricultural Region is an uninterrupted area having some kind of homogeneity with a specifically defined outer limit." – **Whittlesey (1936).**

❖ Agricultural Region

- Agricultural region may be defined as an extensive area or imaginary system of a geographical unit covering the globe, having uniformity in agricultural works, types of crops, production method, factors of production, land utilization, and livelihood of the farmers.
- The livelihood of farmers includes their residences and standard of living too. The farms are distinctive from surrounding areas.
- Agricultural characteristics are affected by the physical and human factors
 - Climate
 - ★ Different crops need different temperatures for plants at different times of the year. In high and **mid-latitudes** the

length of the growing season is very important which depends on temperature. Same is with rainfall.

- ★ The amount of rainfall at different periods, time of rainfall, amount of humidity, snowfall, etc become important for plant growth.

→ Soil –

- ★ The mineral composition of the soil is important. There are certain crops which destroy the fertility of soil.

→ Landform–

- ★ Type of landform also influences the crop. The amount and direction of slope, accessibility, and inaccessibility will be important. The flatness of land affects agricultural characteristics.

→ Density of the population –

- ★ Where the density of the **population is high** there the attitude of local consumption will be important.
- ★ The Labor force is more important here than the capital. Hence, machines are less used because most of the work is done by hand as in Monsoon Asia hence subsistence farming in China, India, and Japan.
- ★ In fact, if other factors are uniform in those areas, capital is more important, machines are more used. Commercial farming is practiced. Special crops are grown and exported as in the U.S.A, Canada, Australia, and Newzealand.

→ Scientific Progress-

- ★ Where modern implements, chemical fertilizers, and capital are used there agriculture is done on a large scale.
- ★ For commercial farming transport, linkages are important especially railways, waterways refrigeration etc.

→ Traditional Factors –

- ★ Wherever traditions are important like religious belief, customs, eating habits, etc. there the agriculture is also affected.. Indian farmers follow the same system or method of agriculture like their forefathers.
- ★ In India, animals are reared for cultivating the land rather than meat hence pastoral activities are negligible rather than the western nation.
- Socio-economic and political factors –
 - ★ In industrially advanced nations agriculture provides the raw materials for industries as well as fulfilling the demands of the people.
 - ★ In the U.S.A on the Atlantic coast, tobacco and vegetables are usually grown. Australia, Newzealand depend on pastoralismEurope is dependent on butter, cheese, and meat from Great Britain.
 - ★ In SE Asia rubber plantations are the result of economic and political relations too. **The development of the cotton belt is due to the presence of Negro laborers in the very beginning.**

❖ Typology of Agricultural Regions

- Diversity in the physical and non-physical factors over the earth surface to divide agriculture into typology is tedious work.
- According to Majid Hussain, **‘Some of the geographers have used agricultural typology and agricultural system as a wider term which emphasizes on the functional attributes’.**
- An agricultural system may be a single farm or a group of interrelated farms having similarities of agricultural attributes. The variations in attributes of agricultural systems are the result of terrain, climate, soil, sociocultural and ecopolitical factors.

- Many geographers have tried to delineate the agricultural systems of the world. But **Whittlesey's classification** of agricultural systems is a milestone and acceptable for all.
- Whittlesey was the first person who made an attempt to classify agricultural types scientifically.
- In **1936**, Whittlesey had classified the agricultural systems of the world into thirteen parts on the basis of region. This division was followed by functioning forms of agriculture prevailing in the whole world.

❖ **Whittlesey World Agricultural Systems/Region:**

- The first scientific attempt for **Whittlesey** in his paper "Major agricultural regions of the Earth" published in 1936 in the Annals of Association of American Geographers.
- Whittlesey in his monumental paper delineated the agricultural system of the earth on the following **five characteristics of agriculture** –

1.Crop and animal association

- Agriculture and pastoralism go together in the world. Both are dependent on the availability of extensive land and the fertility of the soil.
- The human factor is supplemented by animals which increase the efficiency of labor.
- The animals provide milk, meat, bones, manures and they have a positive effect on agriculture.

2.Capital and labor

- Capital and labor too have an impact on agriculture. Agriculture dependent on labor tends to make it
- subsistence type. Mechanization improves productivity in agriculture. Exchange of capital affects the amount of production types and varieties of crops.

3.Productivity of agriculture

- With variations in agricultural conditions the method of production also gets influenced. We may find uniformity in the crop and animal combination of two regions but the production method may be different.
- The same crop may be produced by primitive methods or by machines as tractors. In some regions animals are used for agricultural works and in others, they are kept for utilization of crops so that maximum use of animals may be possible. Some regions produce crops with the help of irrigation and some without irrigation. Thus agricultural productivity also reflects the uniformity and regional distribution of agricultural conditions prevailing in the country.

4. Consumption pattern of agriculture

- The consumption pattern of agricultural production is yet another criteria.
- In some regions crops are grown on a commercial basis for trade thus importance is given on the growth of just one crop, but where farmers cultivate the land for their livelihood there they have to grow many crops. Thus the agricultural characteristics vary a lot.

5. Methods and techniques used in agriculture

- Methods and techniques used in agriculture as well as the standard of living of farmers are again important criteria of classification of agricultural regions.
- For example farmers in Europe and the U.S.A, the farmers enjoy all the benefits. The techniques of farming are good as well as the standard of living.
- In SE Asian countries most of the villages lack transport facilities, electricity, health, and nutrition facilities. The

standard of living is therefore low. On this basis classification of the agricultural region can be done.

- With the help of above indicators, Whittlesey has identified the following types of agricultural system regions

→ **Nomadic Herding**

- ★ This is an extensive form of animal grazing on natural pasturage involving constant seasonal migration of the nomads whose flocks in nomadic herding are confined to rather sparsely populated parts of the world where the natural vegetation is mainly grass.
- ★ Location: Nomadic herding at present is mainly concentrated in Saharan Africa (Mauritania, Mali, Niger, Chad, Sudan, Libya, Algeria). The southwestern central parts of Asia and the north parts of Scandinavian countries (Norway, Sweden, Finland), northern Canada.
- ★ Characteristics:
 1. Nomadic herding is an ecological or near the ecological system of agriculture. It is carried mainly to produce food for the family to fulfill the needs of clothing, shelter, and recreation.
 2. It is a declining type of agriculture that continues to become less important.
 3. The main characteristic of nomadic herding is the continued movement of people with their livestock in search of forage and water for the animals.
 4. The Bedouin of Saudi Arabia, the Tuareg of the Sahara also practice nomadic herding in the desert and semi-desert areas of North Africa, Southwest Asia.
- ★ 5. The chief characteristics of nomadic herding are described below—
 - (i) Seasonal pattern of movement.

(ii) Many kinds of animals graze.

(iii) Transhumance.

→ Livestock ranching

- ★ In the extensive temperate grasslands once named by nomadic herdsmen or by hunters are found permanent ranchers where large numbers of **cattle, sheep, goats, cattle, horses, etc. are kept.**
- ★ Location: Livestock ranching at present is mainly located in the **Americans, Australia, the Republic of South Africa, Brazil, Argentina, Peru, and New Zealand; the nearest equivalent to nomadic herding is ranching.**
- ★ Characteristics:
 1. The livestock ranchers specialize in animal husbandry to the exclusion of crop raising even though both live in arid semi-arid regions.
 2. Livestock ranchers have a fixed place of residence and operate as individuals rather than within tribal organizations.
 3. Livestock ranching differs from nomadic herding in important aspects.
 4. The vegetation cover is continuous.
 5. There is little or no migration.
 6. Ranches are scientifically managed.
 7. The animal's are raised for sale.
 8. Commercial grazing supports the development of the town's communications.

→ Shifting cultivation

- ★ Shifting cultivation essentially is a land rotation system. Farmers using machetes or other bladed instruments chop away the undergrowth from small patches of land. Then they kill the trees by cutting off a strip of bark completely

around the truck. After the dead clean it farm the land. These cleaning techniques have given shifting cultivation the name or slash and burn agriculture.

Location:

- ★ Shifting cultivations, the primitive form of soil utilization, usually tropical rainforests, also tropical lowlands hills in the center of **America, Africa, and Southeast Asia, Indonesia.**

Characteristics:

- ★ Shifting cultivation is called by a different name in different parts of the world. It is generally known as a **slash burn** and **bush fallow agriculture**. It is variously termed as ladang in Indonesia, Milpa in Central America and Mexico, Chengin in Philippines, Konuko in Venezuela, Roka in Brazil, Masole in the Congo central Africa (Zaire basin), and Jhuming in Northeast India.
- ★ **The farmer grows food only for his family in this agriculture system.** Some small surplus, if any are exchanged or bartered (exchange of a commodity for a commodity) or sold for cash in the neighboring markets.
- ★ Shifting cultivation has been described as an economy of which the main Characteristics are rotation of fields rather than rotation of crops.
- ★ In the hill tracts of northeast India, Jhuming is the dominant economic activity. Over 86 percent of the people living on hill are dependent on shifting cultivation.
- ★ The shifting cultivations grow food grains such as rice, maize, millet, cassava, vegetables, and soybean.

