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A Review about Minerals and Power Resources and Their Uses

Vipul Garg*

M.Sc., Department of Geography

Abstract – Minerals are an indispensable part of our lives. Almost everything we use, from a tiny pin to a towering building or a big ship, all are made from minerals. The railway lines and the tarmac (paving) of the roads, our implements and machinery too are made from minerals. Cars, buses, trains, aeroplanes are manufactured from minerals and run on power resources derived from the earth. Even the food that we eat contains minerals. In all stages of development, human beings have used minerals for their livelihood, decoration, festivities, religious and ceremonial rites.

Key Words : Minerals and Power Resources

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INTRODUCTION

Minerals are naturally occurring substances. They have a definite chemical composition. Minerals are formed in different types of geological environments, under varying conditions. You can identify and classify minerals on the basis of their physical properties such as colour, density, hardness. You can also identify them on the basis of their chemical properties like solubility. Now, we look at the various types of minerals.

TYPES OF MINERALS

On the basis of composition, we can classify minerals metallic and non-metallic types. This is because the minerals may or may not contain iron.

METALLIC MINERALS

They contain metals in raw form. Metals are hard substances and are good conductors of heat and electricity. Therefore, they conduct heat and electricity and have lustre or shine. For example, iron ore and bauxite. Metallic minerals are of two types:

- Ferrous minerals contain iron ore, manganese, and chromites.
- Non-ferrous minerals do not contain iron. However, they could contain some other metals like gold, silver, copper or lead. Because they do not contain iron, they are non-ferrous.

NON-METALLIC MINERALS

They do not contain metals. Therefore, they are not good conductors of electricity and heat. For example, limestone, mica, gypsum, coal, and petroleum. So, how do we extract minerals from their ores? There are some processes that are used to extract minerals.

EXTRACTION OF MINERALS

Without proper extraction, minerals are of no use. Therefore, we must concentrate on proper methods for their extraction. The three extraction methods of minerals are mining, drilling, and quarrying.

- **Mining:** It is the process of taking out minerals from rocks buried under the earth's surface. The process of mining includes two methods: (a)Open cast mining, (b)Shaft mining
- **Drilling:** Deep wells are bored to take minerals out. This process is called drilling.
- **Quarrying:** In the process of quarrying, you simply dig out the minerals that lie near the surface. Therefore, you need to be careful while digging them as you could destroy their essential parts.

DISTRIBUTION OF MINERALS

- Minerals are found in igneous rock, metamorphic rocks, and sedimentary rocks.

- Iron ore, nickel, copper minerals are found in igneous and metamorphic rocks. Limestone is found in sedimentary rocks.

Hence, we see that minerals are distributed in various forms.

USES OF MINERALS

- Some hard minerals are used as gems for making jewellery.
- We use copper in almost everything from coins to pipes.
- We use silicon in almost everything from coins to pipes.
- Silicon is used in the computer industry which is obtained from quartz.
- Aluminium is used in automobile, aero planes, bottling industry, building and in kitchen cookware.

Hence, we see that minerals are widely used in almost all sectors of the economy.

ENERGY RESOURCES

Energy is required for all activities. It is needed to cook, to provide light and heat, to propel vehicles and to drive machinery in industries.

Energy can be generated from fuel minerals like coal, petroleum, natural gas, uranium and from electricity. Energy resources can be classified as conventional and nonconventional sources. Conventional sources include: firewood, cattle dung cake, coal, petroleum, natural gas and electricity (both hydel and thermal). Non-conventional sources include solar, wind, tidal, geothermal, biogas and atomic energy. Firewood and cattle dung cake are most common in rural India. According to one estimate more than 70 per cent energy requirement in rural households is met by these two; continuation of these is increasingly becoming difficult due to decreasing forest area. Moreover, using dung cake too is being discouraged because it consumes most valuable manure which could be used in agriculture.

CONVENTIONAL SOURCES OF ENERGY

Coal: In India, coal is the most abundantly available fossil fuel. It provides a substantial part of the nation's energy needs. It is used for power generation, to supply energy to industry as well as for domestic needs. India is highly dependent on coal for meeting its commercial energy requirements. As you are already aware that coal is formed due the compression of plant material over millions of years. Coal, therefore, is found in a variety of forms depending on the degrees of compression and the depth and time of burial. Decaying plants in swamps produce peat. Which has a low carbon and high moisture contents and low heating capacity. Lignite is a low grade brown coal, which is soft with high moisture content. The principal lignite reserves are in Neyveli in Tamil Nadu and are used for generation of electricity. Coal that has been buried deep and subjected to increased temperatures is bituminous coal. It is the most popular coal in commercial use. Metallurgical coal is high grade bituminous coal which has a special value for smelting iron in blast furnaces. Anthracite is the highest quality hard coal.

PETROLEUM

Petroleum or mineral oil is the next major energy source in India after coal. It provides fuel for heat and lighting, lubricants for machinery and raw materials for a number of manufacturing industries. Petroleum refineries act as a "nodal industry" for synthetic textile, fertiliser and numerous chemical industries.

