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(A GEMCO KATI INITIATIVE)

Indian Mining & Exploration Updates

India's new mining reforms explained

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Pic Courtesy : Indranil Bhattacharjee

India Inc gives a thumbs up to mining reform bill

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India's new mining reforms explained

India's mining industry is currently going through it's greatest legislative shake up in a generation, with India's Government claiming that reforming the sector is vital for the country's economic growth. We look at what India's mining reforms could mean for the industry.

Speaking at the Global Mining Summit in December 2020, India's Minister of Mines Pralhad Joshi reaffirmed the nation's commitment to "structural reforms" to its mining sector, "to increase participation of the private sector in mineral exploration and redefine the norms of exploration for auction of mineral blocks, to ensure a seamless transition from exploration to production".

India's mining industry forms a major part of the nation's economy, both in terms of its own contribution to GDP and its supplying the raw materials that underpin India's considerable manufacturing and infrastructure industries. India is home to the fourth largest coal reserves in the world and also hosts significant sources of bauxite, diamonds, and titanium ore.

Why is India's mining sector important?

India has ambitious plans for economic growth. Addressing the World Economic Forum in January 2018, Indian Prime Minister Narendra Modi expressed his driving desire: to make India a $5tn economy by 2025. It was a claim optimistically restated towards the end of 2020, following what could be considered a slight stumbling block to economic growth in the form of the Covid-19 pandemic.

"Today, our country is optimistic of the future, it is optimistic of reaching the $5tn target," Modi said during an interview with India's *Economic Times*.

"India is the third largest economy in terms of purchasing power parity. We want India to become the third largest in terms of current US dollar prices as well. The $5tn target will help us achieve that."

It's a bold target – becoming a $5tn economy in 2025 would require almost doubling the size of India's economy in just five years – and it's a target that the mining industry must play a key role in. The mining sector's contribution to India's GDP has been diminishing in recent years, which the Federation of Indian Mineral Industries attributed to the under-exploration of the nation's "obvious geological potential" and a decreasing expenditure on exploration activities in the country.

Joshi said that the mining industry will be core to reaching the $5tn goal, both in terms of its direct contribution to GDP as well as its ability to grow downstream industries and employment. But growing India's mining industry to a point where it can support a wider push for rapid economic growth requires hefty capital investment from private players, underpinned by renewed support from the state.

Why are changes needed?

India's mining law has remained relatively unchanged since the initial legislation governing the sector was introduced in 1957, with the Mines and Minerals (Development and Regulation) Act, or the MMDR Act. MMDR provides a regulatory framework that categorizes minor minerals – those governed by state governments in accordance with delegated powers – and major minerals, the commodities overseen by India's Central Government. Minor minerals include stones for building, clay, and sand, whereas major minerals include all minerals other than mineral oils, petroleum, and natural gas.

The pursuit of rapid economic growth in the next five years will require a strengthening across all of India's industries. Currently, India imports coal from countries such as Australia, Indonesia, and South Africa – despite being host to globally significant sources of the fossil fuel itself. The country has already begun to open commercial coal mining to private players, in a move that will aim to keep coal imports at a low level and strengthen domestic production.

More general reforms to the mining law will hope to foster this competitiveness between public sector undertakings and private projects more broadly across the sector – something that has been missing from India's industry.

"Our aim is to encourage industry players to adopt sustainable technology solutions including green mining, coal ash ponds, and other newer technology vehicles that can further accelerate the productivity with the economy of scale and also better environmental performance," Secretary at the Ministry of Coal Anil Kumar Jain told a virtual CEO roundtable in November 2020.

What changes are being made?

India is moving quickly with plans to revamp its mining sector. The flurry of reforms proposed include amending two provisions in the MMDR Act that would free up around 500 potential mining sites that have been rendered inaccessible by existing regulatory frameworks.

Under current legislation, these potential leases have either surpassed the legal timeframe for the granting of a mining lease or cannot be reallocated at auction due to legislative red tape. These moves would essentially streamline the transition process between the various stages of mine development work, from exploration right through to production.

There are further proposals to create a better statutory definition of illegal mining. Previously, there has not been a distinction between illegal mining done outside a leasehold area and mining in violation of approvals and clearances within a mining lease

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area. Under new amendments, illegal mining and the government's powers in tackling the practice will only apply to mining committed outside a lease area, rather than mining that breaches regulations within an otherwise permitted lease area.

Who wins, and what are the concerns?

India's cabinet approved the mining reforms at a cabinet meeting in January 2021 chaired by Modi. The winners, simply, are mining companies. These reforms are largely targeted at streamlining the processes and opening up more sites in India to mine, while also levelling the playing field between private enterprise and state-owned endeavors.

Government-backed companies will be charged levies on the extension of mining leases, and the reforms also pave the way for the reallocation of non-producing blocks owned by government companies.

The changes to the definition of illegal mining also provide a somewhat controversial boon to mining companies. India's mining law enables the government to recover 100% of the value of illegally extracted minerals.

Mining within a lease area will become exempt, meaning any violation within that area, be that over-extraction beyond the mining plan or otherwise, will no longer be considered illegal mining in the same sense. Critics fear this could be abused, with private enterprises potentially facing little pushback on poor environmental records or over-extraction.

The government has repeatedly pledged that these reforms will reduce environmental damage from the mining industry and will embed sustainability at the core of all operations. It hopes that a more competitive industry will stimulate innovations and promote the use of new technologies to enhance sustainability.

Modi's government has also been criticised for proceeding with such sweeping reforms to the mining industry with minimal consultation. Proposals were publicly released in late August 2020, with the notice from the Ministry of Mines inviting comments from the public, states and territories, industry, and other stakeholders – but the timeframe given for feedback was just 10 days.

The Mineral Inheritors Rights Association, formed in March 2020 to push for transparency and accountability in India's extractive industries, asserted that the 10-day period was a violation of India's Pre-Legislative Consultation Policy.

"We are anguished to note that only 10 days have been provided for the proposed mining reforms that… would have huge implications across the country," the association said in a statement. "What is even more disturbing and dangerous is that the state governments have not yet been consulted and a 10-day period for the states to respond undermines the federal spirit of this nation."

-Matthew Hall

India Inc gives a thumbs up to mining reform bill

Once the bill becomes law, there will be no distinction between captive and non-captive mines, captive mines will be allowed to sell up to 50% of the minerals excavated during the current year and will also help towards the auctioning of more mines

New Delhi: Industry lobby group Federation of Indian Chambers of Commerce and Industry (Ficci) has given a thumbs up to the government' efforts for getting the Mines and Minerals (Development and Regulation) Amendment Bill, 2021 passed in Lok Sabha on Friday.

Once it becomes law, there will be no distinction between captive and non-captive mines, captive mines will be allowed to sell up to 50% of the minerals excavated during the current year and will also help towards the auctioning of more mines.

Also, the union government will be able to conduct auctions for those blocks wherein the "state governments face challenges in conducting auction or fail to conduct it," with the revenues accruing form such blocks going to the state government' exchequer.

"Cooperative federalism is at the heart of our decisions. Powers have been delegated to States for grant of mineral concessions. We propose to assist State Govts in conducting auctions if they fail or face challenges," said coal and mines and parliamentary affairs minister Pralhad Joshi in a tweet.

As part of the government' efforts to usher in structural reforms in the mining sector, the bill that amends some sections of the Mines and Minerals (Development and Regulation) (MMDR) Act will now go the Rajya Sabha during the current budget session of the Parliament.