→ **Rudimentary tillage**

- ★ Agriculture, as practiced in one place by the settled farmer in which fields are not rotated, is called **sedentary agriculture**
- ★ This is a subsistence type of agriculture and it differs from the aforementioned types because the same plot of land is cultivated continuously year after year.
- ★ Fallowing of land is commonly adopted to maintain soil fertility and is a technique often adopted in tropical regions. Besides grain crops, some tree crops such as the Pará rubber tree are grown using this system.

Location

- ★ Mostly confined to the tropical lands of **Central & South America, Africa, South-East Asia etc.**

Characteristics:

- ★ Crop rotation occurs most rather than field rotation.
- ★ The domesticated animals are used for draught purposes as well as for milk and meat purposes.
- ★ Potatoes, Sweet potatoes, Paddy, Millets, Maize, Sorghum, Root crops, Banana, etc. are grown

→ **Intensive subsistence tillage (with paddy dominance)**

- ★ intensive subsistence farming is practiced in tropical regions that have high populations and receive a large amount of precipitation.
- ★ **Rice** is the dominant crop when it comes to this type of farming, as it can employ and feed a large number of people per unit of area.
- ★ **The southeast Asian region** is where most of this type of farming is done. This type of farming requires the use of both manual and animal power, and farmers try to enhance the productivity per unit of area with the use of manures.

Location:

- ★ Intensive subsistence tillage dominated by paddy is practiced mostly in tropical Asia. It is carried on mainly in China, Japan, India, Bangladesh, Myanmar, Thailand, Sri Lanka, Malaysia, Philippines, etc.

Characteristics:

- ★ Farming is also intensive and double or treble cropping is practiced. **That is several crops are grown on the same land during the course of a year.**
- ★ Where only one crop of ' **paddy**' **can be raised**. The fields one normally used in the dry season to raise other
- ★ food or cash crops such as sugar, tobacco on oilseeds on fiber crop jute.
- ★ Asian farmers are now producing even greater yields per acre because of the recent introduction to improved varieties of hybrid rice.
- ★ In wet paddy agriculture, traditionally much manual and hand labor is required.
- ★ **Cattle and Buffaloes** are kept as draught animals in many parts of the monsoon world.
- ★ In this type of agriculture, the size of holding is generally very small. Farm sizes are also very small and they through many generations have been subdivided so that they become extremely very small.

→ **Intensive subsistence tillage (without paddy dominance)**

- ★ This is a variant of the aforementioned type of farming designed for areas where the amount of rainfall is not very high. These regions grow grain crops other than **rice, such as wheat and millets.**
- ★ Besides the comparatively less wet areas of Asia, northern Africa and the parts of the Middle East utilize this type of

farming. It is also commonly practiced in parts of southern Africa and Central America.

Location:

- ★ It includes interior India and **North-East China**.

Characteristics:

- ★ Land is intensively used & worked primarily by human power.
- ★ Farming in these regions suffers from frequent crop failures & famines.
- ★ **Wheat, Soya bean, Barley, Kaoliang crops are grown.**

→ Commercial plantation

- ★ Although practiced over a rather small area, this type of farming is quite important in terms of its commercial value. The major products of this type of farming are tropical **crops such as tea, coffee, rubber and palm oil**. This type of farming has developed in parts of Asia, Africa, and Latin America where the colonial influence of Europeans has remained.
- ★ Most of the plantations were developed to provide tropical crops to the European markets. This is a highly capital-intensive type of farming and most of the crops are tree crops.

Location:

- ★ The term plantation agriculture was originally applied specifically to the British settlements in America then to any Inga estate in North America, west India, south-east Asia which was cultivated mainly by Negro or other colored labor.

Characteristics:

- ★ A plantation is a landholding devolved to the specialized production of one tropical or subtropical crop raised for market.
- ★ Climatic hazards' strong winds, topography, drainage soil vegetation condition often handicap or many even prevent the development establishment of plantation stct. Accessibility, connectivity, availability of labor, difficulties of clearing vegetation, prevalence of discoveries of insect pests , weeds, rapid deterioration of the tropical soil , soil erosion are some of the main problems of plantation agriculture.
- ★ The plantation forms an arc generally large and arc found mainly in the thinly populated areas. The size of the farm varies from 40 hectares in **Malaya, India**, to 60000 hectares in Liberia. In these estates a large disciplined but unskilled labor force is necessary.
- ★ Some of the main plantation crops are **rubber, oil palm, cotton, copra, beverages like coffee, tea, coco, fruits like pineapples, bananas, as well as sugar-cane jute.**
- ★ The continent wise analysis reveals that Asia is the leading producer of Jute (96%), rubber (90%) tea (87%) coconut (37%) tobacco (46%) of the total world production Asia share in the production of sugarcane is 39% that of banana , oil palm is 25% each (Hussain 1996).
- ★ The characteristics features of commercial plantation may be summarized as follows—
 - ★ Estate farming.
 - ★ Foreign ownership local labor.
 - ★ Fanning in estates is scientifically managed.

→ [Mediterranean agriculture](#)

- ★ The typically rugged terrain of the Mediterranean region has resulted in typical livestock and crop combinations. Wheat, vineyards, and citrus fruits are the major crops, and small animals are the major livestock reared in the region.
- ★ **Horticulture** is a major activity of this region, and most of the crops are grown during the winter with the help of winter rains.

Location:

- ★ Agricultural typology is confined to the coastal areas the Mediterranean sea in Europe, Asia, Minor, North African coastal strip.
- ★ Outside the Mediterranean coast, this system is found in **California (USA)**.
- ★ Central Chile the south-east of cape province (**South Africa**) **South-West of Western Australia**.

Characteristics:

- ★ This type of farming is also found in irrigated semi-decent descent areas in similar latitudes.
- ★ The agricultural landscape of the Mediterranean region has been largely affected by long day summers occurrence of rains during the winter season devices for artificial irrigation during drought periods of summers.
- ★ Traditional Mediterranean agriculture is based on barley cultivation in the rainy wastes season raising drought-resistant vine tree crops like the grape olive, fig, small livestock herding particularly of sheep goats pigs.
- ★ In recent times farmers have begun using irrigation ill 1 major way which has led to the expansion of crops such as citrus fruits.
- ★ The Mediterranean land is in fact the **Orchard lands** of the world, the heart of the **world's wine industry**.

→ **Commercial grain farming**

- ★ Commercial grain farming is another market-oriented type of agriculture in which farmers specialize in growing **wheat on less frequent rice or corn.**

Location:

- ★ Great wheat belts stretch through **Australia, the plains of interior North America, the steppes of Russia, the pampas of Argentina, together with the United States, Canada farmer, Soviet union.**

Characteristics: The commercial grain farming is basically extensive. The main characteristics of these systems are—

- ★ Big farm size
- ★ Comprehensive use of heavy machines
- ★ Low use of irrigation fertilizer
- ★ Low production rate
- ★ Long-distance of the farm from the market.
- ★ Widespread use of machinery enables commercial grain farmers to operate on this large scale indeed planting harvesting grain is more completely mechanized than any other form of agriculture.
- ★ Wheat is the main crop; Mize, Barleys, oat ore other important crops. The wheat production regions are divided into two belts.
- ★ Winter wheat belt.
- ★ Spring wheat belt.

→ **Commercial livestock and crop farming**

- ★ This type of agriculture is commonly known as mixed farming, and originated in the humid areas of the middle latitudes, except Asia.
- ★ Its development is closely related to the market facilities, and it is a typically European type of farming. **Great Britain**

and New Zealand are examples of areas where this type of farming is common practice.

Location:

- ★ It is found throughout Europe from Ireland in the West through central Europe to Russia. It is also found in north
- ★ America east at 98⁰ meridian in the **pampas of Argentina, Southeast Australia, Australia, South Africa, New Zealand.**

Characteristics:

- ★ The main characteristic of the mixed farming arc is that farms produce both crops and livestock the two enterprises interwove and integrate.
- ★ Mixed farms are one characterized by high expenditure on machinery farm building and extensive use of machinery and building fertilizers also by the skill experts of farmers who need to know about all aspects of farming to market their range of product successfully.

→ **Subsistence crop & livestock farming.**

- ★ In this type of agriculture practically nothing is sold off the farm. This type of farming has been common in areas of middle latitudes with lower fertility of soils, or in areas with rough terrain. It has declined significantly after the collectivization of farming in Russia, which was one of the major regions where this was practiced.

