

UNIT 9 – UPSC - Distribution of key natural resources across the world (including South Asia and the Indian subcontinent)

Natural resources are highly valued because human beings are dependent on them to fulfil their fundamental needs that changes with time. While natural resources are distributed in all through the world, specific resources often require particular conditions and so not all natural resources are spread equally. Consequently, nations trade their natural resources to make certain that their needs can be fulfilled.



In simple term, natural resources are material and constituent formed within environment or any matter or energy that are resulting from environment, used by living things that humans use for food, fuel, clothing, and shelter. These comprise of water, soil, minerals, vegetation, animals, air, and sunlight. People require resources to survive and succeed. Everything which happens naturally on earth are natural resources that is minerals, land, water, soil, wind that can be used in many ways by human being. It can be explained by several environmentalist scholars that a natural resources is any kind of substance in its natural form which is needed by humans.

The general classifications of natural resources are minerals for example as gold and tin and energy resources such as coal and oil. The air, forests and oceans can also be categorised as natural resources. Theoretical studies have documented that Land and water are the natural resources, which include Biological resources, such as flower, trees, birds, wild animals, fish etc., Mineral resources, such as metals, oil, coal, building stones and sand, and other resources, like air, sunshine and climate (UNEP, 1987). Natural Resources are used to make food fuel and raw materials for the production of finished goods (Adriaanse, 1993). Natural resources change in value over time, depending on what a society most needs or considers most valuable.

Resource distribution is defined as the geographic occurrence or spatial arrangement of resources on earth. In other words, where resources are located. Any one place may be rich in the resources for people desire and poor in other. The availability of natural resources is based on two functions

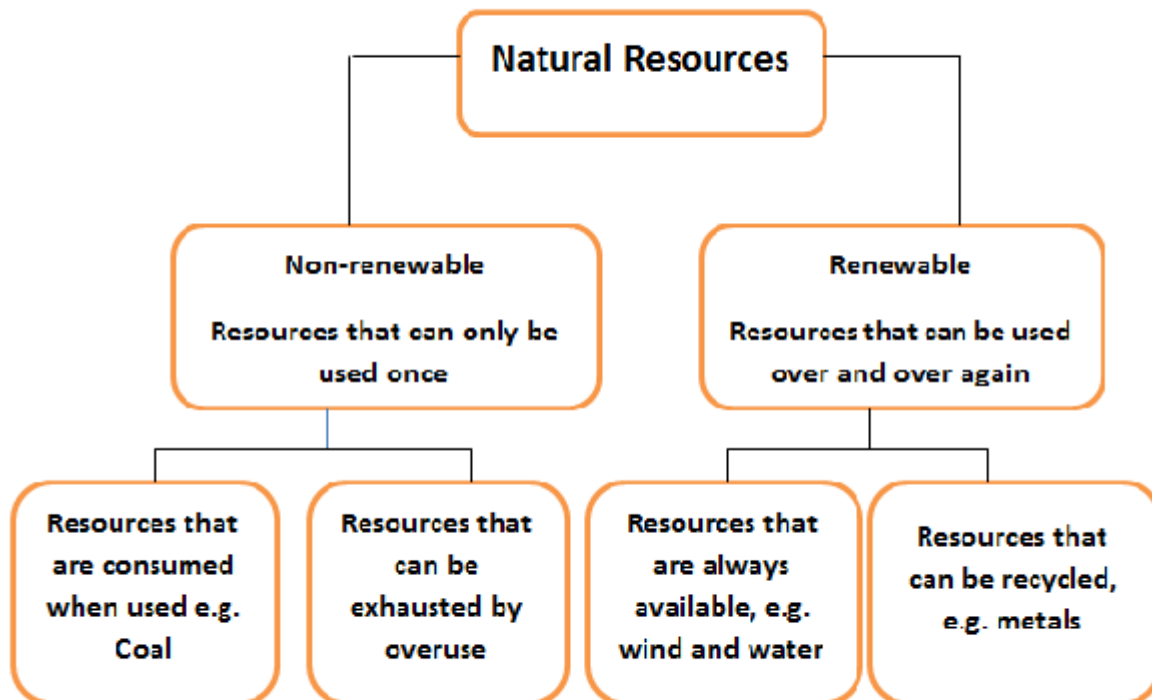
that include the physical characteristics of the resources themselves and human economic and technological conditions. The physical processes that govern the formation, distribution, and occurrence of natural resources are determined by physical laws over which people have no direct control. We take what nature gives us. To be considered a resource, however, a given substance must be understood to be a resource. This is cultural, not purely a physical circumstance.

