

Coal mining and its impact

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Manifest pedagogy

Issues related to coal can be asked from geography, environment, economic or also from polity perspective. Preparing coal related issues from all dimensions for both and prelims and mains would be an important strategy.

In news

Accident of coal mining in Meghalaya

Placing it in syllabus

Distribution of key natural resources across the world (including South Asia and the Indian subcontinent)

Static dimensions

- Types of coal
- Distribution of coal in India
- Types of coal mining

Current dimensions

- Hazards of coal mining
- Rat hole mining
- Accident of coal mining in Meghalaya

Content

Coal is a combustible black or brownish-black sedimentary rock, formed as rock strata called coal seams. Coal is mostly carbon with variable amounts of other elements; chiefly hydrogen, sulfur, oxygen, and nitrogen

Types and Distribution (in India) of coal

- **Anthracite:** It is the highest grade of coal containing a high percentage of fixed carbon. It is hard, brittle, black and lustrous. It is found in smaller quantity in regions of Jammu and Kashmir.
- **Bituminous:** It is a medium grade of coal having high heating capacity. It is the most commonly used type of coal for electricity generation in India. Most of bituminous coal is found in Jharkhand, Odisha, West Bengal, Chhattisgarh, and Madhya Pradesh.
- **Subbituminous:** It is black in colour, dull (not shiny) and has a higher heating value than lignite.
- **Lignite:** It is the lowest grade coal with the least carbon content. It is found in the regions of Rajasthan, Tamil Nadu, and Jammu & Kashmir.

Also, **there is peat**. Peat is not actually coal, but rather the precursor to coal. Peat is a soft organic material consisting of partly decayed plant and, in some cases, deposited mineral matter. When peat is placed under high pressure and heat, it becomes coal.

Types of coal on the basis of a time period

Gondwana coal: Around 98 per cent of India's total coal reserves are from Gondwana times. This coal was formed about 250 million years ago.

Tertiary coal is of younger age. It was formed from 15 to 60 million years ago.

Different types of Mining

The method for mining coal depends on the location of the deposit.

Surface/Opencast

As one of the most popular methods of coal mining, the surface

technique consists of five main forms: strip mining, open-pit mining, mountaintop removal, dredging and highwall mining.

Strip mining

Strip mining exposes coal by removing earth above each coal seam. This earth is referred to as overburden and is removed in long strips. The overburden from the first strip is deposited in an area outside the planned mining area and referred to as out-of-pit dumping. Overburden from subsequent strips is deposited in the void left from mining the coal and overburden from the previous strip.

The contour mining

The contour mining method consists of removing overburden from the seam in a pattern following the contours along a ridge or around the hillside. This method is most commonly used in areas with rolling to steep terrain. It was once common to deposit the spoil on the downslope side of the bench thus created, but this method of spoil disposal consumed much additional land and created severe landslide and erosion problems.

Mountaintop coal mining

Mountaintop coal mining is a surface mining practice involving removal of mountaintops to expose coal seams, and disposing of associated mining overburden in adjacent "valley fills." Valley fills occur in steep terrain where there are limited disposal alternatives.

Room & Pillar

The room & pillar method of coal mining consists of extracting the mineral across a horizontal plane, creating a horizontal array of rooms and pillars. This method is also utilized in iron ore mining and other base minerals.

Longwall

The preferred choice in underground coal mining is the Longwall technique which accounts for roughly 301 percent of all underground coal production. This process involves a cutting head that moves back and forth across a panel of coal. Once cut, the coal falls onto a flexible conveyor for removal. This method is conducted under hydraulic roof support that advances as the seam is cut.

Rat hole mining

The mining is done by digging small holes into the ground, much like the holes dug by rats. Miners break the rocks with axes and other hand-held equipment and carry out the material in baskets or buckets.

Rat hole mining is a term used in coal mining and is so named because of its name during colonial times and because of the sizes of the holes.

Generally done illegally, this type of mining is mainly carried out in the Northeast regions of India (mainly the state of Meghalaya), by members of the community or families. This form of illegal mining has significantly impacted the environment of the region and has resulted in water polluted by the waste from the mining and the death of fish and animals. The **National Green Tribunal (NGT) of India has banned this practice.**

Hazards of mining

It can be classified as hazards to the miners and hazards to the environment

Dangers to miners

Open cut hazards are principally mine wall failures and vehicle collisions; underground mining hazards include suffocation, gas poisoning, roof collapse, rock burst, outbursts, and gas explosions. Following are the two

incidents which brief the disaster of coal mining in India;

- The **1965 Dhanbad coal mine disaster** occurred on May 28, 1965, in a coal mine near Dhanbad, a town in India. On the fateful day, there was an explosion in Dhori colliery near Dhanbad, which led to fire in the mines. The fire killed 268 miners. Dhori colliery is located near Bermo. The mine was at that time privately owned by the Raja of Ramgarh
- The **Meghalaya mining accident** happened in December 2018, when 15 miners were trapped in a **mine in Ksan**. The miners are trapped inside the coal mine at a depth of around 370 feet (112 meters) in Jaintia Hill district. It is the best example that tells how disastrous the coal mining.

Environment impact of coal mining

- The **environmental impact of the coal industry** includes issues such as land use, waste management, water and air pollution, caused by the coal mining, processing and the use of its products. In addition to atmospheric pollution, coal burning produces hundreds of millions of tons of solid waste products annually, including fly ash, bottom ash, and flue-gas desulfurization sludge, that contain mercury, uranium, thorium, arsenic, and other heavy metals.
- There are severe health effects caused by burning coal. According to a report by the World Health Organization in 2008, coal particulates pollution are estimated to shorten approximately 1,000,000 lives annually worldwide.

Solutions

- Closing illegal and unregulated mines
- Scrap mining and recycling
- Better legislation and regulations

- Improving environmental performance
- Accurate tallying of toxic mining waste
- Closing and reclaiming sites of shut-down mines
- Investing in research and development of Green Mining Technology
- Replenishing the environment