Location:

- ★ **Northern Europe, Middle East, Mountain region of Mexico.**

Characteristics:

- ★ Produced crops & raised livestock mainly used for own subsistence.
- ★ The traditional way of farming.

- ★ Seeds are poor quality & animals are poorly husbanded.
- ★ **Capital input is normally unknown.**
- ★ **Rice, Wheat, Maize, Rye, Barley, etc are the main crops.**
Sheep and Goats are the most important animals.
- ★ Intensive cultivation causes depletion of soil fertility and farmers attempt to maintain it by applying farmyard manure, compost, green manure, and chemical fertilizers.
- ★ In other parts where rainfall is low, wheat, barley, maize, jowar, bajra, etc. may be grown, for example, in parts of Rajasthan, some parts of Peninsula India.
- ★ **Sheep and Goats** are the most **important animals** domesticated in these regions.

→ Commercial dairy farming

Location:

- ★ The rearing of the cattle for milk, milk products (butter, cheep, condensed, dried milk, etc) is known in dairy farming.
- ★ It is mainly practiced in **Europe, Northern USA, Canada, Australia, New Zealand, Denmark, Netherlands, Belgium, Finland, France, and Switzerland.**
- ★ It contributes **40% of agricultural income.**

Characteristics:

- ★ Dairying is capital-intensive farming. A modern dairy farm needs long here from the farming of huge amounts for the development of infrastructural facilities.
- ★ Capital is required for the purchase of mechanical equipment like milking machines, milk freezers, feeding towers, born silos for the storage of fodder for winters.
- ★ The size of cattle in dairies varies from country to country from farm to farm depending on the size of the holding. In the United Kingdom for example the ratio of cattle pasture

is one cow after one acre. The average size of dairy cattle in northwest Europe is only five cows per farm.

- ★ Nearly **80% of the total milk production of the world is produced in Europe, Russia, Anglo America, Australia, New Zealand (Hussain 1996).**
- ★ Modern methods of dairy farming cattle breeding herd management allow high yields of dairy products. A cow in temperate latitudes under normal healthy conditions yields as much as **3000kg of milk per year.**

→ Specialized horticulture

- ★ The specialized cultivation of vegetables, fruits, and flowers is called horticulture.

Location:

- ★ Horticulture is well developed in the densely populated industrial districts of **northwest Europe, Britain, Denmark, Germany, Netherlands, France, Italy.**

Characteristics:

- ★ In horticultural farms small such farms are located where communication links the consumption centers are appreciably good.
- ★ The land fruits' vegetable gardening is very intensively cultivated. Soil fertility is maintained by the heavy application of manures and fertilizers & work is done by hand labor.
- ★ The market gardens are scientifically managed to achieve optimum yields and handsome returns.
- ★ The important vegetation regions are **California Rio Ground boring of Texas Florida Netherlands, Rhone valley, etc.** fruits regions are west of Paris, Rhine valley lake region of Switzerland, Mendoza, Sanjuam of Argentina etc. (grape production) southwestern Germany (apple).

★ Besides **Saudi Arabia, Iraq** for **date**, **India and South-East Asia** for **spices, pineapple, mango, banana, berries, apricot, plum, grapes, oranges, apple, guava, etc.** are produced in varying agro-climatic condition of India and exported to distant markets to earn a considerable amount every year.

- Crop combination analysis
 - ❖ Crop combination refers to the **aggregate of various crops grown/cultivated in an area at a given point of time.**
 - ❖ Crop combination is the analysis of the total percentage acreage area occupied by different crops in a given region in an agricultural year.
 - ❖ The study of **crop combinations constitutes an important aspect of agriculture.**
 - ❖ It provides a good basis for agricultural regionalization and helps in the formulation of strategy for agricultural development.
 - ❖ **Crops are generally grown in combinations and it is rarely that a particular crop occupies a position of total isolation.**
 - ❖ The distribution maps of crops and their concentration are interesting and help in knowing the density and concentration of individual crops, but it is even more important to view the integrated assemblage of the various crops in a region.
 - ❖ For example, the demarcation of India into rice or wheat regions does not explain the agriculturally significant fact that very often the wheat/rice region also has mustard, gram, pulses, and maize.
 - ❖ Calculation Of Crop Combination
 - For a comprehensive and clear understanding of the agricultural mosaic of a region, a systematic study of the crop combinations has great planning significance
 - The methods applied for the demarcation of crop combination regions may be summed up under two categories
 - **The Arbitrary Choice Method**

- ★ In the arbitrary choice method, the first two or the first three crops in the area are included and the rest of the crops are excluded from the combination.
- ★ **This is an unscientific method** as the crops are excluded from the combination without any consideration of their percentage area and their monetary value.

→ **The Statistical Method**

- ★ This method being based on the **statistical formula** is more scientific and reliable for the objective grouping of crops.
- ★ In the field of agricultural geography, **Weaver (1954)** was the first to use the statistical techniques for the demarcation of crop combination regions of the **Middle West (USA)**.
- ★ In his attempt to demarcate the agricultural regions of the **Middle West (USA)**, Weaver based his analysis on acreage statistics.
- ★ Weaver computed the percentage of total harvested cropland occupied by each crop that held as much as one percent of the total cultivated land in each of the **1081** counties covered in his research work.
- ★ He devised a rigorous approach that would provide an objective, constant, and precisely repeatable procedure and would yield comparable results for different years and localities.
- ★ Weaver calculated deviation of the real percentages of crops

❖ **Crop Combination Regions in India**

- The method of least squares used by **J.T. Coppock** in **1964** has been employed in ascertaining the crop combination regions.

- There are 11 first ranking crops occupying areas large enough to merit-separate treatment; i.e. **rice, wheat, jowar, maize, bajra, ragi, gram, pulse, sugarcane, cotton, oilseed.**
 - The first ranking crops are those crops that occupy the highest percentage of the cropped areas in the component areal unit.
 - Thus India has been divided into **11 crop zones or regions** of the first order.
 - The crop zones thus derived have been subdivided into dominant crop combination regions; to bring out the agricultural land use of the transitional areas in a more meaningful way.
- ❖ Analysis of crop diversification and index of agricultural productivity
- Crop diversification refers to the **addition of new crops or cropping systems to agricultural production** on a particular farm taking into account the different returns from value-added crops with complimentary marketing opportunities.
 - It refers to the **crops, crop sequences and management techniques used on a particular agricultural field over a period of years.**

Type of diversification	Nature of diversification	Potential benefit
Improved structural diversity	Makes crops within field more structurally diverse	Pest suppression
Genetic diversification in monoculture	Cultivation of mixture of varieties of same species in a monoculture	Disease suppression, Increased production stability
Diversify field with fodder grasses	Growing fodder grasses alongside of food/pulse/oilseed/vegetables	Pest suppression, opportunity to livestock farming
Crop rotations	Temporal diversity through crop rotations	Disease suppression, Increased production
Polyculture	Spatial and temporal diversity of crops	Insect, pest disease suppression, climate change buffering
Agro-forestry	Growing crops and trees together	Pest suppression and climate change buffering
Mixed landscapes	Development of larger-scale diversified landscapes through mixture of crops and cropping system with multiple ecosystems	Pest suppression, climate change buffering and increased production stability
Micro-watershed based diversification	Integration of crop with other farming components for year round income and employment generation, besides sustaining soil	Insect, pest and disease suppression, climate change buffering and increased production, employment and income

➤ Benefits

- **Increases Farmers' income:**
- **Increases natural biodiversity and productivity**
- **Reduces the risk of total crop failure**
- **Food security**

- **Access to national and international markets**
- **Manage price risk**
- **Conservation**

➤ **Challenges**

- Suitability for some crops
- Overuse of Resources
- Inadequate infrastructure
- Lack of Knowledge and Training

❖ **Index of agricultural productivity**

- The production index is a measure of agricultural output changes
- which is calculated at three levels: **countries, regions (economic classes, continents), and global.**

❖ **Distribution of major industries**

➤ **Classification of Industries**

- **Primary Industry:** It is the simplest form of industry which consists of the first processing of raw materials and then producing industrial raw materials. Such industries include the smelting of bauxite to make aluminum.
- **Secondary Industry:** Basically they include **all reprocessing of partially manufactured goods to make more complex products**, e.g. the use of cloth in clothing and the use of paper to make books. They are called heavy industries e.g. engineering, metal goods, heavy chemicals, shipbuilding, locomotives, and light industries.
- **Tertiary Industry:** It consists of **service industries such as trade, transportation, commerce, entertainment, personal services, tourism, and administration, and so on.**
- **Quaternary industry:** This group is involved in the research of science and technology and other high-level tasks. They include scientists, doctors, and lawyers.

→ **Quinary Sector:** Some consider these to be a branch of the quaternary sector, which includes the highest levels of decision-making in a society or economy. This sector would include the top executives or officials in such fields as government, science, universities, nonprofits, healthcare, culture, and the media. These are of a consultancy nature.