The various types of natural resources are often categorized as renewable and non-renewable resources.

Renewable resources: Renewable can be described by scientists as a resource that can be replenished or reformed either naturally or by systemic recycling of used resources. Renewable is resource or source of energy that is replaced naturally or controlled carefully and can therefore be used without the risk of finishing it all (Oxford dictionary). Another way to define is a resource that is able to be renewed and be capable of being begun or done again. Renewable resources are usually living resources such as plants and animals and they also include air and water. These resources are termed as 'renewable' because they can usually reproduce or restock themselves. Renewable resources are significant aspect of sustainability. Renewable resources are valuable because they provide green energy. Renewable natural resources include those resources beneficial to human economies that demonstrate growth, maintenance, and recovery from exploitation over an economic planning horizon. The natural environment, with soil, water, forests, plants and animals are all renewable resource. In the case of air and water, they are renewable elements because they exist as part of a cycle which allows them to be reused. Renewable resources can only exist as long as they are not being used at a greater rate than they can replenish themselves (David Waugh, 2002).

Non-renewable resources: Non-renewable resources cannot be re-produced or re-grown and are, therefore, they are available in limited supply. Scholars affirmed that Non-renewable resource is a natural resource that does not renew itself at a sufficient rate for sustainable economic extraction in meaningful human timeframes. Non-renewable resources are resources for which there is a limited supply. The supply comes from the Earth itself and, as it typically takes millions of years to develop, is finite. Non-renewable resources can generally be separated into two main categories; it includes Fossil fuels, nuclear fuels. Coal is considered a non-renewable resource because even though it is continually being formed, it is incapable to refill its stock at a rate which is sustainable (David Waugh, 2002). A non-renewable resource cannot maintain the demands for current human needs while still preserving the ecosystem for future generations.

Types of natural resources: (Source: David Waugh, 2002)



Distribution of resources varied:

Since the formation of earth, it has experienced numerous physical processes which have resulted in great variations between different areas. Since natural resources often need specific conditions in which to form, they are not distributed evenly across the world. For instance, Coal is usually found in areas which were originally swampland during the greatest coal-forming era in history, the Carboniferous Period. It has been observed that as the distribution of natural resources is varied, it is not unusual for some nations to have one type of natural resource in plentiful quantity and for other countries to have many different types but with only a small supply. This indicates that the nations which are rich in some kind of natural resources do not necessarily use them all themselves. As an alternative, countries often export the natural resources that they have plenty of and import those which they require.

Uneven Resource Distribution:

It has been observed that generally populace tend to settle and cluster in places that have the resources they need to survive and prosper. The geographic factors that most influence where humans settle are water, soil, vegetation, climate, and landscape. Because South America, Africa, and Australia have fewer of these geographic benefits, there is less population as compared to North America, Europe, and Asia.

Due to uneven resource distribution, human beings migrate to other regions where plenty of resources are available. Majority of people often migrate to a place that has the resources they need or want and migrate away from a place that lacks the resources they need. Lively examples in historical migrations are The Trail of Tears, Westward Movement, and the Gold Rush related to the desire for land and mineral resources. Economic activities in a region relate to the resources in that region. Economic activities that are directly associated with resources include farming,

fishing, ranching, timber processing, oil and gas production, mining, and tourism. Many business scholars have affirmed that nations may not have the resources that are important to them, but business movement enables them to acquire those resources from places that have. For example, Japan has very limited natural resources but it is one of the wealthiest in Asia. Sony, Nintendo, Canon, Toyota, Honda, Sharp, Sanyo, Nissan are prosperous Japanese corporations that make products that are highly-desired in other countries. As a result of trade, Japan has enough wealth to buy the resources it needs.