"FICCI acknowledges Government's efforts to deliberate and usher recent reforms in the Indian mining sector. These reforms will play a fundamental role in enhancing mining sector's contribution to the employment and GDP of the country, contributing immensely to the vision of Atmanirbhar Bharat," Ficci said in a statement.

National Mineral Policy has a goal to increase mineral production by 200% in 7 years. Of India's obvious geological potential area of 0.571 million sq. km, only 10% has been explored.

"The introduction of composite license regime would enhance mineral exploration and production in the country, alongside attracting investments both from domestic as well as foreign investors," said Sumit Deb, chairman and managing director at state run NMDC Ltd said in the statement.

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Going forward, all clearance and licences granted shall continue till the reserves have been mined and post the expiry or termination of the lease, will be transferred to the next successful bidder. This will help attract investors as under the previous regime, the new lessee had pre-embedded clearances for only two years, making it difficult to get fresh clearances within this time period.

According to the statement, Deb who is also the co-chair of Ficci mining committee acknowledged the reform of exploring the possibility of making National Mineral Exploration Trust (NMET) an autonomous body, for better utilization of NMET funds and increasing the mineral exploration in the country.

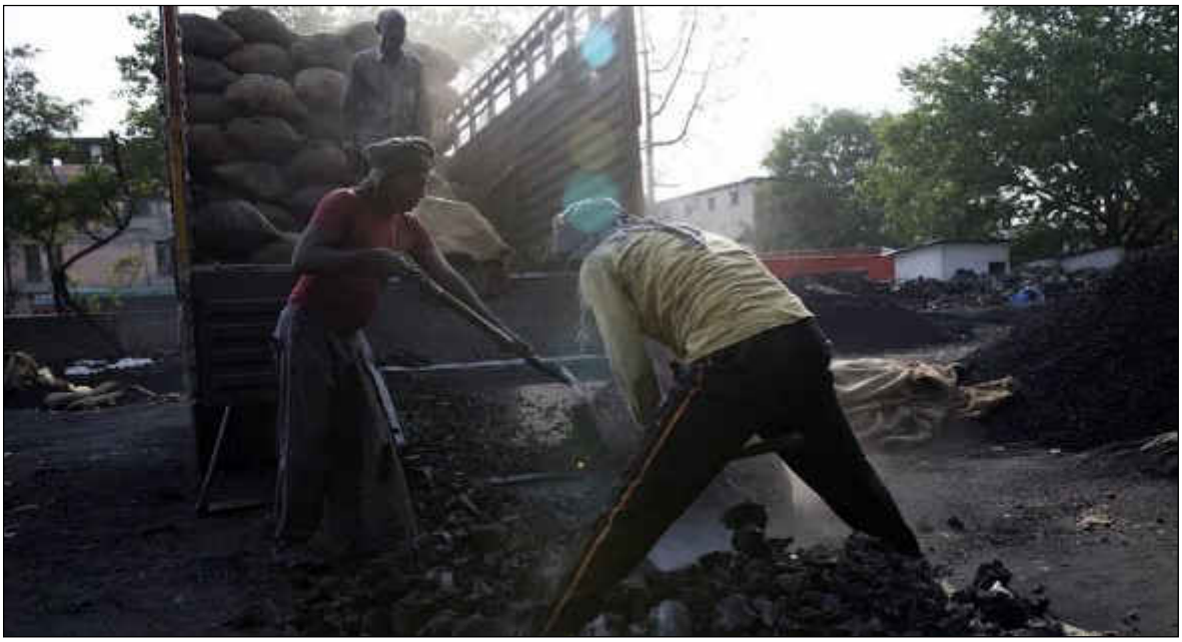
This law-making exercise assumes significance given that the mineral sector contributes only 1.75% to the country's gross domestic product (GDP), with India importing minerals worth ₹2.5 trillion annually.

"We produce around 1.25 lakh crores worth of minerals while we import around 2.5 lakh crores worth of minerals," Joshi said in anothe tweet.

The amendments also simplify the exploration regime, do away with any charges on transfer of mineral concessions for non-auctioned captive mines, rationalize stamp duty payable on mining, and development of a National Mineral Index for introducing an index-based mechanism for making statutory payments. Also, there will be changes to the district mineral foundation fund, a social impact fund that miners have to contribute towards.

"Outcomes of District Mineral Foundation will be more visible. #MineralReforms to resolve legacy issues and clarify mining definitions so that their interpretations may not hinder activities, but support it," Joshi said in another tweet.

CAG raps Odisha for poor mining revenue



The Comptroller and Auditor General (CAG) of India has pulled up the State government for short receipt of mining revenue of Rs 371.59 crore and non-inclusion of sizing charges in run-of-mine (RoM) price of coal during assessment of royalty, resulting in short levy of Rs 124.26 crore.

Mines and Minerals (Development and Regulation) Act-1957 provides that the holder of a mining lease shall pay royalty in respect of any mineral removed or consumed by him from a lease area at the specified rate.

As per the 2012 notification of the Ministry of Coal, royalty on coal is leviable at the flat rate of 14 per cent (pc) ad-valorem on the price of coal as reflected in the invoice excluding taxes, levies and other charges, said the report tabled in Odisha Assembly recently.If the top size of coal is limited to 100 millimetre (mm), processed through manual or mechanical means, the sizing charge was Rs 79 per tonne till August 31, 2017.

However, the charge was revised to Rs 87 per tonne thereafter for RoM coal, the CAG said in its report on revenue sector for the year ended March 2019.RoM coal is the coal obtained directly from the mines in its natural and unprocessed state.

Further, provisions of MMDR Amendment Act, 2015 provides that the holder of a mining lease, is required to pay two pc of the royalty paid to the National Mineral Exploration Trust (NMET) and 30 pc of the royalty to the District Mineral Foundation (DMF) under intimation to the circle mining office concerned.

How Modi govt's changes to mining law could unshackle the sector in India

A look at the key changes to the Mines and Minerals (Development and Regulation) Amendment (MMRDA) Bill, 2021, and how they impact the mining sector.

New Delhi: The Parliament Monday cleared the Mines and Minerals (Development and Regulation) Amendment (MMRDA) Bill, 2021, which will help unshackle India's vast mining reserves that lie untapped now.

The bill to regulate India's mining sector was passed by Rajya Sabha. Once it becomes an act after getting presidential assent, it will help make the mining sector more industry friendly by doing away with a lot of restrictions in the existing law. In a first, the bill will also allow private entities to be engaged in mineral exploration work.

Introducing the bill in the Rajya Sabha, Coal and Mines Minister Pralhad Joshi said the amendments were necessitated because despite India's immense mineral potential, the country is "under-explored" and "under-performed" in attracting investment. The bill, which was passed by the Lok Sabha last week, amends the Mines and Minerals (Development and Regulation) Act, 1957.

"India is the fourth largest reserve of coal, still we import coal. According to an assessment by the Geological Survey of India, we have around 500 million tonnes of gold but still we import 983 tonne of gold every year, which is worth around Rs 229 lakh crore," Joshi said.

He added, "We share similar potential like South Africa and Australia, where their contribution to GDP is 7.5 per cent. Australia is at 7 per cent and South Africa is at 7 per cent whereas India is only 1.75 per cent," Joshi said.

One of the main reasons for this, Joshi said is because only the government agencies like GSI, MECL or CMPDIL are engaged in mining. The private players do not have much of a presence.

"We want to bring even private players into it because we know that we have rich minerals. We have coal, we have gold, and we have silver. But, we are not able to bring them out. That is why we are bringing some changes in this (law). That is why we are trying to redefine exploration," Joshi said.