➤ **Major Industries**

→ **Basic Industries:** There are some industries that produce raw materials for other industries and the iron and Steel industry. Its products are used in manufacturing machines, which in turn, are used to produce other types of products. **The major producers of steel are CIS, U.S.A., Japan, and China.**

→ **Consumer goods Industries:** Produce goods for final consumption e.g.

→ **Metallic Industries:** Modern Industries owe their development to metallic industries. It includes nonferrous and ferrous industries copper, aluminum, etc. are called non-ferrous industries which do not have Iron content. Industries based on metals having Iron content are known as ferrous industries. For example Iron and Steel industry, machine and tools, motor cars, railways, engines, agricultural tools industries, etc.

→ **Shipbuilding Industry:** It is ideally situated in areas noted for the Iron and Steel Industry. Japan leads in the shipbuilding Industry.

→ **Automobile Industry:** The best locations in established industrial regions with a tradition of manufacturing components. General Motors, Ford and Chrysler of the U.S.A., British Leyland in the U.K., Volkswagen and Mercedes in Germany, Fiat of Italy, Datsun, Toyota, and Mazda of Japan

are the major producers. U.S.A., Japan, Germany, France, and other European countries are the major car producers in the World.

- **Railway equipment and airplanes:** It is located either in the heavy engineering districts close to the steel rolling mills or at local points of the national railway system. The United States is the world's largest locomotive producer. The Industry is centered in Detroit, Chicago, New York, etc., and is highly capital-intensive. The U.S. produces the largest number of planes of which two-thirds are destined for export around the world. Seattle on the eastern front is the hub.
- **Chemical Industries:** Chemicals are used widely such as in agriculture, the metallic industry, textiles, leather, paper, glass, ceramics, soap, and food processing industries. The Chemical Industry is responsible for the development of the modern industry. Petrochemical industry based on petroleum as raw material, chemical fertilizers, paints and varnishes, plastics and some of the medicines are the products of the petrochemical industry. The main petrochemicals manufacturing countries are the U.S.A. Spain, Britain, and CIS.
- **Textile Industry:** Modern, mechanized textile manufacturing was first developed in Britain. Textile manufacture using wool, cotton, silk, or linen according to the climatic zone was practiced all over the world. Textile industries are located mainly in relation to power and labor supplies. Cheap labor supplies were an important factor in the establishment of textiles industries in the Southern U.S.A. and in Japan.
- **Agro-based industries:** Some of the industries utilize agricultural products as raw materials, for example, Jute, tea, sugar, cotton, and vegetable oil industries. The food

processing industries of modern-day are also agro-based industries.

→ **Forest-based industry:** Paper and pulp industry, rayon, turpentine oil, and furniture industry are based on the raw materials.

Industry	Leading Countries
Iron and Steel	USA, Germany, Russia
Cotton textile	USA, Japan, Russia
Rubber	Malaysia, Indonesia & Thailand
Synthetic Rubber	USA, Germany, Japan
Woolen textile	Australia, Russia
Silk textiles	China, Japan
Microelectronics	Japan, USA
Ship Building	USA, Japan, Norway
Pulp & Paper	Canada & USA
Newsprint Paper	USA & Canada
Petroleum Products	USA, Germany & Japan
Television Receivers	Japan, USA
Cement	Russia, Japan
Heavy Chemicals	USA, Germany
Synthetic fibers	USA, Germany
Aircraft	USA, Russia
Locomotives	USA, United Kingdom

Aluminum	Canada, United Kingdom
Newsprint	Canada, USA
Wood Pulp	USA, Canada
Sawn wood Products	Russia, USA
Cork	Russia, USA

Center	Major Industry
Ahmedabad	Cotton Textile
Akron (Ohio, USA)	Synthetic rubber
Anshan (China)	Iron & Steel
Antwerp (Belgium)	Shipbuilding, petrochemicals
Auckland (NZ)	Dairy products
Baku	Oil refinery
Belfast (Northern Ireland)	Ship building
Birmingham (England)	Iron & steel
Cadiz (Spain)	Cork
Cairo (Egypt)	Cotton textiles
Chelyabinsk (Russia)	Iron & Steel
Chiba (Japan)	Marine engineering
Chicago	Meat Packing

Dallas (Texas, USA)	Aircraft
Detroit (Michigan, USA)	Automobiles
Dhaka	Carpet
Dresden (Germany)	Optical Instrument
Dundee (Scotland)	Cotton Textile
Glasgow	Ship building
Gorky	Engineering
Halifax (Canada)	Worsted textiles
Hamamatsu (Japan)	Musical instruments
Hamburg	Ship building
Hamilton	Iron & Steel
Havana	Cigar
Hongkong	Toys, light electronic industries
Houston	Oil refinery
Ivanovo (Russia)	Cotton textiles
Johannesburg	Gold Mining
Kansas city	Aircraft
Kiev (Ukraine)	Engineering
Kimberley	Diamond
Kingston	Locomotive
Lyons	Silk
Los Angeles	Aircraft

Magnitogorsk	Iron and steel
Manchester	Cotton textiles
Milan (Italy)	Silk
Moscow	Cotton textiles and heavy Industries
Multan	Pottery
Munich	Lens Manufacturing
Nagasaki	Ship building
Nagoya	Ship Building
New Castle	Iron & Steel
New York	Ship building, cotton textiles
Osaka	Cotton Textile
Ottawa	Paper
Pittsburg (USA)	Iron & Steel
Quebec (Canada)	Marine engineering
Ruhr Valley (Germany)	Iron and steel
San Francisco	Ship building
Sarnia (Canada)	Oil refinery
Seattle (USA)	Aircraft
Shanghai	Cotton Textile
Sheffield (England)	Cutlery
Shenyang (China)	Iron & Steel
Tokyo	Ship building & cotton textiles

Tula (Russia)	Iron & Steel
Vancouver	Oil refining & shipbuilding
Vienna	Glass
Vladivostok	Ship Building
Wellington (New Zealand)	Dairy
Windsor (Canada)	Automobile
Zurich (Switzerland)	Light Engineering

➤ Major Industrial Regions of the World

➔ **Moscow-Tula region of Russia –**

- ➔ an industrial city and the administrative center of Tula Oblast, Russia; it is located 193 kilometers south of Moscow, on the Upa River.
- ➔ The region is rich in iron ore, clay, limestone, and deposits of lignite (coal).
- ➔ It is a prominent industrial center with metalworking, engineering, coal mining, and chemical industries.

➤ **Magnitogorsk –**

- ➔ is an industrial city in Chelyabinsk Oblast, Russia, located on the eastern side of the extreme southern extent of the Ural Mountains by the Ural River.
- ➔ It was named for the Magnitnaya Mountain that was almost pure iron, a geological anomaly. Huge reserves of iron ore in the area made it a prime location to build a steel plant.
- ➔ The city played an important role during World War II because it supplied much of the steel for the Soviet war machine and its strategic location near the Ural Mountains

meant Magnitogorsk was safe from seizure by the German Army.

➤ **Donbas of Ukraine (Donets Basin) –**

- **Historical, economic, and cultural** region of eastern **Ukraine**.
- A coal mining area since the late 19th century, it has become a heavily industrialized territory suffering from urban decay and industrial pollution.
- The coal mines of **Donbas** are one of the most hazardous in the world due to enormous working depths (down from 300 to 1200 m) as a result of natural depletion, as well as due to high levels of methane explosion, coal dust explosion, and rockburst dangers.

➤ **Kuzbass region –**

- Located in southwestern Siberia, where the West Siberian Plain meets the South Siberian Mountains.
- It is one of Russia's most important industrial regions, with some of the world's largest deposits of coal.
- The south of the region is dominated by metallurgy and the mining industry, as well as mechanical engineering and chemical production.

➤ **Great lakes region –**

- The Great Lakes region of North America is a bi-national, Canadian-American region that includes the eight U.S. states of Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin as well as the Canadian province of Ontario.
- Navigable terrain, waterways, and ports spurred an unprecedented construction of transportation infrastructure throughout the region.

→ The region is a global leader in advanced manufacturing and research and development, with significant innovations in both production processes and business organization.

➤ **Appalachian region –**

→ Is a 205,000-square-mile region that follows the spine of the Appalachian Mountains from southern New York to northern Mississippi.

→ The Region's economy, once highly dependent on mining, forestry, agriculture, chemical industries, and heavy industry, has become more diversified in recent times, and now includes a variety of manufacturing and service industries. Coal mining is the industry most frequently associated with Appalachia due in part to the fact that the region once produced **two-thirds** of the nation's coal.

➤ **New England –**

→ Is a region in the northeastern corner of the United States consisting of the six states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut.