Distribution of key natural resources in the world: It has been seen that most of the countries in the world are having natural resources. Some have less amount while other countries are rich in particular natural resource. Economists stated that natural resources add wealth to nations.

When it is evaluated for resource distribution around the world, Australia has many natural resources. These resources include mineral resources, such as copper, gold and diamonds, energy resources, such as coal, oil, and uranium, and land resources that are used for farming and logging. These resources are financially important to Australia. Many people consider that the monetary system of Australia is resource dependent, which means that if these resources were to be depleted, Australia's economy would suffer. Australia has more coal than is needed and so exports it to countries like Japan which are lacking in it. Australia does not, however, produce enough oil to meet the demands of consumption and it is forced to import it. Some countries, especially developing nations, have the availability of natural resources but they do not use them fully. Sometimes countries do not have a great demand for the resource or simply lack the technology to develop or extract it. Rich transnational corporations (TNCs) often pay a fee to do the mining or extraction of the natural resources and then export them to developed countries.

Mineral resources: Australia is major producer of minerals at global scale. The most important mineral resources in Australia are bauxite, gold and iron ore. Other mineral deposits in Australia include copper, lead, zinc, diamonds and mineral sands. A majority of Australia's minerals are excavated in Western Australia and Queensland. The minerals mined in Australia are exported, or shipped abroad.

Energy resources: Australia has huge deposits of coal. Coal is generally found in the eastern part of the country in the Sydney and Bowen basins. Majority of Australian coal is exported to nations like Japan, Korea, Taiwan and Western Europe. The rest of the coal mines in Australia are burned for electricity within Australia.

Natural gas is also plentiful in Australia. Natural gas is used to heat homes and power certain types of vehicles. Natural gas reserves in Australia are mostly found in Western Australia and central Australia. Since most of these reserves are far away from metropolitan centres, gas pipelines have been built to transport natural gas to cities such as Sydney and Melbourne. Some of this natural gas is exported from where it is collected. Natural gas collected in Western Australia is exported directly to Japan in liquid form.

Australia is also rich in uranium and supply at global level. Uranium is used to produce nuclear power. Nuclear power and uranium mining are both highly contentious, as people are concerned for their environmental impact, because uranium can produce toxic energy.

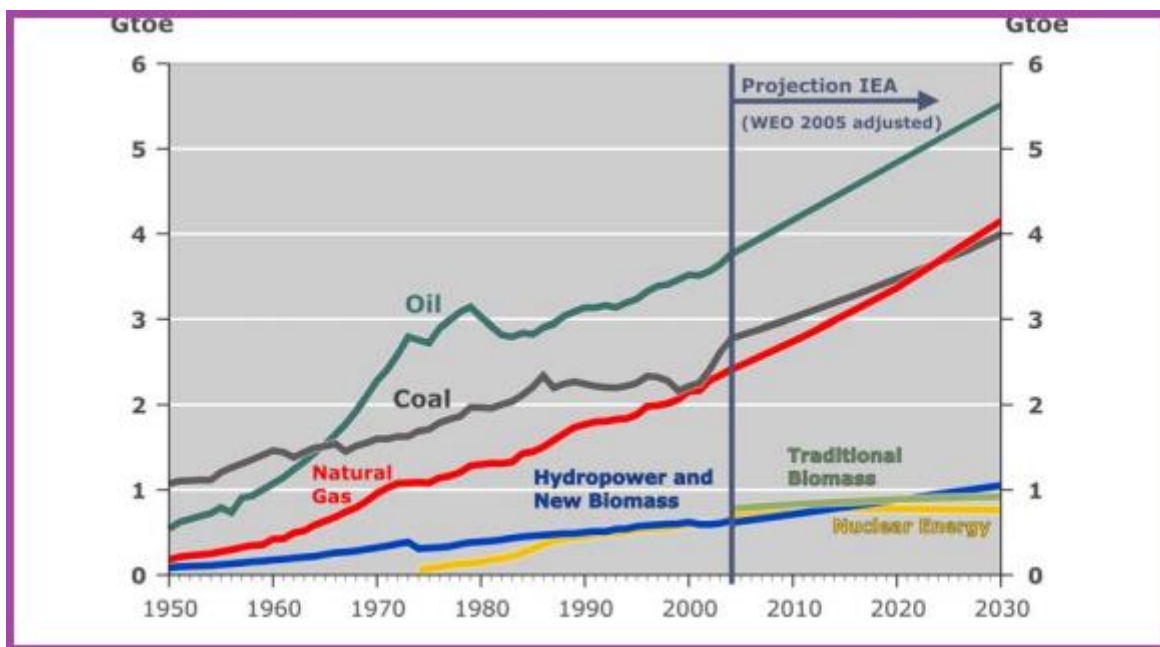
Lastly, Australia has many land resources. Australian soil is used to grow food in the form of crops and to produce food for raising livestock, such as cattle. Australian forests are used as a source of wood for building and making paper.