The Union minister said the major objective is to generate employment. "It will help generate approximately 55 lakh direct and indirect employment," he said.

ThePrint explains some of the key points of the MMRDA Bill and how this will help India.

A legal entity means lease. Earlier, when the lease of a mine expired, all the statutory clearances given to the lessee were transferred to the new lessee, selected through an auction. However, this came with a catch — the statutory clearances are valid for just two years, after which the lessee has to obtain fresh clearances all over again. This is a time consuming process.

The amended bill provides for seamless transfer of statutory clearances from one lessee to another, with the provision that such clearances remain valid throughout the duration of the lease.

"This will not cause any disruption. Some 904 mines will expire in the next 10 years … See the disruption it will cause if the new lessee has to obtain statutory clearances all over again," BJP Rajya Sabha MP Ashwini Vaishnaw said while speaking on the bill.

No end-use restrictions on captive mines

The old law gave the central government the power to reserve any mine (except coal, lignite and atomic mineral) for a specified end use. These were called captive mines. The Centre could decide where production from such mines would be used.

The new bill has removed all such restrictions.

It also allows captive mines (except those mining atomic minerals) to sell 50 per cent of the mineral they produce in the open market. This was not allowed earlier. The new bill also empowers the Centre to auction a mine if the state government fails to do so within a specified timeframe.

Mining lease specifications

The amended bill mandates that once a mining lease has been given, production has to start within the next two years, otherwise the lease gets terminated.

It also provides for extending the mining lease given to government companies after the lease expires. This was not allowed earlier. This provision will go a long way in helping government public sector undertakings.

Easy transition from exploration to production

So far, if a company was given an exploration license and managed to find minerals, it had to apply afresh for getting a license for production from the mine. This clause has been removed now.

The new bill allows seamless transition from exploration to production.

Opposition's counter

The bill has invited criticism from opposition parties including the Congress, who say that the bill tinkers with the federal structure of the Constitution.

Opposition leaders including Congress's Jairam Ramesh in Rajya Sabha said that Clause 14(iii) that empowers the Centre to decide on auction a mine when the state government is unable to auction and Clause 10(i) that gives Centre the blanket power to determine composition and functioning of

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the District Mineral Foundation (DMF) is a complete mockery of the state government's powers and responsibilities.

The DMF is to be utilised for the development of the district where the mine is located. Every mine owner is expected to contribute to the DMF. So far, the DMF has accumulated Rs 45,000 crore, of which just 45 per cent has been utilised.

The amended bill gives the central government blanket powers to decide the manner in which the DMF's funds will be utilised.

(Edited by Manasa Mohan)

- By Moushumi Das Gupta

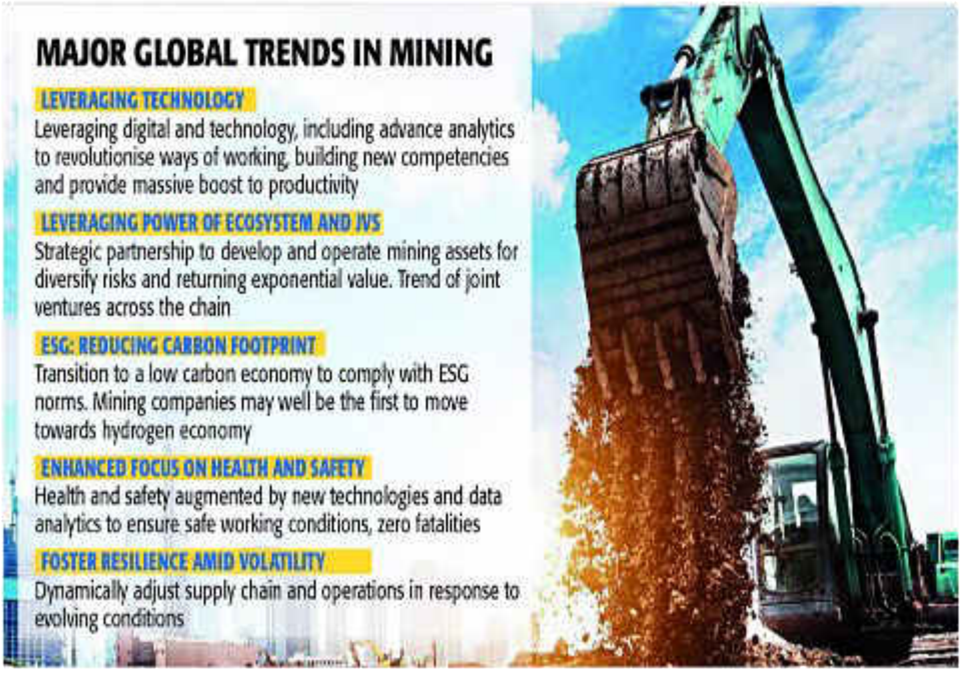
Mining technology for future growth

The global economy has been showing signs of recovery after being severely hit by the pandemic. In fact, the global economic output is expected to return to the pre-pandemic levels of Q4 FY19 in the first half of the current calendar year. India is expected to grow more than 11 per cent this year and the OECD (Organization for Economic Co-operation and Development) expects the global GDP growth to be 5.6 per cent, which is not too far away from the IMF's projection of 5.4 per cent.

One sector that has benefited immensely from this recovery is mining, which is now expecting a bright future ahead after a lull period. Good tiding for the mining industry augurs well for the Indian economy. That is because mining has a disproportionate impact on the GDP — for every 1 per cent growth in mining, industrial production grows by 1.2-1.4 per cent. Moreover, one direct jobin mining creates 10 indirect jobs.

One of the telltale signs of any rebound in the economy is the surging prices of commodities. The prices of all kinds of metals, including steel, iron ore, pig iron, DRI, pallets, have been going up. "Apart from coking coal prices, which have reduced due to Chinese embargo of coking coal from Australia, prices for most minerals have gone up due to pent-up demand post Covid-19," says Vidya Rattan Sharma, Managing Director of Jindal Steel & Power.

Just as every other industry, technology has helped mining too in dealing with the problems caused by the pandemic. With digitalisation, everyone is connected to virtual meetings. "We took faster decisions



at the senior leadership level and communicated it down to the last person within hours," says D. B. Sundara Ramam, Vice President, Raw Material, Tata Steel. "Suddenly, our system has become agile."

COVID has led people to make possible many things that were previously thought to be impossible. "Things that companies were trying to achieve for many years were successfully implemented and put in place in a matter of weeks," pointed out David Burns, Managing Director - Natural Resources, Global and Growth Markets Lead, Accenture.

But as things look up, the industry finds itself grappling with some challenges. Last year, supply chain disruption was the issue. Now, the supply chains are connected, but not uniformly. People are ready to pay any price to get materials but aren't ready to disrupt operations. That's leading to rise in the prices of metal, consumables and fuels. "That's where digitalisation is coming in handy. Every industry, including mining, is understanding it is only adapting technology that you can make operational improvement," says Arun Misra, CEO & Whole Time Director, Hindustan Zinc. "More mining capacity should not come with more machines. It should come from increase in availability, utilisation and efficiency which is enabled through Digital. Mining operations will become more automated in the future through Robotics," he added.

Companies are also moving towards a new era with digital/tech initiatives to improve supply chain and logistics efficiencies and minimise losses. But logistics continues to be a major bottleneck for the industry and remains a concern. That is because everyone is increasing production. "Almost 10-12 million tonnes of steel is being produced

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every month, that means India will touch 120 million tonnes of steel annually. All that will mean nothing if the overall ecosystem, especially logistics, is not geared up to make it happen," said Ramam.