→ It historically has been an important center of industrial manufacturing and a supplier of natural resource products such as granite, lobster, and codfish.

→ Exports consist mostly of industrial products, including specialized machines and weaponry. About half of the region's exports consist of industrial and commercial machinery, such as computers and electronic and electrical equipment.

➤ **Yokohama region of Japan –**

→ Yokohama is the capital city of Kanagawa Prefecture and the second-largest city in Japan by population after Tokyo.

→ It is a major commercial hub of the Greater Tokyo Area.

→ The city has a strong economic base, especially in the shipping, biotechnology, and semiconductor industries.

➤ **Manchurian region of China**

→ Is a great industrial hub, with huge **coal mines, iron- and steelworks, aluminum-reduction plants, paper mills, and factories making heavy machinery, tractors, locomotives, aircraft, and chemicals.** The chief commercial port is Dalian.

→ The great Manchurian plain crossed by the Liao and Songhua rivers is the only extensively level area. Fertile and densely populated, it has been a major manufacturing and agricultural center of China.

➤ **Sao Paulo region –**

→ is the largest city in Brazil & is considered the “financial capital of Brazil”, as it is the location for the headquarters of many major corporations and the country’s most renowned banks and financial institutions.

→ Once a city with a strong industrial character, Sao Paulo’s economy has become increasingly based on the tertiary sector, focusing on services and businesses for the country.

➤ **Lorraine region of France –**

→ Is situated in the northeast corner of France bordering Germany, Belgium, and Luxembourg.

→ This region of France is a mostly rich farming country through which the rivers the Meuse and Moselle flow, rising onto the forested slopes of the Vosges.

→ The region is known for its iron and steel industry and crystal works

➤ **Ruhr and Silesia of Germany –**

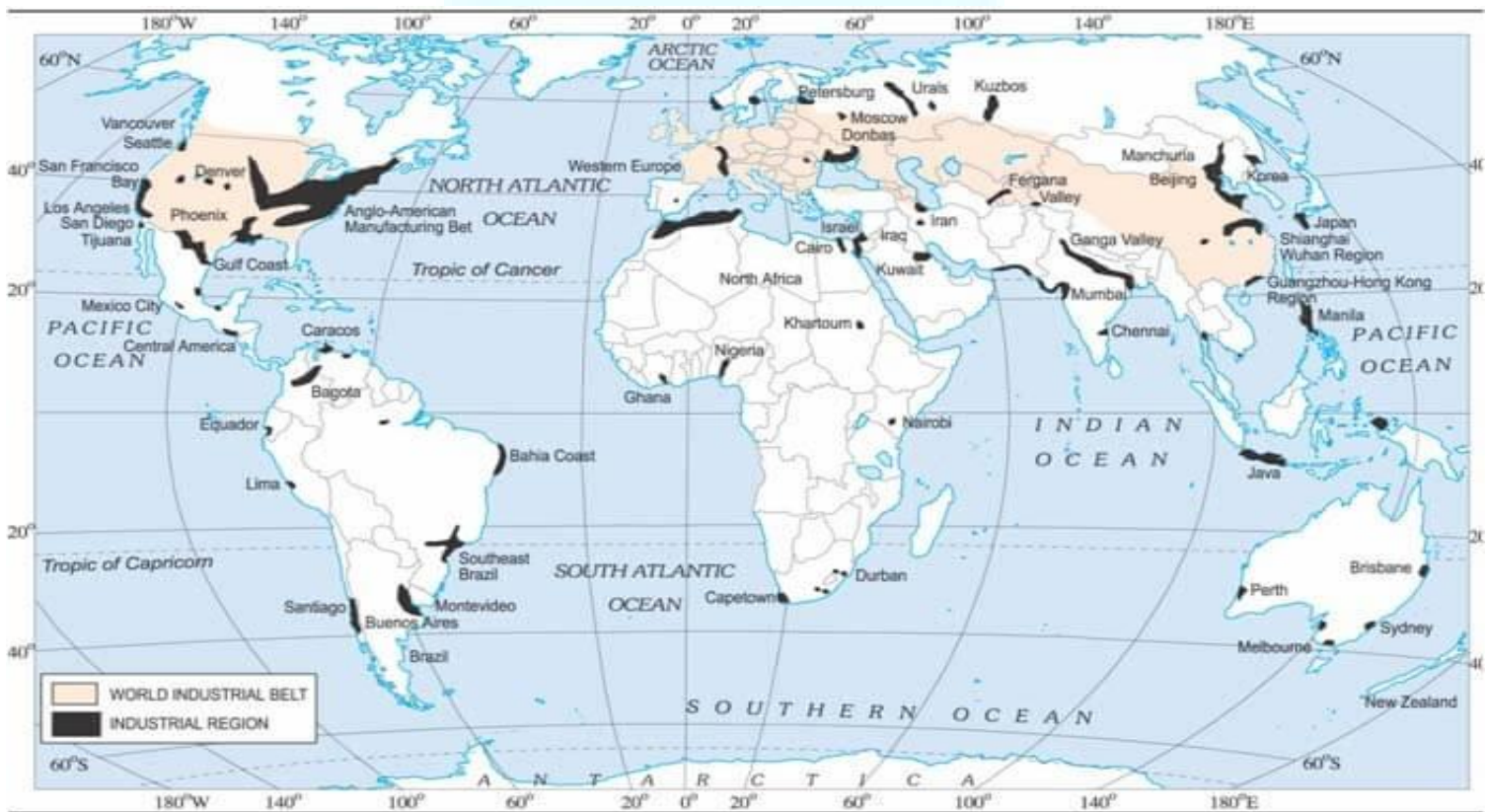
→ Ruhr valley is an urban area in North Rhine-Westphalia, Germany.

→ It is Germany's most densely populated region & is known for coal mining and steel industries.

➤ **West Coast region of Canada –**

→ Energy, and agriculture are Western Canada's dominant industries – and this region, with only 10 million inhabitants, is one of the world's largest net exporters of both energy and agricultural commodities.

→ Approximate breakdown: **Oil** (13% of world reserves; 4% of world production) **Uranium** (8% of world reserves; 20% of world production), **Potash** (60% of world reserves; 30% of world production), **Wheat, coarse grains, oilseeds** (21% of the world export market for wheat; 10% for oilseeds).



● Transportation pattern of world trade

❖ **Trade is the exchange of goods and services between countries.**

Goods bought into a country are called **imports**, and those sold to another country are called **exports**.

- ❖ **Developed countries have a greater share of global trade than developing countries.**
- ❖ The greatest volume of trade occurs between the developed, rich countries, especially between industrial leaders such as **Germany, Japan, the United Kingdom and the United States.**
- ❖ Trade between the **US, Canada, Western Europe, and Japan** is **usually** referred to as **North-North trade.**
- ❖ Moving to a world where **South-South** commerce (**trade between developing countries**), and **North-South** commerce (**trade between developed and developing countries**), overtaking North-North trade.
- ❖ While high-income economies accounted for **80%** of world trade in **1985**, will account for less than 50% by the middle of the current decade.



- ❖ The past few decades have seen important shifts that have reshaped the global trade landscape. As a share of global output, trade is now at almost three times the level in the early 1950s, in large part driven by the integration of rapidly growing **emerging market economies (EMEs).**

- ❖ The expansion in trade is mostly accounted for by growth in **non-commodity exports, especially of high-technology products such as computers and electronics.**
- ❖ These developments in global trade have been associated with **increased trade interconnectedness** and carry important implications for trade patterns, in particular in response to relative price changes.
- ❖ **Air, Road, Sea and Rail.** These are the four major modes of transport.
- ❖ **Road Freight**



- Road transport can be the most flexible option for international business. It is usually quick and efficient.
- It's a common choice in countries like the **USA and Canada**, where **road freight accounts for the majority of transport**, and it can be used in combination with every other mode of transport on this list.
- **Benefits of road freight**
 - There are fewer restrictions on road freight compared to air or sea freight.
 - Trucks are easier to track than ships or planes – GPS can let you know where they are at all times

- It's one of the most financially economical modes of transport
- It's highly accessible. Every country in the world has a road network. That can't be said for sea or rail networks
- It's easy to organize specialist transportation based on your products. Road freight can accommodate hazardous materials, perishable goods and just about anything else
- Door-to-door transport is possible when correctly planned
- It's easy to adjust routes and timings if necessary
- Uncomplicated packing, shipping and offloading process