When discussing about natural resources in Africa, It is revealed in reports that Africa is rich in natural resources including diamonds, salt, gold, iron, cobalt, uranium, copper, bauxite, silver, petroleum and cocoa beans, but also woods and tropical fruits. Russia is excessively capable of natural resources, but industrial development was hindered until the twentieth century by their Siberian inaccessibility. Russia now produces 20 per cent of the world's natural gas, and oil is also a valuable commodity. Russia is self-sufficient in all major industrial raw materials, and contains reserves of less essential, but significant natural resources, including diamonds and gold.

Industrialized nations have benefit over poor countries because if they do not have the quantity or type of natural resources which they require, they can afford to import them. Developed countries need to import natural resources because they depend on them for the development of their economy. Their use of natural resources is considered as a well-planned and constructive industry. It has been recommended that developed nations use more of the natural resources of world as compared to other developing nations. Reports have signified that while developed countries account for 25 percent of the world's population, they use 75 percent of the world's natural resources.

Geographical Distribution of Oil and Natural Gas Deposits: It was documented in reports that about 70 % of global conventional oil and natural gas reserves are concentrated inside a so called Strategic Ellipse stretching from Middle East to the North of West Siberia. Main consuming regions in 2004 were North America, Austral-Asia, and Europe, for natural gas North America, CIS and Europe.

Development of primary energy consumption worldwide and projections of IEA until 2030 (Sources: BP and IEA, 2015)



When appraising the distribution of natural gas, it is found in reports that about 41 % of global reserves are in the Middle East, about 32 % in the CIS countries and about 8 % in Africa.

Regarding iron core resource in the world, USA is rich in this resource. Ore is mined in the red mountains and Birmingham Valley. Northern New Jersey, the states of Utah, Nevada and California also are rich in iron core. In Canada, there are three main areas where iron core is mined that include Ontario, Quebec and new found land. In Europe, Germany, France, Sweden