To sustain mining operations successfully, it is important to engage the community around. Transparent communication can help address the negative perceptions about mining and help garner the support of communities. If the government makes the information public, it will assuage a lot of anxiety among people and change their perception about mining, the panel echoed.

"There is an imperative on social responsibility. Mining cannot be an island, it has to work in the ecosystem of communities and the right to operate comes also from how you take that responsibility," said Vinod Kumar, Managing Director and Lead – Chemicals and Natural Resources, Accenture in India.

The panel felt that opening up the mining sector could help unlock new opportunities. "India has vast mineral reserves and is a mineral giant but a mining pygmy. The government should take steps to liberalise mining and enhance our production output," said Ambar Timblo, Managing Director, Fomento Resources. He, however, welcomed the Centre's proposal to do away with the categorisation of captive and non-captive mines.

Going forward, the sector is hopeful that some of the recent reforms like the amendment to MMDR Act and initiatives under 'atmanirbhar bharat' will help spur growth.

- By Siva Kumar

Coal India to invest $1.73bn in solar power projects

The world's largest coal miner eyes further mine closures while planning foray into solar wafer manufacturing

Coal India Ltd, the world's largest coal miner, could venture into solar wafer manufacturing and wants to "aggressively" participate in the country's solar energy auctions, its chairman told Reuters.

Pramod Agarwal said its joint venture with state-run NLC India Ltd plans to invest around 125 billion rupees ($1.73bn) in solar power projects with a capacity of 3,000 megawatts, of which Coal India will invest some 60 billion rupees by March 2024.

At the same time, it plans to keep closing small mines and stay away from opening those that would entail mass hiring, Agarwal said. The group closed 82 mines in the three years to March 2020, resulting in cuts to its workforce of 18,600 employees.

"Coal as you know, we're going to lose business in the next two, three decades. Solar will take over (from) coal slowly as a major energy provider in the coming years," Agarwal said in an interview.

"We are just exploring the possibilities where we can invest in solar wafer production, nobody is (currently) there in the country," he said.

India, which makes solar cells and modules but not wafers, is planning to levy customs duties on some solar equipment from April 2022 as it looks to expand local manufacturing capacity.

Agarwal said the company's steadily falling headcount would lead to a major reduction in costs. "The net reduction of employees is to the tune of 13,000 to 14,000 per annum," he said.

State-run Coal India will face increased costs due to periodical wage revisions for non-executive employees, effective from July 1, 2021.

"But manpower reduction will have a stabilising effect, so the wage bill effect may be flat," Agarwal said.

-By Daniel Brightmore

In India's oldest coalfield, mining has caused irreparable damage to the environment

Decades of unabated coal mining has irreversibly changed the character of Raniganj Coalfields.

"You think anything will ever grow here again?" – asked Tapas Mondal (name changed to protect identity) while he stood beside a stream gushing with fresh water with hills and hillocks around him. The little streams of water emerged from within crevices of these hills and flowed through the valleys, joining forces with other streams to form the river that lay a little distance away from us.

But Mondal's question leaves one with thoughts because there was not a single tree around as he stood inside the Sonpur Bazari open-cast pit – the largest open-cast coal mine in India's oldest coalfield area, Raniganj Coalfields, spread over West Bengal and parts of Jharkhand.

Everything around, even the men and machinery, were coloured black due to coal dust.

Mondal – a supervising engineer in the Sonpur Bazari open-cast mine, named after the Sonpur Bazari village it evicted – posed this question when asked by Mongabay-India if trees would grow back when the mine was backfilled after extracting all the coal, as per the coal ministry's environment-friendly policy adopted in 2012.

"When I was a kid (in the 1980s)," he continued without waiting for an answer to his question, "there were lush forests all around us, and we would often spend hours picking fruits and berries. The coal mine was underground then, and my father used to work there."

"The forests started vanishing once Sonpur Bazari became an opencast mine – thousands of trees were uprooted to make way for it," he said. "After backfilling, only the grasses and shrubs will grow back, not a forest – this I know very well."

Sonpur Bazari is one of the numerous opencast mines in the Raniganj Coalfields area that came up in the late 1980s and 1990s, coinciding with India liberalising its economy. Like Mondal, several residents of the area – including Asansol, West Bengal's second-largest city after Kolkata – referred to the vanishing forests when speaking about the long-term impact of mining on the environment.

"In fact, you can rarely spot the Asan tree, from which Asansol draws its name, in the area these days," Jaya Mitra, an Asansol-based environmentalist and author, told Mongabay-India. "This was not so even till the early 1980s when you saw them in abundance in areas outside the city. Things started changing rapidly when opencast mines came in and prised open the earth from these parts. Entire forests and villages were uprooted to extract coal."

But references to vanishing forests are best understood by referring to the past when Asansol was part of a forested, riverine ecosystem, inhabited by indigenous groups. Coal, and development and its pitfalls, came much later.

Life before mining

Santimoy Bandopadhyay, a retired high school history teacher (of Asansol) and author, provides a vivid picture of life in ancient times in his book Asansoler Praikrama (Circumambulation of Asansol). The entire area stretching from Dhanbad district in Jharkhand to Birbhum district in West Bengal, he notes, was covered in thick forests, crisscrossed by rivers and rivulets, and inhabited by Adivasi groups.

Although local kings ruled over patches of this belt, they did not undertake projects that altered the natural environment in a big way, not even during the Mughal period.

"Historical records show that in the sixteenth century, Jahangir and his armies halted in Asansol during their transit from Delhi to Bardhhaman to collect taxes, as it was on the banks of Damodar river," said Debabrata Ghosh, a veteran journalist with Bengali daily Aajkal who lives in Asansol and has travelled across Raniganj Coalfields over the past four decades. "But even then, barring small settlements and temples, there was not much change in the natural settings."

Industries changed everything

Raniganj Coalfields entered the records as the birthplace of mining and exploration in India in 1774 when John Sumner and Suetonius Grant Heatly of the East India Company commenced commercial exploitation along the Western bank of Damodar River. A host of companies, including Carr & Tagore – the first Indian company in the commercial mining sector – established underground pits here in subsequent decades, extracting large quantities of coal without causing much damage to the topography.

Even then, industries like steel, chemical, and power manufacturing that were established to take advantage of the abundant availability of coal spurred large-scale urbanisation.

The evidence of the impact of these activities is in the maps of the area. Older maps showed a large network of interconnected perennial and seasonal streams that flowed into the Ajay and Damodar rivers on the northern and southern flanks of Raniganj Coalfields.

But as mining and industries expanded, especially in the post-independence decades, the network shrank drastically, such that today's maps only show the Ajay and Damodar.