➤ **Drawbacks of road freight**

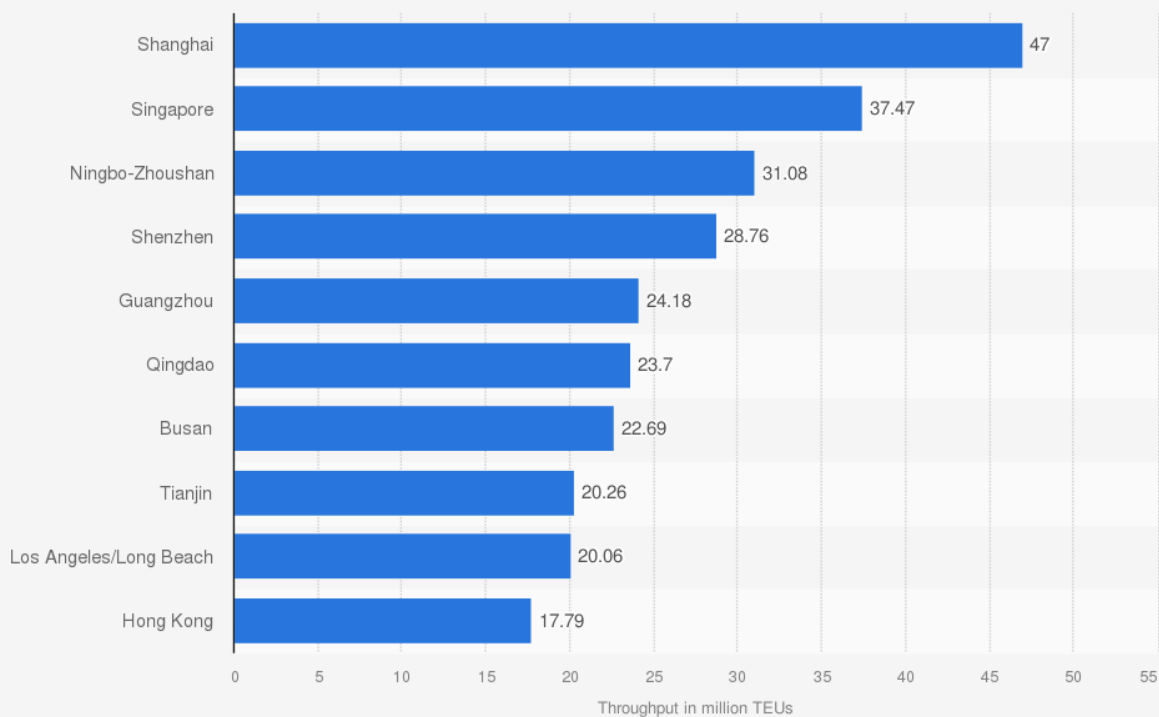
- Road freight can take longer than transportation by air or sea and can also be unpredictable due to unforeseen weather or road closures
- It's not suitable for trans-global transportation
- It's easier for criminals to target trucks compared to other transport modes
- Size and weight limits apply
- Issues with seasonality can make roads unsafe
- Higher risk of accidents and breakdowns when compared to alternative modes of transport
- It's slower than other modes of transport

❖ **Sea Freight**



- Sea freight accounts for the vast majority of the world's trade. More than **90%** of all goods are transported by ships.
- Between 2013 and 2019, both the capacity of the global merchant fleet and the volume of seaborne trade increased significantly. During this time span, the volume of goods carried by ships rose by almost 35 percent, while the combined capacity of merchant ships grew by around 17 percent.

The largest container ports worldwide in 2021, based on throughput (in million TEUs)



Source
Alphaliner
© Statista 2022

Additional Information:
Worldwide; 2021

➤ **Benefits of sea freight**

- ➔ It's the best way to transport large and heavy goods. Cargo ships can carry thousands of tons, making them perfect for oversized or bulk products
- ➔ It's cheaper than air transportation. And also more environmentally friendly

- Minimal handling is required
- Slow-moving vessels mean goods are less likely to be damaged
- Shipping is rarely impacted by weather conditions
- It has the highest carrying capacity of all freight options
- **Sea freight the largest carrying capacity**
- **Drawbacks of sea freight**
 - Not always the most financially economical choice
 - Can be inaccessible depending on origin or end destination
 - Long transit times make it unsuitable for expedited deliveries

❖ Air Freight



- Air freight is the go-to choice for speedy delivery. It's accessible all over the world and a convenient method to move smaller shipments long distances.
- **benefits of air freight**
 - Speed is the biggest benefit of air freight. It's rare for flights to suffer more than a few hours delay and air freight allows for a much more direct route than road, sea or rail

- The fixed schedule of air freight makes them a reliable choice
- Security is much higher with air freight than other modes of transport, packages often receive the most rigorous protection measures
- The reduced risk of air freight tends to mean lower insurance premiums

➤ **drawbacks of air freight**

- Air freight is one of the most expensive transport methods owing to high fuel costs and additional expenses like security checks
- The nature of air freight means there are restrictions on what can be transported. Size, weight and product types are all restricted.
- It can be risky, given that any crash can result in the complete loss of goods.

❖ **Rail Freight**



- Trains are a vital part of logistics routes across the globe, particularly in Europe and North America, where rail networks are comprehensive.
- **In North America, for instance, rail freight accounts for about 15% of all freight journeys.** It's the ideal choice for organizations that require fast, scheduled and reliable freight in areas of the world where rail networks are strong.

- **benefits of rail freight**

- Trains offer more carrying capacity than road freight
- Less chance of delays owing to fixed schedules and the nature of rail journeys
- Low environmental impact compared to any other mode of transport. It emits over three-quarters fewer emissions than road freight
- A cost-effective solution for long journeys
- Particularly good for inter-country transportation

- **drawbacks of rail freight**

- Can be slower than other forms of transport
- A lack of accessibility means rail freight isn't suitable in all locations
- No door-to-door service owing to predefined routes
- Usually requires additional transportation at the end of the journey.

- Trade blocs

- ❖ A trade bloc is a **group of nations that has reached a set of special agreements regarding their economic relationships with each other.**
- ❖ The agreements generally focus on the **relaxation or elimination of trade barriers, which are laws that limit the amount of business done across two countries' borders.**

- ❖ The most common types of trade barriers are **tariffs** (taxes on imports) and **quotas** (limits on the quantities of various imports).
- ❖ The **World Trade Organization (WTO)** permits the existence of trading blocs, provided that they result in lower protection against outside countries than existed before the creation of the trading bloc .
- ❖ The most significant trading blocs currently are:
 - **European Union (EU)**
 - The European Union is the largest trade block in th
 - The European Union is a group of 28 countries that operate as a cohesive economic and political block
 - 19 of these countries use **EURO** as their official currency. 9 EU members (**Bulgaria, Croatia, Czech Republic, Denmark, Hungary, Poland, Romania, Sweden, and the United Kingdom**) do not use the euro
 - **European Free Trade Area (EFTA)**
 - The **European Free Trade Association (EFTA)** is the intergovernmental organization of **Iceland, Liechtenstein, Norway and Switzerland**.
 - These countries are **not part of the European Union (EU)** with which India is negotiating a separate trade agreement called the India-EU Broad-based Trade and Investment Agreement.
 - **North American Free Trade Agreement (NAFTA) between the USA, Canada and Mexico**
 - NAFTA came into effect in **1994**.
 - It is a successor to the **Canada-United States Free Trade Agreement**.
 - It encouraged big business to reorganize supply chains around the North American continent.
 - This eventually made industries such as automobiles globally more competitive.

→ Overall, regional trade has expanded more than three times since NAFTA came into effect.

➤ **Mercosur**

→ **Mercosur is a sub-regional bloc of South American Countries.**

→ Its purpose is to promote free trade and the fluid movement of goods, people, and currency

→ Its full members are **Argentina, Brazil, Paraguay, Uruguay and Venezuela.**

→ Its associate countries are Bolivia, Chile, Peru, Colombia, Ecuador and Suriname

→ The Mercosur trading bloc was established in **1991**

→ Headquarter : **Montevideo (Uruguay)**

➤ **Association of Southeast Asian Nations (ASEAN)**

→ The Association of Southeast Asian Nations is a regional organization which was established to promote political and social stability amid rising tensions among the **Asia-Pacific's post-colonial states.**

→ The motto of ASEAN is “**One Vision, One Identity, One Community**”.

→ **8th August** is observed as ASEAN Day.