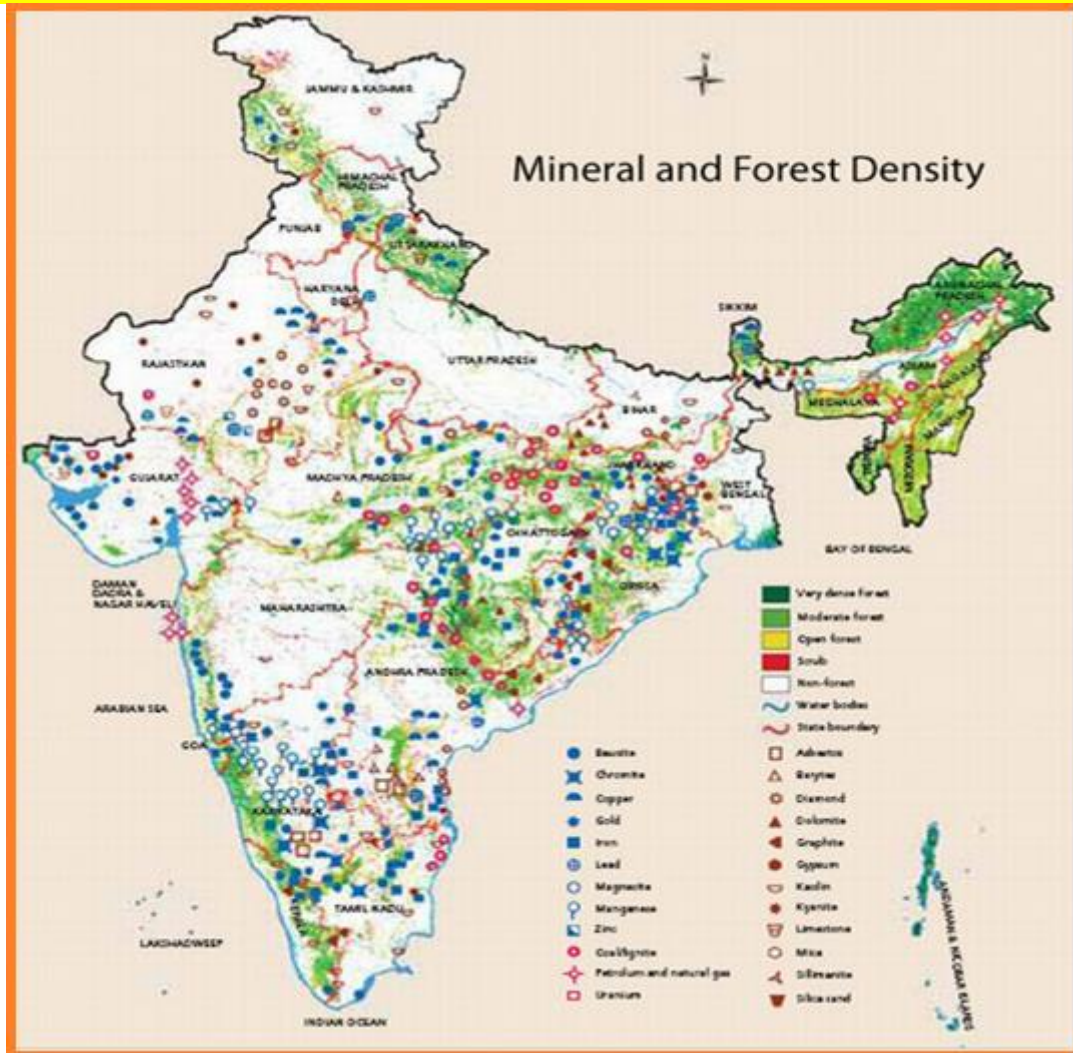
and UK are large producer of Iron ore. Ukraine has the sixth position in the world in producing iron ore and it produced 4.32 per cent of the world production in 2006. Krivoi Rog of Ukraine possesses best iron ore having 68.5 per cent metallic percentage. It contributes 75 per cent production of Ukraine. The estimated reserves of the region are more than 200 million tons. Other regions of Ukraine are Zaporozhe, Zdanow, Lipetsk and Kerch Peninsula.

South Africa is also major iron ore producing country of the African continent and ranks 8th in the world iron ore production. In South Africa Transvaal is the main iron ore-producing centre. Transvaal is having high-grade ore with 60 to 65 per cent iron content. The total reserves have been estimated at 10 billion tons in South Africa. The average annual production of South Africa is 4 million metric tons.

Distribution of key natural resources in South Asia:

When appraising the regions of South Asia, it has been found that these provinces have enormous natural resource and ecological and biological diversity. Many researchers have recognized that The Southeast Asian states today are rich in natural resources and are major world producers of rubber, tin, copra, palm oil, petroleum and timber (Chia 1999). However population growth and economic development are intimidating the region's rich heritage through the expansion and intensification of agriculture, the unrestrained growth of industrialization, the destruction of natural homes and urban extension. Southeast Asia has lavish source of hydrocarbon resources natural gas and petroleum.