Most of the petroleum occurrences in India are associated with anticlines and fault traps in the rock formations of the tertiary age. In regions of folding, anticlines or domes, it occurs where oil is trapped in the crest of the upfold. The oil bearing layer is a porous limestone or sandstone through which oil may flow. The oil is prevented from rising or sinking by intervening non-porous layers.

Petroleum is also found in fault traps between porous and non-porous rocks. Gas, being lighter usually occurs above the oil.

NATURAL GAS

Natural gas is an important clean energy resource found in association with or without petroleum. It is used as a source of energy as well as an industrial raw material in the petrochemical industry.

Natural gas is considered an environment friendly fuel because of low carbon dioxide emissions and is, therefore, the fuel for the present century.

ELECTRICITY

Electricity has such a wide range of applications in today's world that, its percapita consumption is considered as an index of development. Electricity is generated mainly in two ways: by running water which drives hydro turbines to generate hydro electricity; and by burning other fuels such as coal, petroleum and natural gas to drive turbines to produce thermal power. Once generated the electricity is exactly the same.

NON-CONVENTIONAL SOURCES OF ENERGY

The growing consumption of energy has resulted in the country becoming increasingly dependent on

fossil fuels such as coal, oil and gas. Rising prices of oil and gas and their potential shortages have raised uncertainties about the security of energy supply in future, which in turn has serious repercussions on the growth of the national economy. Moreover, increasing use of fossil fuels also causes serious environmental problems. Hence, there is a pressing need to use renewable energy sources like solar energy, wind, tide, biomass and energy from waste material. These are called nonconventional energy sources.

NUCLEAR OR ATOMIC ENERGY

It is obtained by altering the structure of atoms. When such an alteration is made, much energy is released in the form of heat and this is used to generate electric power. Uranium and Thorium, which are available in Jharkhand and the Aravalli ranges of Rajasthan are used for generating atomic or nuclear power. The Monazite sands of Kerala is also rich in Thorium.

SOLAR ENERGY

India is a tropical country. It has enormous possibilities of tapping solar energy. Photovoltaic technology converts sunlight directly into electricity. Solar energy is fast becoming popular in rural and remote areas. Some big solar power plants are being established in different parts of India which will minimise the dependence of rural households on firewood and dung cakes, which in turn will contribute to environmental conservation and adequate supply of manure in agriculture.

WIND POWER

India has great potential of wind power. The largest wind farm cluster is located in Tamil Nadu from Nagarcoil to Madurai. Apart from these, Andhra Pradesh, Karnataka, Gujarat, Kerala, Maharashtra and Lakshadweep have important wind farms. Nagarcoil and Jaisalmer are well known for effective use of wind energy in the country.

BIOGAS

Shrubs, farm waste, animal and human waste are used to produce biogas for domestic consumption in rural areas. Decomposition of organic matter yields gas, which has higher thermal efficiency in comparison to kerosene, dung cake and charcoal. Biogas plants are set up at municipal, cooperative and individual levels. The plants using cattle dung are known as 'Gobar gas plants' in rural India. These provide twin benefits to the farmer in the form of energy and improved quality of manure.

Biogas is by far the most efficient use of cattle dung. It improves the quality of manure and also prevents the loss of trees and manure due to burning of fuel wood and cow dung cakes.

TIDAL ENERGY

Oceanic tides can be used to generate electricity. Floodgate dams are built across inlets. During high tide water flows into the inlet and gets trapped when the gate is closed. After the tide falls outside the flood gate, the water retained by the floodgate flows back to the sea via a pipe that carries it through a power-generating turbine.

GEO THERMAL ENERGY

Geo thermal energy refers to the heat and electricity produced by using the heat from the interior of the Earth. Geothermal energy exists because, the Earth grows progressively hotter with increasing depth. Where the geothermal gradient is high, high temperatures are found at shallow depths. Groundwater in such areas absorbs heat from the rocks and becomes hot. It is so hot that when it rises to the earth's surface, it turns into steam. This steam is used to drive turbines and generate electricity.

CONSERVATION OF ENERGY RESOURCES

Energy is a basic requirement for economic development. Every sector of the national economy – agriculture, industry, transport, commercial and domestic – needs inputs of energy. The economic development plans implemented since Independence necessarily required increasing amounts of energy to remain operational. As a result, consumption of energy in all forms has been steadily rising all over the country.

REFERENCES :

Bharucha, J.P. (1982). Vegetation of India, Oxford India, Bombay.

Dubey, R. N. (1974). Economic Geography of India, Kitab Mahal, Allahabad

Joshi, H. L. (1990). Industrial Geography of India, Rawat Publications, Jaipur

Nag, P. and Sengupta, S. (1992). Geography of India, Concept publications. Co., New Delhi.

Rautray, J.K. (1993). Geography of regional disparity, Asian Institute of Technology, Bankok, 1993

https://www.toppr.com/guides/geography/mineral-and-power-resources/what-are-mineral-and-power-resources/

https://www.nios.ac.in/media/documents/316courseE/ch23.pdf

Corresponding Author

Vipul Garg*

M.Sc., Department of Geography

vipgupta785@gmail.com