Mitra underlined the role of real estate lobbies in killing off rivers. "Real estate lobbies, that function like mafias, have

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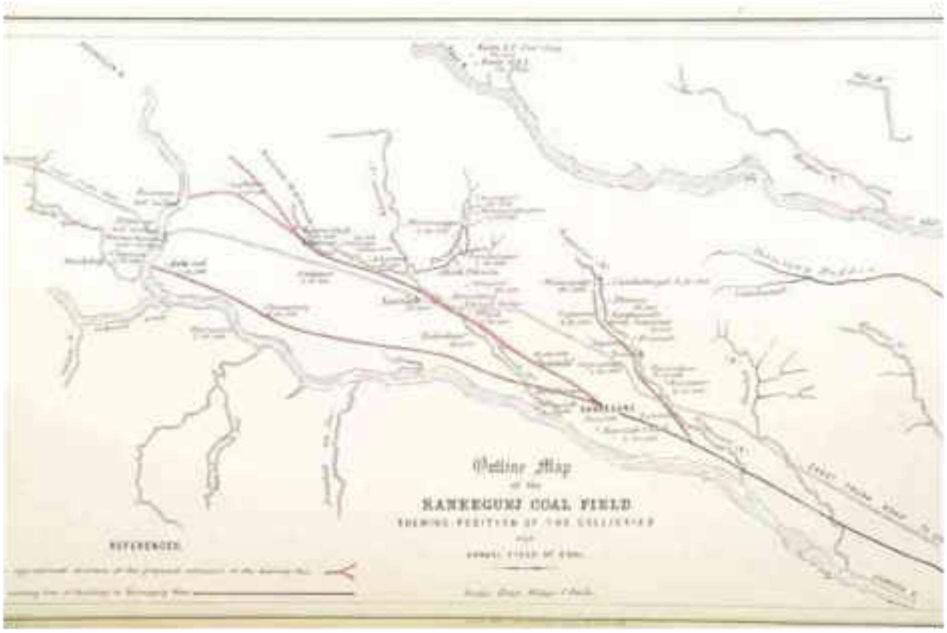

Raniganj coalfield is India’s oldest coal mining area. Photo credit: British Library/Flickr

converted many real jungles into concrete in the past few decades,” she said. “They have also encroached into perennial rivers like Ghorui and Nunia, building palatial homes and villas along their banks while reducing the rivers to drains.”

Opencast mining

Several studies, reports and data on pollution show that the ill effects of mining and allied activities in Raniganj Coalfields deepened since the 1990s following the operationalisation of several opencast mines.

Both Asansol and Durgapur, the coalfield’s largest urban settlements, were categorised as “critically polluted” by the Central Pollution Control Board and included among India’s most polluted cities on several occasions between 2009 and 2017.

Incidents of land subsidence due to abandoned/ illegal underground mines, which were limited to one or two per year in the 1970s and 80s, also spiked in subsequent decades. In 2020, for instance, there were three incidents of subsidence during the monsoons in which scores of people lost their homes and one person was killed.

“Most cave-ins happen during the monsoons because the ageing pillars supporting underground channels, from which coal was extracted earlier, give away due to waterlogging,” Moloy Chatterjee, a labour supervisor in the Bhanora coal mine, explained to *Mongabay-India*. “The cave-ins are likely fallout of opencast mining – after all, the explosives that we use to blast through layers of rocks and soil to reach coal reserves also shake up the earth all around.”

A study based on the analysis of satellite images, meanwhile, noted that between 1993 and 2015, large-scale changes in land use and land cover were noticed in the Raniganj Coalfields area, concentrated around opencast mines that came up in different parts at different points.

Forest cover shrank by nearly 50%, while many dense forests were gobbled up by opencast mines. Whereas areas around mines witnessed a sharp spike in construction activity, more than doubling the area covered by concretised settlements.

The cumulative impact of such large-scale changes in the natural environment is reflected in rising temperatures – the study showed that surface temperatures increased by two to four degrees between 1993 and 2015, especially in areas with mining and construction activity.

Studies also cited interviews with medical practitioners in Asansol, during which they said that patients with respiratory ailments topped their charts. But the real burden of such ailments remained hidden as government hospitals and health centres did not collect data on chronic respiratory diseases, they pointed out.

Seeds of resistance

Notwithstanding the irreversible effects of opencast mining on the environment and health, the Indian government amended mining laws amidst the pandemic, without properly consulting the mining-affected communities, to clear the decks for large-scale commercial extraction of coal and other minerals.

The government also compiled a list of coal reserves across states and auctioned a number of such reserves in the late 2020s, paving the way for new, more expansive opencast mines, including in Jharkhand, next door to Raniganj Coalfields.

Yet, the environment matters little in politics and governance in the area. Although Bharatiya Janata Party leader and Asansol’s Member of Parliament Babul Supriyo is the minister of state of the country’s environment ministry, neither he nor leaders of other parties talk of pollution and environmental degradation in their rallies and public meetings in the area.

A brick kiln near the Bhanora opencast mine in Raniganj Coalfields. Photo credit: Aritra Bhattacharya

“Some of us met Babul Supriyo after he became a member of parliament from our area in 2014, and urged him to restore the shrinking riverine ecosystem urgently if he genuinely wanted to work for the constituency and its people, as encroachments and obstructions in the natural course of Ghorui, Nunia and other rivers were causing floods. He promised to do something, and then forgot all about it,” rued Mitra.

In such circumstances, the local community – those affected most acutely by mining, including workers and their families living in coal-bearing areas – has been leading the struggle against further environmental degradation.

Trade unions with a presence in the coal sector, including independent groups like Thika Sramik Adhikar Union and those affiliated with political parties like Colliery

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Mazdoor Sabha of India and Khadan Thikadar Mazdoor Sabha, had been opposing opencast mining for several years, but in separate programmes. They came together to form a joint action committee during the pandemic, in anticipation of the government's mining law reforms.

"We have organised numerous protests against the reforms since then, including at colliery gates, inside mining pits and in cities like Asansol and Durgapur," Sujit Bhattacharjee, president of the Khadan Thikadar Mazdoor Sabha, and a member of the committee, informed *Mongabay-India*.

"Participation in all programmes has been good, but at times, even we have been surprised with the numbers protests have drawn, particularly from workers, poor people and concerned citizens," he said.

This article first appeared on Mongabay.

-By Aritra Bhattacharya

Coal mining norms to be eased further

- Bidders will be able to submit preferences for auctions
- The govt on Thursday listed 67 mines for the second tranche of commercial coal mine auctions

India seeks to further liberalize its coal mining regime to ensure greater participation of all stakeholders, by allowing bidders to submit preferences for future mine auctions.

Besides, as part of the Centre's plan to usher in structural reforms in the coal sector, state-run Coal India Ltd is looking to merge e-auction windows to move toward a 'one price for one coal grade' system. Coal and mines minister Pralhad Joshi announced the proposed initiatives at the launch of the second tranche of commercial coal mine auctions on Thursday.

The moves assume significance considering that India has the world's fourth largest reserves and is the second-largest producer of coal. With global shift to green energy to address growing environmental concerns, the Indian government is trying to harness coal reserves within the next three decades.

The so-called 'rolling auction' mechanism announced by the minister will ensure that coal blocks are always available for auction.

The initiative comes at a time when the global window for future coal mining is getting shorter.

"We are making coal the driver of economic activities in the country," Joshi said in a ministry statement. India's coal requirement is expected to go up to 1,123 million tonnes (mt) by 2023 from the present level of 700 mt.

"With rolling auctions, we will upload a comprehensive list of mines along with key technical data and bidders can submit their preferences for the mines to be included in the next tranche of auction. This would be a continuous process and would result in expediting the auction setup. Moreover, it will also help bidders in planning better and would further enhance transparency in the system," Joshi said.

On Thursday, India listed 67 mines in Chhattisgarh, Jharkhand, Odisha, Madhya Pradesh, Maharashtra and Andhra Pradesh for the second tranche of commercial coal mine auctions.

"This is the highest number of mines on offer in a particular tranche of auctions after the commencement of the auction regime since 2014," the ministry added.