Natural resources (Source: <http://www.newsecuritybeat.org>)



Traditional government accounting systems do not consider the significance of these natural resources. The South Asia's nation governments have recognised several areas for growth that include nature-based tourism, mining, ecosystem, biodiversity and agriculture which will concurrently help diversity the economic and decrease poverty. In order to fulfil all development goals, the governments need to optimize use of natural resources. The main concentration of South Asia is to understand the value of natural resources that leads to better decisions for development. Valuing the environment and incorporating natural resources into national accounts, it can support better to nation's economy.

Distribution of key natural resources in Indian sub continental:

India is gifted with various types of natural Resources such as fertile soil, forests, minerals and water. These resources are unevenly distributed. The Indian continent covers a multitude of biotic and abiotic resource. As India has rapid population growth therefore there is overconsumption of resources, such as uncontrolled logging or overfishing and many valuable natural resources are rapidly being exhausted. India has huge watered fertile lands. In the sedimentary soil of the Northern Great Plains of the Sutlej-Ganga plains and Brahmaputra Valley wheat, rice, maize, sugarcane, jute, cotton, rapeseed, mustard, sesame, linseed, are grown in plentiful. India's land area includes regions with high rainfall to dry deserts, Coast line to Alpine regions.

India also has a variety of natural vegetation since the country has a varied relief and climate. These forests are narrowed to the plateaus and hilly mountainous areas. India has a great variety of wildlife. There are many national parks and hundreds of wild life sanctuaries. Around 21 percent

of the total geographical area include Forests. Because India's weather conditions are changing frequently and differences in altitude, different types of Forest are present in India including Tropical, Swamps, Mangrove and Alpine. Variety of forest vegetation is large. Forests are the main source of Fire woods, Paper, Spices, Drugs, Herbs, Gums and more. Forests has great contribution to nation's GDP.

India has more marine and inland water resources. Reports signify that India has an 8129 km long coastline. Inland fishery is performed in Rivers, Reservoirs and Lakes. Reports of EIA estimate for 2009 indicated that in Indian rivers more than 400 species of fish are found and many species are economically important.

Table: Marine fishery resources of India (Source: K. Rama Mohana Rao, 2000)

State/Union Territory	Continental Shelf ('000 sq. kms)	Number of Landing Centres	Number of Villages	Approx. Length of Coastline (Kms.)
Andhra Pradesh	31	379	409	974
Goa	10	87	91	104
Gujarat	164	854	851	1600
Karnataka	27	28	204	300
Kerala	40	226	222	590
Maharashtra	112	184	395	720
Orissa	24	63	329	480
Tamil Nadu	41	362	442	1,000
West Bengal	17	47	652	157
Andaman and Nicobar	35	57	45	1,912
Pondicherry	1	28	45	45
Lakshwadeep	4	11	10	132
Daman and Diu	o	7	31	27
Total	506	2,333	3,726	8,041

India had about 125 Million metric tonne of proven oil reserves as on April 2010 or 5.62 billion barrels. Most of India's crude oil reserves are located in the western coast (Mumbai High) and in the north-eastern parts of the country, although considerable undeveloped reserves are also found in the offshore Bay of Bengal and in the state of Rajasthan.

Statistical data have revealed that India has 1,437 billion cubic metres (50.7×10¹² cu ft) of confirmed natural gas reserves as of April 2010. An enormous mass of India's natural gas production comes from the western offshore regions, particularly the Mumbai High complex. The onshore fields in Assam, Andhra Pradesh, and Gujarat states are also main producers of natural gas. Reports of EIA revealed that India produced 996 billion cubic feet of natural gas in 2004. India imports small amounts of natural gas.