→ ASEAN Secretariat – **Indonesia, Jakarta.**

→ Member Nations:

- ★ Indonesia
- ★ Malaysia
- ★ Philippines
- ★ Singapore
- ★ Thailand
- ★ Brunei
- ★ Vietnam

- ★ Laos
- ★ Myanmar
- ★ Cambodia

➤ **South Asian Free Trade Area (SAFTA)**

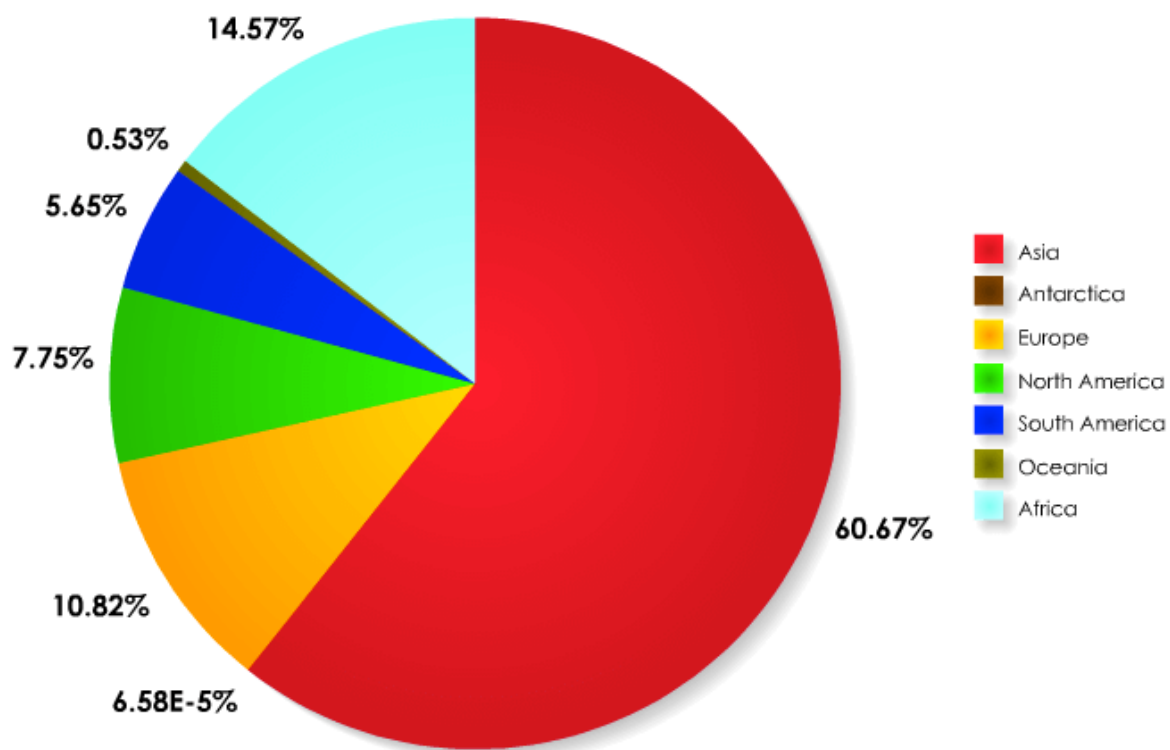
- The **South Asian Free Trade Area (SAFTA)** is the free trade arrangement of the **South Asian Association for Regional Cooperation (SAARC)**.
- The agreement came into force in 2006, succeeding the 1993 SAARC Preferential Trading Arrangement.
- SAFTA signatory countries are **Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka**.

➤ **Pacific Alliance – 2013**

- The Pacific Alliance is a **Latin American trade bloc**, formed by **Chile, Colombia, Mexico and Peru**, which all border the **Pacific Ocean**.
- Together, these four countries have a combined population of nearly **230 million people** and make up roughly **35% of Latin American GDP**.

- Distribution of population

World Population By Continent



USCB

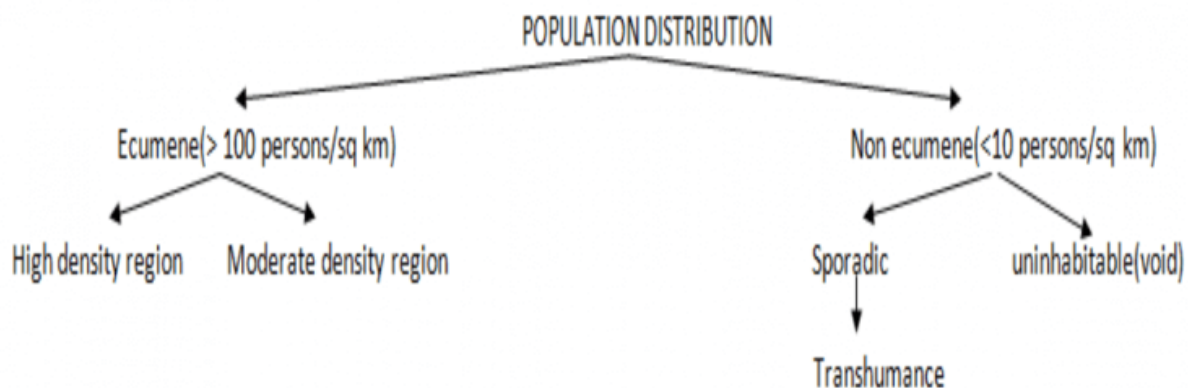
- ❖ The projected world population on Jan. 1, 2022 is **7,868,872,451**.
- ❖ It took over 2 million years of human prehistory and history for the world's population to reach 1 billion, and only 200 years more to reach 7 billion.
- ❖ **Six of the Earth's seven continents are permanently inhabited on a large scale.**
- ❖ **Asia** is the most populous continent, with its **4.64 billion** inhabitants accounting for **60% of the world population**. The world's two most populated countries, **China and India, together constitute about 36% of the world's population**.
- ❖ **Africa** is the **second most populated continent**, with around **1.34 billion people**, or **17% of the world's population**.

- ❖ **Europe's 747 million people** make up **10%** of the world's population as of 2020, while the **Latin American and Caribbean regions are home to around 653 million (8%)**.
- ❖ **North America**, primarily consisting of the United States and Canada, has a population of around **368 million (5%)**, and **Oceania**, the **least populated region**, has about **42 million inhabitants (0.5%)**.
- ❖ **Antarctica** only has a very small, fluctuating population of about **1200 people based mainly on polar science stations**.
- ❖ Latitude wise population distribution
 - About **50%** of the population lives between **20-40 degrees north**.
 - It is the region where we have monsoonal, Mediterranean, East Coast, West Coast climate, and grassland.
 - **30%** of the population lives between **40-60 degrees north** and to the **north of 60 degrees**, **North** lives on **1%** of the population.
 - **10%** of the population lives in the Southern **Hemisphere**.

Country	Human Beings (in millions)	Capital City
China	1,382	Beijing
India	1,326	Delhi
United States	324	Washington D.C.
Indonesia	260	Jakarta
Brazil	209	Brasilia
Pakistan	193	Islamabad
Nigeria	187	Abuja
Bangladesh	163	Dhaka
Russia	143	Moscow
Mexico	128	Mexico City
Japan	126	Tokyo
Philippines	102	Manila
Ethiopia	101	Addis Ababa
Viet Nam (Vietnam)	94	Hanoi
Egypt	93	Cairo
Germany	81	Berlin
Iran	80	Tehran
Turkey	79	Ankara
Congo, Democratic Republic of	79	Kinshasa
Thailand	68	Bangkok
France	64	Paris
United Kingdom	65	London
Italy	60	Rome
South Africa	55	Pretoria
Myanmar (Burma)	54	Naypyidaw

❖ Elaborate analysis of density distribution

- The habitable world can be divided into Ecumene and Non-Ecumene locations.



- Regions of agglomeration/high density
- In this 7 major regions are included
 - **East, South East Asia, and South Asia**
 - ★ These regions have a monsoonal climate, paddy culture.

- ★ High fertility of flood plains contributed towards a high concentration of human beings.
- ★ These regions represent dominant rural agrarian set up including China, Pakistan, India, Bangladesh etc.

→ **Nile Valley**

- ★ It is a wheat-growing region having a density of population of more than 500 people per sq km.
- ★ This region consists of land with fertile black alluvial soil and canal irrigation.

→ **West Europe, North European plains, Anglo America (along Great lakes region), Japan**

This region represents a high level of:

- ★ Industrialization
- ★ Urbanization
- ★ Enough job opportunities
- ★ Better infrastructure
- ★ Better health care
- ★ Better food and nutrition intake
- ★ In migration in bulk

→ **Metropolitan regions of the world with high primacy**

- ★ Mexico City (>20% of the country)
- ★ Sao Paulo, Rio de Janeiro region (15% of the population of Brazil)
- ★ Santiago, Lima
- ★ Sydney- Melbourne (60% of Australia's population)
- ★ Moscow

→ **Some Island of huge concentration with favorable geographical conditions and economy includes:**

- ★ Bahrain
- ★ Mauritius

- ★ Jamaica
- ★ Trinidad and Tobago
- ★ Hawaii group
- ★ Puerto Rico

➤ Regions with Moderate density

Those regions which are neither too favorable nor too unfavorable come under this category. It includes:

- Savannah lands of Brazil, N. Australia and parts of Africa.
- Several plateau areas where the tropical climate is favorable
- Fertile soil regions of sub-humid conditions
- Attitudinally modified equatorial regions
- Australia and New Zealand
- Temperate grassland some of them are supposed to have increased population by immigration while others through natural increase.