The two-stage auction process allows bidders to quote the percentage revenue share over the reserve price. Besides there will be no restriction on the sale and utilization of coal from the mines. Earlier, blocks were allocated to companies on payment of fixed amounts per tonne.

"Start of commercial coal mining is the most revolutionary and progressive measure taken in the coal sector in India," NITI Aayog chief executive officer Amitabh

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Kant said at the event.

"The coal mines on offer are a coking and non-coking mines and fully and partially explored mines," the ministry said.

-By Utpal Bhaskar

Government eases public hearing rules for legacy mining cases

- In its latest decision, the Indian government's ministry of environment has come out with an order to help a certain category of mining projects avoid public hearing while seeking environment clearance.
- This decision is mainly for projects which were granted environment clearance under environmental impact assessment notification 1994 after a public hearing was conducted.

But experts note that public hearings should be understood as a critical tool for good governance and an important process for mining-affected communities, who may be suffering from non-compliance of mandatory environmental safeguards in mining projects.

Indian government's environment ministry has come out with an order with which the mining industry can avoid public hearing for projects which were granted environment clearance under the Environmental Impact Assessment (EIA) notification 1994.

Under India's environmental laws, industrial projects such as mining, highways, power plants, dams are granted environment clearance after a detailed process involving public hearing and an appraisal by expert committees.

Once the Environment (Protection) Act 1986 came into force, such projects were first brought under regulation through EIA notification 1994 which was then updated with the EIA notification 2006 to reflect the required changes. In 2020, the central government came up with a draft 2020 version which has, so far, been controversial and ended up in court seeking wider public consultations.

Now, in February 2021, the Union Ministry of Environment, Forest and Climate Change (MoEFCC) has come out with an order that seems to make operations easier for the legacy mining projects.

The ministry's February 16 order highlighted that its April 2018 order enabled those "whose environmental clearance under was granted EIA notification 1994 and was considered as valid for five years, to apply for environment clearance under EIA notification 2006."

"In such cases, public hearing has already been conducted earlier (at the time of grant of EC under EIA notification 1994) for the same project to undertake activities at that place and for that quantity," the order noted.

Thus the MoEFCC, in its latest order, said: "the requirement of undertaking public hearing again has been reviewed keeping in view that the mining activity at that place was being undertaken since past several years. In such cases, fresh public hearing, to decide whether mining activity could be undertaken at that place and for that quantity, may not be warranted since these are legacy cases."

However, it noted that the "views of the public are required to be obtained in such cases through other modes of public consultation process stipulated in the EIA notification 2006."

Under the EIA notification 2006, the public hearing is a process during which the people (who are going to be affected), near the site of the project or in close proximity

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can access the draft EIA report and record their concerns in front of the government authorities. It is considered an important component in the complete environment clearance process as sometimes serious opposition during these hearings or people highlighting lacunae in the process has led to projects getting shelved or cancelled.

The MoEFCC in its February 2021 order noted that to "ensure uniformity in approach in these legacy cases, it has been decided that in such cases the project proponent shall invite the suggestions/objections as wider part of public consultations for the project, instead of public hearing."

But provided the project will not result in any "increase in the production capacity and mining lease, no change in mining (mining method, mining plan, mineral transportation, water requirement, reclamation plan) is involved" and that the mine "has not discontinued operations for a period of more than five years from the date of application for grant of environment clearance."

According to the public consultation process mentioned in the EIA notification 2006, besides public hearing, written responses can be obtained from concerned persons "having a plausible stake in the environmental aspects of the project or activity." Once the public consultation project is undertaken, the applicant is mandated to address all the environmental concerns expressed during this process and make required changes in the draft EIA and environmental management plant.

Kanchi Kohli, a senior researcher with the Delhi-based Centre for Policy Research, emphasised, that public hearings need to be understood as a tool for good governance that is critical both for the economy and the environment.

"It is a legal and a legitimate space where project authorities, the government and project-affected people come face to face in an official forum where the history of a project's operations and new knowledge can inform decisions. Public hearings also provide an opportunity to EIA consultants to present the project impacts to a wider set of people who may not be able to navigate the technicalities of bulky impact assessment reports. It is for this reason that the EIA notification includes a physical space for interaction along with seeking written comments," she explained to Mongabay-India.

She noted that in the present case, "an office memorandum is not just selectively reading down what is required by law, but is also taking a myopic approach to public hearings."

"If a project is already in operation and is seeking an expansion, such hearings bring to light serious legacy issues arising out of non-compliance of mandatory safeguards including pollution, rehabilitation, and occupational health. Where projects have not begun operations, relying on 15–20 year old public hearing defies good business practice and sound regulatory logic. You may have an environmental approval, but it would have little or no social legitimacy," Kohli said.

The public consultation process is normally followed by the project's scrutiny by the expert committee which considers EIA reports and public consultation outcome for granting or rejecting environmental clearance to the project.

However, the latest order, while easing the path for the mining industry, may not favour the mining-affected communities and environment which undergoes a series of changes once the mining activities starts in an area.

Reforms in the mining sector on the government's agenda

In fact, the dilution of the public hearing process has been on the government's radar for some time now. In September 2017, the MoEFCC had allowed coal mine expansion upto 40 percent of capacity, if there was no increase in area for the proposed expansion.

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It had also held that such an expansion can be allowed if "mineral transport is through conveyor system up to the silo and loading to railway wagons, and not by road."

In 2020, following in the footsteps of the coal ministry, the union ministry of mines had also sought a similar exemption for non-coal mining projects.

In a notification published on March 18, 2021, the MoEFCC has said that the projects where construction and commissioning of proposed activities have not been completed within the validity period of the environmental clearance (EC) and a fresh application for EC have been submitted, the concerned expert committee "may exempt the requirement of public hearing subject to the condition that the project has been implemented not less than 50% in its physical form or construction."Also, throughout 2020, the Indian government's effort has been to ease rules for undertaking mining activities and bring changes to give a boost to the sector.

The government's ministers have maintained that the mining sector, especially coal, will be an important contributor to India, nearly doubling the size of its economy and become a five trillion dollar economy. The government has also said that mining sector amendments are crucial to India's efforts in reviving the economy post-Covid-19.

Over the past few months, the government has proposed several changes in the mining sector. The latest move was on March 15, 2021, when the government introduced the Mines and Minerals (Development and Regulation) Amendment Bill, 2021 in Lok Sabha.

The bill proposes the removal of the restriction on end-use of minerals, eases rules for the sale of minerals by captive mines, empowers the central government to auction mines of states in certain cases, eases the process for the transfer of statutory clearances, provides a way for the extension of leases to government companies, conditions for lapse of mining lease, and talks about non-exclusive reconnaissance permit.

-By Mayank Aggarwal

Why MMDR Amendment bill will help unlock mining industry that has been under-performing

In Episode 709 of #CutTheClutter, Shekhar Gupta decodes the new MMDR Amendment Bill and explains why it is sorely needed to breathe life into the mining industry.

New Delhi: On 22 March, Parliament cleared the Mines and Minerals (Development and Regulation) Amendment Bill, 2021, bringing in many reforms to India's untapped mining industry.

In episode 709 of 'Cut the Clutter', Editor-in-Chief Shekhar Gupta explains why the MMDR Amendment Bill is crucial.

Untapped potential of mining industry

Introducing the bill in the Rajya Sabha Monday, Union Minister for Mines Pralhad Joshi said mining in India contributes to only 1.75 per cent of the GDP, while the share for countries like Australia and South Africa is about 7 per cent of the GDP. The minister added that India shares this potential.