Mineral Resource in India are also in large amount such as iron, coal, mineral oil, manganese, bauxite, chromite, copper, tungsten, gypsum, limestone, mica. When evaluating the Livestock Resource, it is found that Hills, mountains and less fertile lands are put under pasture. Scientific methods are followed in rearing cattle. India maintains rich domestic animal diversity. India has large number of animals like goat, sheep, poultry, cattle, and buffalo. Indian livestock has imperative role in improving the socio-economic status of the rural masses. In the area of Horticulture, India has various agro-climatic conditions which facilitates cultivation of a large

number of horticulture crops such as vegetables, fruits, flower, medicinal and aromatic plant, mushroom, etc. and plantation crops like tea, coffee and rubber.

Non-renewable resources are also plentiful in different parts of India: Coal is the mainly used energy in India and occupies the leading position. In India, coal is obtained mostly from Andhra Pradesh, Chhattisgarh, Orissa, Madhya Pradesh, West Bengal, Tamil Nadu, and Meghalaya, Jammu and Kashmir. Natural gas in India is available in Tripura State, Krishna Godavari field and gas associates in petroleum products. Petroleum product has become a vital source of energy in India. In India, Petroleum products can be obtained from Digboi, Assam, around the Gulf of Khambhat in Gujarat, off shore in Arabian Sea, spread out from Mumbai up to 100 miles.

India has fourth rank in producing iron ore in the world. On an average, India produces about 7 per cent of the world production. It has about 2.6 per cent iron ore reserves of the world. Main states that produce iron ore are Chhattisgarh (Arindogi, Raoghat and Bailadia (Bastar), Dhalli, Rajbara (Durg), Odisha (Keonjhar, Mayurbhanj and Diringburi districts), Karnataka (Babudan hill, Hospet, Chitradurg, Tumkur, Sandur and Bellary districts). Jharkhand (Noamundi, Notaburu, Pansiraburu, Budaburu, Guo, Barajamada, Meghahataburu in Singhbhum district), Andhra Pradesh (Anantpur, Kurmool, Adilabad, Karimnagar), Goa (Bicholim, Sirigao, Mapusa, Netralim), Maharashtra (Pipalagoon, Asola, Lohara in Chandrapur district).

Recently, it has been observed that The Indian mining industry is passing through a perilous phase, witnessing negative growth.

Indian Natural Resources (Source: www.mapsofindia.com/india-natural-resources)



China has a cosmic territory, with plentiful natural resources and diverse types of land resources. China's land resources are large in absolute terms but small on a per-capita basis. There are more mountains than plains, with sophisticated land and forests constituting small proportions. Numerous land resources are haphazardly distributed among different regions. The cultivated land is mostly in plains and basins in the monsoon regions of east China, while forests are mostly found in the remote mountainous areas in the northeast and the southwest. Grasslands are chiefly distributed on inland plateaus and in mountains. The Agricultural Census in 1996 have shown that China has 130.04 million hectares of cultivated land and 35.35 million hectares of land suitable for agricultural uses. The cultivated land is mainly distributed in the Northeast China, North China and Middle-Lower Yangtze plains, the Pearl River Delta and the Sichuan Basin. It is established in research studies that China's total forest area was 175 million hectares, and its forest coverage rate was 18.21 percent. The total standing stock volume of China was 13.62 billion cubic meters (The sixth national enumeration of forest resources, 1999-2003). The stock volume of its forests stood at 12.46 billion cubic meters.

Natural forests are concentrated focused in the northeast and the southwest, but uncommon in the densely populated and economically developed eastern plains and the vast north-western district. When considering regional distribution, China's forests are found mainly in the Northeast

China Forest Zone, the Southwest China Forest Zone and the Southeast China Forest Zone. Grassland in China is extensive. China has 400 million hectares of grassland. It is found in statistical report that China is one of the countries with the largest area of grassland in the world. Natural grassland is mainly distributed in areas west and north of the Greater Hinggan Mountains, the Yinshan Mountain and the eastern foot of the Qinghai-Tibet Plateau, while artificial grassland is concentrated in southeast China where it lies amid cultivated land and forests.