➤ Non Ecumene (Void, Sporadic)

Void zones:

- These are geographical regions where environmental conditions are highly unfavorable for population concentration like equatorial rainforest, tropical desert, high mountains, tropical deserts, polar region.

- These areas have sparse population and include:

Low latitude regions:

- ★ These include equatorial regions which are characterized by high temperature, high rainfall, high humidity, dense vegetation, and the rapid growth of vegetation (Selvas).
- ★ All Selvas are sparsely scattered
 1. Amazon basin
 2. S-W Africa
 3. Zaire Basin

4. Borneo Island

- ★ Selvas zone are impenetrable, two exceptions to these regions are

1. Singapore
2. Java Island

High latitude regions (north of 60 degrees North)

- ★ These are the areas of subpolar and polar characteristics having very cold conditions.
- ★ The average temperature is below the freezing point for over 9 months.
- ★ There are cold waves, blizzards, purge (Siberia) which leads to low or no bacterial activity.
- ★ There is no vegetation with no proper soil formation
- ★ The above conditions make human survival difficult in these regions.
- ★ There are few exceptions to the above
 1. Iron ore mines region of Sweden
 2. Gold in Yukon valley of Canada, Fairbanks and fort Yukon of Alaska.
 3. Coal, oil and salt areas of Siberia and Asiatic tundra.

High-temperature region

- ★ These are both temperate and tropical regions.
- ★ They are characterized by torrential rain, scanty vegetation, sandy surface, etc.
- ★ Soil layer is dominated by salt and sand, and the groundwater table is very deep.
- ★ There is a lack of surface water with a suffusion of desert environment.
- ★ Main area of the Sahara desert is 29 lakh square km, but it has a total of about 30 lakh persons.
- ★ There is hardly any permanent settlement.

★ Exceptions

1. Gold mines in Kalgoorlie and Coolgardie in Australia
2. Cripple Creek in the USA
3. Oil regions of Libya and Arabia (petro economy)
4. Central Asia has low density due to climatic continentality

Dense forests region: the areas consists of

- ★ Taiga forest areas (55 degree to 66 degrees North)
- ★ Very dense forests in northern Canada and Siberia. These are known as the land of mosquitoes. Here the surface is moist throughout the year.
- ★ These regions have podzol soil where acidity is high. More acidity leads to more angular grain thus making agriculture difficult or impossible.
- ★ Winter is very harsh and summer is of very short duration.
- ★ The above factors lead to very less population density in northern Canada and Siberia.

High altitude region

- ★ All-mountain regions with an altitude greater than 4000m where there is no human activity comes under this category.
- ★ There are very cold conditions, steep slopes, lack of soil layer, lack of vegetation, etc. which discourages human settlement.
- ★ Examples: Tibetan Plateau, high mountain regions which have an average of 3 to 5 persons/ square km.

Sporadic Ecumene:

- These are sparsely populated areas having irregular and sporadic types of settlement.
- These areas have large areas which remain inhabitable while relatively small points swarm with people.

→ The best example includes:

- ★ Larger oases of Africa and West Asia.
- ★ Islands of Java and Philippines
- ★ Isolated towns of Congo and Amazon basin
- ★ Mekong delta
- ★ Mesopotamia
- ★ Turanian plains

→ The major sporadic ecumene regions have:

Minerals

- ★ Kiruna (Iron ore- Sweden)
- ★ Magadan (Coal- Siberia)
- ★ Manaus (Gold-Brazil)
- ★ Namib desert (Uranium- Namibia)

Energy resource

- ★ Persian Gulf shoreline (crude oil)
- ★ Sakhalin (crude oil, natural gas- Russia)

Marine links

- ★ Honolulu
- ★ Hawaii islands
- ★ Singapore representing port of call along with Port Said, Port Suez, Panama city, Colon

→ The development of sporadic ecumene is also correlated to the favorable habitat with almost all megacities of African Savannah. E.g. Addis Ababa, Kampala, Nairobi which are located at the elevation of > 3000m

→ The administrative capital of Yemen (Sana) and Bolivia (Lapaz) have similar conditions. Lake Titicaca in Bolivia has the highest navigable lake in the world.

→ It is estimated that the population in sparsely populated areas will increase at a faster pace, which may create ecological and demographic problems.

- Concept of sustainable development

- ❖ Sustainable development is **development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.**

- ❖ Thus, it takes into account both the present and future generations without over-exploitation of natural resources and environmental degradation.

- ❖ The term **sustainability** is often referred to as “sustainable development”.

- ❖ Sustainable development is a **multidimensional concept, involving not less than four dimensions.**

- ❖ Basic Characteristics of Sustainable Development

- There should be an uninterrupted rise in **real per capita income** and **economic welfare** on a long-term basis.

- Sustainable development simply means that **resources should be naturally used in such a way that they are not over-exploited.**

- Sustainable development aims at making use of natural resources and the environment for improving the standard of people in such a way that the ability of future generations to meet their own needs is not minimized.

- Sustainable development aims at promoting environment-friendly and biodegradable products, while also making sustainable planning for replacement or replenishment of resource usage.

- Sustainable development emphasis on eco-friendly building and developmental practices like green architecture.

- ❖ Three Core Elements of Sustainable Development

- **Environmental Conservation:**

→ The primary focus of sustainable development is to protect the environment so that the resources provided by it do not get destroyed.

➤ **Social Development:**

→ It aims to attain the well-being of an individual and society at large.

→ It entails the availability of necessary resources, proper healthcare, and good quality of life for people.

➤ **Economic Progress:**

→ It encourages people to invest in sustainable efforts by persuading them through its long-term benefits and supporting both the environmental and social elements of the cause.

❖ Principles/Premises of Sustainable Development

➤ Sustainable development is the alternative method for development, which by definition is **eco-friendly and resource-efficient**.

➤ There is a symbiotic relationship between **consumer and producer's natural systems**.

➤ The present generation should meet its needs without compromising the ability of future generations to meet their own needs i.e to ensure that productive assets available to future generations are not unfairly minimized.

➤ Those who enjoy the fruits of economic development must not make the resources of future generations worse by excessively degrading the Earth's exhaustible resources and polluting its ecology and environment.

➤ The development should not focus only on growth, instead it should aim for broader goals of social transformation.

➤ Internally and externally sustainable development are two major aspects of sustainable development. With both, no real sustainable development would emerge.

- In the long term, sustainable development has to maintain relations with ecology, resources, and people along with their service agencies, institutions, and other aspects of their social organizations.
- The economic progress which destroys natural capital is not often successful.
- Sustainable development is largely responsible for the poor, and hence it should ensure that the poor have adequate access to sustainable and secure living.
- The past environmental mistakes should not be repeated as past patterns of environmental degradations are unavoidable.
- The environment and development are not mutually incompatible. Both a healthy environment and a healthy economy is essential for economic development

❖ Sustainable Development Examples

- Hydro energy as used in turbines.
- Wind energy is often employed in wind mills.
- Solar energy is finding wider implementation with innovations in solar cells and allied technologies.
- Efficient and recycled use of water.
- Green architecture and other sustainable constructions.
- Crop rotation and similar agricultural methods.
- Maintenance and growth of sustainable green spaces.

❖ Sustainable Development Goals

- The documentary screened at the **Rio+20** conference – “**Future We Want**” presented the idea of a post 2015 development agenda.
- **Sustainable development Goals (SDGs)** is an **intergovernmental agreement** formulated to act as post **2015**

Development agenda, its predecessor being Millennium Development Goals.

- It is a group of **17 goals with 169 targets and 304 indicators**, as proposed by the **United Nation General Assembly's** Open Working Group on Sustainable Development Goals to be **achieved by 2030**.
- Post negotiations, an agenda titled "Transforming Our World: the 2030 agenda for Sustainable Development" was adopted at the United Nations Sustainable Development Summit.
- SDGs is the outcome of the **Rio+20** conference (2012) held in **Rio De Janeiro** and is a non-binding document.
- **17 Sustainable Development Goals**
 - **SDG 1: No Poverty**
 - **SDG 2: Zero Hunger**
 - **SDG 3: Good Health and Well-being**
 - **SDG 4: Quality Education**
 - **SDG 5: Gender Equality**
 - **SDG 6: Clean Water and Sanitation**
 - **SDG 7: Affordable and clean energy**
 - **SDG 8: Decent Work and Economic Growth**
 - **SDG 9: Industry, innovation and infrastructure**
 - **SDG 10: Reduced inequalities**
 - **SDG 11: Sustainable cities and communities**
 - **SDG 12: Responsible production and Consumption**
 - **SDG 13: Climate actions**
 - **SDG 14: Conserve life below water**
 - **SDG 15: Protect the life on land**
 - **SDG 16: Peace, justice and strong institutions**
 - **SDG 17: Partnerships for the goals**