India produces coal worth Rs 1.25 lakh crore, yet heavily imports it despite being the third largest storehouse of coal in the world. It also has 22,000 million tonnes of iron ore reserve — enough to last India another 100-150 years. Additionally, the mining sector in India produces over one crore jobs, said Gupta.

According to the Geological Survey of India estimates, India has 500 million tonnes of gold ore but that ore isn't of good quality, which is why most gold mines have gone to seed. "Let's take the ballpark figure of $30 billion a year — that is Rs 2.2 lakh crore or thereabouts, of import of gold every year. That is about a little less than half of all our petroleum and gas imports," explained Gupta.

A lot of mining is also done illegally, said Gupta, which can be devastating for the

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environment. The laws around illegal mining are strict, and the smallest fault can invite closure of the mine — which invests a lot of power in the hands at many levels of bureaucracy and works as an "ATM machine" for the entire chain and then nobody worries about the environment, reinvestment or restoration of the soil, he added. "All these things have festered because of an outdated law."

Reforms in the law

The new law brings in a number of reforms, Gupta explained. Now, PSUs (public sector units) which have old mining contracts will be given extensions on the basis of a payment. Earlier, one had to reapply for clearance after a lease expired. Now the clearances continue for the life of a mine, even after the expiry of the lease.

Restrictions on the end use of minerals by captive plants have been relaxed. Captive mines produce minerals for the exclusive use by the company that owns them, "…you can use 50 per cent of minerals on your plant if you've taken a captive mine and remaining 50 per cent can be sold in the market. This means there is incentive now for people with captive mining leases to produce more," Gupta said.

This reform helps in many ways, explained Gupta. For example, manganese, which is a byproduct of iron ore production, currently cannot be used by captive mines for anything at all and just piles up by the side of mines because companies cannot sell or refine it. "This is a big change because while India imports oodles of manganese from countries like South Africa, Zimbabwe, its own manganese lies wasted," he said.

The reform will also prevent hoarding of mines — since you can sell in the market, the incentive to hoard is gone.

The new law mandates that whoever takes a mining lease has to start producing within three years of taking such lease or the lease will be taken over and the mine will be re-auctioned.

Hoarding is quite an issue, currently, and data suggests that of the 2,904 mining leases, 1,900 — that is two thirds — are lying unused, non-working and unexploited. Even PSUs have 297 functioning leases right now of which 199 minds are non-functional and non working.

The new law also gives license of use of minerals along with the license for exploration, which gives an additional incentive for exploring more. "This is a good reform since this leads to a seamless exploration and production cycle which wasn't there earlier," Gupta said.

Contentious provisions

The new law states the Centre will take over the auction of mines if the state fails to do so over a certain period of time , which the Centre and state will determine among themselves. However, even if the Centre auctions the mine, all proceeds from it will go to the state only.

Gupta said this is sugar-coating a very bitter pill: "States are protesting (against) this because, you see, India's mineral-rich states like Jharkhand, Odisha, Chhattisgarh, even Rajasthan aren't run by the BJP, currently. So the states see this as an encroachment of their rights."

The Centre, however, argues this is an incentive for the states to increase mining. According to the Centre, of the 143 mines allocated to the states for auction, only seven have been auctioned in the past six years.

Every mine owner has to give a percentage of the proceedings to the district mineral fund, which will be used to restore the place — Rs 45,000 crore have been collected under the fund of which less than half has been used. "Through this law, the Centre has empowered itself to tell states how best to use these funds," Gupta said.

The National Mineral Exploration Trust which gets 2 per cent of mineral royalties has Rs 2,300 crore in its corpus of which it has been able to use only Rs 308 crore. "The central government now plans to empanel a bunch of private mining industry players, who will then be given incentives out of this fund to explore for more minerals in India," Gupta explained.

Goa : We want the Mining Act to be amended

In an exclusive interview with KIRAN D. TARE, Sawant outlines how he proposes to overcome the spate of crises. Excerpts:

Two years ago, on March 18, 2019, the 47-year-old PRAMOD SAWANT, an ayurvedic doctor-turned-politician, had the difficult task of stepping into the very big shoes of Manohar Parrikar, who had passed away the previous day. At the time, the BJP was in a minority in the Goa government, Sawant had no administrative experience and no one to guide him, the other two influential leaders, Laxmikant Parsekar and Rajendra Arlekar, having lost the state election two years ago. Goa's economy was already precarious, after the Supreme Court cancelled 88 mining leases in February 2018, inflicting an annual loss of Rs 1,000 crore since then. The arrival of Covid-19 in March 2020 dealt a further blow as national and international travel restrictions hit its other mainstay, tourism. Goa's debt has risen from Rs 12,395 crore in March 2017 to Rs 18,444 crore by December 2020. Sawant also took flak for reducing the annual parental income criterion for the popular Laadli Lakshmi scheme (in which a girl child gets Rs 1 lakh when she turns 18) from Rs 8 lakh to Rs 3 lakh in October 2020. With India's highest per capita income, Goa (counter-intuitively) has a higher number of people

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above the income threshold than below the revised lower income threshold. There is also the dispute with Karnataka over the Mhadei's water, as the state's diversion of the river is said to affect its flow in Goa. Environmentalists are up in arms over a number of government projects they say will benefit the coal-mining business at the cost of the state's ecology. Yet, Sawant soldiers on as he presides over a BJP government that now has, for the first time in the party's history in Goa, 28 of the state's 40 MLAs.

You have had a difficult two years in office. What has been your administration's prime focus?

A. Goa witnessed the launch of several infrastructure projects before I took over. My focus is on human development, especially in rural areas, in agriculture. We have extended Prime Minister Narendra Modi's idea of 'Aatmanirbhar Bharat (self-reliant India)' to build a 'Swayampurna Goa (self-reliant Goa)'.

Q. How do you plan to achieve this?

A. Goa was fully dependent on neighbouring states for vegetables, fruits, milk and other commodities, even including chicken. When the national lockdown last year halted transport, we realised how helpless we were. We decided to change the situation. We have assigned a deputy collector-level official to each panchayat to ensure [the benefits of] central and state government schemes reach farmers. These officials visit [the panchayats they are assigned to] every Saturday to help villagers get benefits of the schemes. As a result, we have succeeded in providing kisan and soil health cards to all our farmers. We provided financial help to boost milk and fish production and floriculture. Now, we are exporting 20 per cent of our cauliflower and chilli produce to other states, and will increase it in the coming days. We are also trying to enhance our manpower skills, especially in fishing and pharmaceuticals.

Q. Goa is celebrating 60 years of its liberation from Portuguese rule. How do you propose to mark this milestone?

A. We have planned to provide housing, insurance, water, health and electricity to all by December 19, 2021, the 60th liberation [anniversary]. The Centre has assisted us with a grant of Rs 300 crore to celebrate liberation day. At the same time, we will organise cultural programmes in other states too, like Maharashtra, Gujarat and Karnataka, in recognition of their contribution to Goa's liberation.

Q. Goa's economy has been paralysed for the past few years. You have had to take loans to meet your expenses. How do you plan to improve the situation?

A. We have cleared all dues pending till June 2020. Goa is the only state that has used the Centre's RXIL (Receivable Exchange of India Limited) platform (which finances MSMEs) effectively to clear its dues. We received help from NABARD and the Union government too. We were the first state to open up economic activity and ease the lockdown. The results are visible, our financial condition is improving. The state has started earning revenue. The infrastructure projects are on track.

