MINERAL RESOURCES

'God sleeps in the minerals, awakens in plants, walks in animals, and thinks in man' **-Arthur Young**

Introduction

Minerals are essential for the formation and functioning of organisms, plant animals and human beings. In the modern era, human life needs variety of minerals to sustain industry based civilization. Mineral resources are broadly defined as elements, chemical compounds, and mixtures which are extracted to manufacture sustainable commodity. India has rich mineral resource base to provide suitable base for industrial development in the country. Sufficient reserve of nuclear energy minerals is available in India.

India's reserves, as well as production are adequate in petroleum, ores of copper, lead, zinc, tin, graphite, mercury, tungsten, and in the minerals required for fertilizer industry such as sulphur, potassium and phosphorus.

Exploitation of Minerals

Depending on their use, mineral resources can be divided into several broad categories such as elements for metal production and technology, building materials, minerals for the chemical industry and minerals for agriculture. When usually we think about mineral resources, we often think of metals but the predominant mineral resources are not metallic. The picture of annual world consumption of some elements is as under:

Sodium and iron are used at a rate of about 0.1 to 1.0 billion metric tons per year.
Nitrogen, sulphur, potassium and calcium are primarily used as fertilizers at a rate of about 10 to 100 million metric tons per year.
Zinc, copper, aluminium and lead are used at a rate of about 3 to 10 million metric tons per year;
Gold and silver are used at a rate of about 10 thousand metric tons per year.
Out of all the metallic minerals, iron consumption is 95% of the metals consumed

Thus, with the exception of iron, the non-metallic minerals are consumed at much greater rates than the elements used for their metallic properties.

Uses of Minerals

Due to increased population, there is increased demand of minerals by the industry, transport, agriculture and defence preparation. Depletion of almost all known and easily accessible deposits is anticipated in near future. Moreover, there may be shortage of some crucial elements such as mercury, tin, copper, gold, silver and platinum. The limited resource of phosphorus, which is an essential component of chemical fertilizers, is another area of concern.

Environmental Impacts of Mineral Extraction

Extracting and use of mineral resources can affect the environment adversely. Environmental affect may depend on factors such as mining procedures, ore quality, climate, size of operation, topography, etc. Some of major environmental impacts of mining and processing operations are as under

1. Degradation of land.

2. Pollution of surfaces and ground water resources.

3. Effect on growth of vegetation due to leaching out effect of minerals.

4. Surface water pollution and groundwater contamination lead to occupational health hazards etc.

5. Air pollution due to emission of gases.

6. Deforestation affects flora and fauna.

7. Rehabilitation of affected population.

Conservation of Minerals

Conservation of minerals can be done in number of ways and these are as follows,

Industries can reduce waste by using more efficient mining and processing methods.
In some cases, industries can substitute plentiful materials for scarce ones.
Some mineral products can be recycled. Aluminum cans are commonly recycled. Although bauxite is plentiful, it can be expensive to refine. Recycling aluminum products does not require the large amounts of electric power needed to refine bauxite.
Products made from many other minerals, such as nickel, chromium, lead, copper, and zinc, can also be recycled.
Strict laws should be made and enforced to ensure efficient management of mining resources.