ISSUES OF COAL MINING IN INDIA - ECONOMY PRELIMS AND GS III MAINS

Q. Discuss the role of coal mining in the aspect of India's environmental and climate goals in place for both immediate and long-term energy needs. (15 marks, 250 words)

News: *Coal mining linked to serious respiratory and skin diseases among workers in three States, says study*

What's in the news?

- Prolonged exposure to coal mining pollutants has resulted in widespread respiratory and skin diseases among the workers and people in six districts in India, where coal extraction is a major occupation, says a survey involving 1,200 households and published by the National Foundation for India, an organisation that works on social justice issues.

Key takeaways:

- Every household in six districts of Chhattisgarh, Jharkhand, Odisha spends ₹300-₹1,000 a month on medical needs, says study.

Impacts of Coal Mining:

1. Air Pollution:

- Coal mining operations release a substantial amount of particulate matter, sulfur dioxide (SO2), nitrogen oxides (NOx), and other pollutants into the air.
- These emissions contribute to smog formation, acid rain, and respiratory problems in nearby communities.
- Example - The Jharia coalfield in Jharkhand is one of India's largest coal reserves and a significant contributor to air pollution.

2. Water Pollution:

- Coal mining can lead to the contamination of surface and groundwater sources.
- Acid mine drainage (AMD) is a common issue, where water reacts with exposed coal and rock, releasing acidic and toxic substances into water bodies, harming aquatic life and polluting water supplies.
- Example - In the Singrauli region of Madhya Pradesh and Uttar Pradesh, coal mining operations have led to the contamination of local rivers and water sources.

3. Soil Degradation:

- Surface mining methods, such as mountaintop removal and strip mining, disrupt the natural landscape and result in the loss of topsoil and vegetation.
- This degradation of soil quality affects plant growth and reduces the land's ability to support wildlife and agriculture.
- Example - In the Raniganj coalfield in West Bengal, extensive strip mining and coal extraction have caused severe soil degradation and loss of fertile topsoil.

4. Methane Emissions:

- Coal mining releases methane, a potent greenhouse gas, into the atmosphere.
- Methane emissions contribute to climate change and exacerbate global warming.

- Example - Coal mining operations in the Godavari Valley Coalfield in Andhra Pradesh release significant amounts of methane during extraction.

5. Land Subsidence:

- Underground coal mining can cause land subsidence, where the ground sinks or collapses due to the removal of coal from beneath the surface.
- This can damage infrastructure and disrupt the stability of the landscape.
- Example - In the Jharia coalfield, extensive underground mining has caused land subsidence and the collapse of land above mined-out areas. This has led to infrastructure damage, including roads, buildings, and railways.

Need of Increasing Coal Mining for India:

1. Energy Source:

- According to the International Energy Agency (IEA), in 2020, coal accounted for around 37% of the world's electricity generation, making it a major source of energy for electricity production, thus ensuring energy security.

2. Economic Growth:

- The World Coal Association estimates that the coal industry supports over 7 million jobs worldwide, including direct employment in mining and jobs in associated industries like transportation and manufacturing.

3. Industrialization:

- The industrial sector is a major consumer of coal-based energy.
- For example, in China, coal is a primary energy source for steel, cement, and chemical industries, vital for the country's economic development and infrastructure growth.

Need to Ban on Increasing Coal Mining:

1. Environmental Impact:

- The combustion of coal is responsible for about 40% of global CO2 emissions, making it a significant contributor to climate change and its associated impacts.

2. Public Health Concerns:

- According to the World Health Organization (WHO), exposure to air pollutants from coal combustion leads to over 800,000 premature deaths annually globally due to respiratory and cardiovascular diseases.

3. Climate Change:

- The Intergovernmental Panel on Climate Change (IPCC) states that coal-fired power plants are the largest source of global greenhouse gas emissions, contributing to rising temperatures and extreme weather events.

4. Non-Renewable Resource:

- The U.S. Energy Information Administration (EIA) estimates that global proven coal reserves would last about 132 years at current consumption rates.
- Continued reliance on coal without alternative energy planning poses long-term energy security risks.

Way Forward:

- Accelerating the **growth of solar and wind power,** with a focus on grid integration solutions like large-scale battery storage.
- Implementation of technologies like **Flue Gas Desulfurization (FGD)** and Selective Catalytic Reduction (SCR) to reduce emissions from existing coal plants.
- Offering **financial and regulatory incentives** for private companies to invest in cleaner and more efficient power generation technologies.
- Promoting **energy efficiency** measures to reduce overall demand and lessen the pressure on the grid.
- Modernising the **grid infrastructure** to handle the integration of variable renewable energy sources and improve overall efficiency.
- Exploring **alternative sources** like clean coal gasification, gravity battery, harnessing ocean energy and nuclear power (with strict safety protocols) to meet energy needs.

India's power sector transformation requires a well-defined roadmap that balances immediate energy needs with long-term sustainability goals. By focusing on renewables, clean coal technologies, and energy efficiency, India can ensure a reliable and sustainable power supply for its growing economy.

Go back to basics:

India and Coal:

- India has the **fifth-largest coal reserves in the world**.
- India is the **second-largest producer of coal in the world**, after China.
- Its own coal production will surpass a billion tonnes by 2025, the annual report of the International Energy Agency (IEA).

Findings of IEA Report:

- India’s coal consumption has doubled since 2007 at an annual growth rate of 6 percent.
- **India and China, are also the only two countries globally where there has been an uptick in investment in coal mine assets.**
- This is because domestic production has been ramped up in both countries to reduce external reliance.

India’s Coal Demand:

- India’s demand for coal has risen to 784.6 million tonnes for the financial year ending March 2023.

Global Coal Reserves:

1. USA
2. Russia
3. Australia
4. China
5. India

Global Coal Exporting Countries:

1. Australia
2. Indonesia
3. Russia
4. USA
5. South Africa

Global Coal Importing Countries:

1. China
2. India
3. Japan
4. South Korea
5. Taiwan