Mineral Resource in China are plenteous. A total of 171 kinds of minerals have so far been discovered, of which 158 have proven reserves. These include 10 kinds of energy mineral resources such as petroleum, natural gas, coal and uranium; 54 kinds of metallic mineral resources such as iron, manganese, copper, aluminium, lead and zinc; 91 kinds of non-metallic mineral resources such as graphite, phosphorus, sulphur and sylvine; and three kinds of water and gas mineral resources such as underground water and mineral water. Presently, the supply of over 92 percent of China's primary energy, 80 percent of its industrial raw materials and more than 70 percent of its agricultural means of production come from mineral resources.

Energy Mineral Resources in China are also in huge quantity but the structure of these types of resources is not perfect, with coal making up a large proportion while petroleum and natural gas constituting comparatively small proportions. Coal resources has huge reserves and complete varieties but uneven distribution among different grades, with small reserves of high-quality coking coal and anthracite coal; wide distribution but a great difference in wealth for different deposit locations, with large reserves in western and northern regions and small reserves in eastern and southern regions; a small number of surface coalmines, most of which are lignite mines; and great varieties of associated minerals existing in coal seams.

There are large oil reserves in China and it ranks as one of the 10 countries in the world with more than 15 billion tons of exploitable oil reserves; low proven rate, with verified onshore reserves accounting for only one fifth of the total and the proven rate for offshore reserves being even lower; and concentrated distribution, with 73 percent of the total oil resources distributed in 14 basins each covering an area of 100,000 square km and more than 50 percent of the nation's total natural gas resources distributed in central and western regions.

China is lavish in metallic mineral resources. It has proven reserves, more or less, of all kinds of metallic mineral resources that have so far been discovered at international level. Among these resources, the proven reserves of tungsten, tin, antimony, rare earth, tantalum and titanium rank first in the world; those of vanadium, molybdenum, niobium, beryllium and lithium rank second; those of zinc rank fourth; and those of iron, lead, gold and silver rank fifth.

China's metallic minerals such as tungsten, tin, molybdenum, antimony and rare earth have large reserves, and are of superior quality and competitive in world markets. However, many important metallic minerals such as iron, manganese, aluminium and copper are of poor quality, with ores lean and difficult to smelt. Most of the metallic mineral deposits are small or medium-sized, whereas large and super-large deposits account for a small proportion.

China has full range of non-metallic mineral resources and it is one of the few countries in the world that have a relatively non-metallic mineral resources. Currently, there are more than 5,000 non-metallic mineral ore production bases with proven reserves in China.

Regarding water and Gas Mineral Resources, there are proven natural underground water resources in China amount to 870 billion cubic meters per year, of which 290 billion cubic meters

are exploitable. The natural underground salty water resources in China stand at 20 billion cubic meters per year. Though, China's underground water resources are not equally distributed, with the southern region rich, and northern and western regions poor. Underground water aquifer types vary from region to region. North China has a widespread distribution of underground water resources through pore aquifers, while its south-western region has wide distribution of Karst water resources. Marine resources in China are in huge quantity and scattered in the offshore waters which are sedimentation basins, with a total area of nearly 700,000 square km, estimated to contain about 24 billion tons of oil reserves and 14 trillion cubic meters of natural gas.

Bangladesh: India's neighbouring country, Bangladesh has lavishly natural gas as natural resource and ranked 7th position in the Asia. Among the natural resources of Bangladesh are its arable land, timber, coal and natural gas. The most lucrative of these resources is the fertile sedimentary soil in the delta region largely moulded by the country's physical geography. Bangladesh also receives heavy rainfall throughout the year.

To summarize, Natural resources such as different materials, water, energy and fertile land, are the basis for humans on Earth. Besides resources such as water, air, sunlight, forest area or agricultural land, which exist as separate entities, other resources like metals, ores and primary energy resources have to be extracted from the soil to make them usable. Their value is mainly determined by the relative shortage of the resource in combination with its exploitability for industrial use.