Q. The ban on iron ore mining has been a blow to people's livelihoods and the state's income. What are you doing for the resumption of mining in the state?

A. The matter is pending in the Supreme Court. We have presented a strong case. We have been demanding an amendment to the Mining Act [The Goa, Daman and Diu Mining Concessions (Abolition and Declaration as Mining Leases) Act, 1987]. The Union government is positive about reforms in iron ore and coal mining. I hope the problem will be solved. Meanwhile, we are proposing to e-auction the iron ore [mined] earlier but not yet sold. That will generate some revenue.

Q. Tourism has always been the mainstay of Goa's economy. What new plans does the government have to further tap potential in the sector?

A. So far, Goa has been about the sun, sand and sea. Now, we are turning it into a destination for medical and pilgrim tourism as well. We are promoting our culture and wildlife sanctuaries; we have organised three bird festivals so far. A new tourism policy, with a provision for a tourism board (an integrated body of all the organisations related to tourism), has been introduced. We will get investors in as well.

Q. You had to announce the shifting of IIT from Melauli after pressure from villagers. You are also being accused of helping coal transporters with your infrastructure projects to extend railway tracks.

A. We had decided to construct the IIT on government land. It has been difficult to convince people about the benefits [of this project]. We will give new land for the IIT. As for expanding the railway track, that is for passenger [transport] for the next 100 years, not for the transport of coal. The survival of the MPT (Mormugao Port Trust) is currently dependent on coal transport. If iron ore mining resumes, the MPT's dependency on coal transport will reduce.

Q. Why is Goa on the back foot when Karnataka draws excess water from the Mhadei?

A. We are not on the back foot. We have challenged Karnataka's illegal action in the Supreme Court. We have said they can use water from the Mhadei only for drinking purposes. The National Institute of Hydrology has conducted two tests for salinity in the Mhadei. Both tests show that the salinity is increasing as the sea water is rapidly mixing with the river water because of the dam that Karnataka built, which is obstructing the flow of the river. The water level in Mhadei has also gone down in several areas in Goa. We will face serious drinking water problems if this situation continues. A third salinity test is to be conducted in May. We will submit the reports of all three tests in the Supreme Court to support our case.

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Q. The BJP registered an impressive victory in the panchayat elections, winning 35 of the 40 seats. But there are complaints that the party neglects loyalists.

A. We run the government taking everyone on board. Seniors like Laxmikant Parsekar and Rajendra Arlekar are members of the party's parliamentary board (the apex decision-making body). There is no truth in the allegation that loyalists are being neglected.

Q. You will be facing the assembly election in February next year. What target have you set?

A. Our target is to win 30 out of 40 seats. Every opponent will be a challenge, but one thing is for sure, we will form a majority government.

Q. Where do you see Goa in the next five years?

A. Goa will become self-reliant in the next five years. We will have an international airport at Mopa. Iron ore mining will have resumed. Infrastructure works will have been completed. We will achieve our dream of 'Bhangaralem Goem (Golden Goa)'. It will be a heaven to live in.

Process to form state mining corporation has begun: Goa CM

As the state looks to restart mining operations, which have been non-functional for more than two years, the process to form a state mining corporation has begun.

When asked about the progress regarding the setting up of a corporation to oversee the functioning of the mining industry, Goa Chief Minister Pramod Sawant on Wednesday said, "The process to form state mining corporation has begun, and currently it is underway."Sawant had proposed the formation of a state mining corporation in his budget speech last month.

Mining activity in Goa was banned by the apex court first in 2012, following the unearthing of an Rs. 35,000 crore scam by a judicial commission appointed by the central government. But it was resumed in 2015 with restrictions, before it stopped again after the apex court in 2018, found irregularities in the renewal of 88 mining leases.The BJP-led government in Goa has been under pressure to restart the mining industry, especially with the state assembly polls, which have been scheduled to be held in early 2022. (ANI)

'No country can control the entire critical mineral value chain'

India needs to act fast on exploration, excavation and setting up critical material value chains through adequate downstream investments

Technology has advanced so rapidly in the last few years that many minerals that were just part of research are now essential for modern applications, especially for clean energy. This phenomenon has driven the global demand for a new group of metals, non-metals and mineral elements considered necessary for the economic well-being of the world's developed and emerging economies.

These minerals are now required everywhere, from mobile phones and computers to flat screen monitors, wind turbines, electric cars and solar panels.

The system which is emerging is expected to be a stark departure from the era of oil domination — better for human health, and steadier politically and economically. But if the transition does not happen smoothly, it could involve new risks, leading to political and economic volatility in oil-producing countries, Venezuela and Saudi Arabia. These places, which control 85 per cent of the world's energy today, could see an erosion of their power when solar and wind assets generate 50 per cent of the world's energy by 2050.

The transformation could also see concentration of the green assets and critical minerals and ingredients in an increasingly belligerent China which has made a conscious effort to corner these resources. Today, China controls 72 per cent of the world's solar modules, 69 per cent of lithium-ion batteries and 45 per cent of wind turbines.

It also controls refining of minerals, which are critical for clean energy, and has been frantically investing in electric cars manufacturing and transmission, as well as stockpiling minerals like cobalt. The future quest for clean energy would thus require reliable global supply chains of critical minerals.

Efficient batteries, which can be charged quickly, require lithium, cobalt, nickel and copper. Neodymium and other rare earths are required to make powerful magnets, which are important for the manufacture of wind turbines and electric vehicles.

Critical mineral production in the world today is, however, largely monopolistic; there are risks in supply and there is a complex global supply chain. The high importance and low occurrence renders these critical minerals susceptible to supply risks. Several critical minerals typically co-occur and require separation using extensive chemical processes.

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According to a report by the International Energy Association, China produces 63 per cent of the world's rare earth elements, including 45 per cent of molybdenum. China has also taken a majority stake in the cobalt mines of Democratic Republic of Congo, which in turn produces 70 per cent of the world's output.

China has been a major importer of lithium, which is produced up to 55 per cent in Australia. It has at least 85 per cent of the world's processing capacity for rare earths to be turned into critical materials for use in the high-tech industry.

China dominates value chains across mining, processing and producing magnets and has a major role in the global supply chains of rare earths. The supply of these critical minerals can thus be disrupted easily due to trade wars, conflict or civil unrest.

This is what had happened in 2010, when China suspended exports of rare earths to Japan for almost two months. Recently, it has passed a law, requiring case-by-case scrutiny of exports of rare earth and other critical minerals out of the country.

Even though Australia is the world's largest producer of lithium, more than 99 per cent of value in the lithium battery production is added during chemical processing, cell manufacturing and assembly. South Africa mines 72 per cent of the world's platinum. Indonesia is the largest producer of nickel but has banned its exports. Cobalt supplies could be disrupted if labour and environmental standards are brought to bear on the Democratic Republic of Congo.

The complexity of the value chains, high investment overheads for processing and small markets imply only a handful of businesses or countries participate in the critical materials market. Typically, a single country produces one half of the global supply. On average, top three account for around 80 per cent of all critical material production.

The EU's 'Raw Materials Initiative' (2018), Japan's 'Strategy for ensuring stable supplies of rare metals' (2019), the United States energy department's 'Critical Materials Strategy' (2010), China's 'Situation and Policies of China's rare earth industry' (2010) and Australia's 'Critical Minerals Strategy' (2019) not only reflect a growing awareness to the political, environmental, economic and social problems affecting these minerals, they also commit substantial government resources to building more sustainable and secure alternatives.

The EU has ensured that it is home to giant developers of solar and wind farms and the US has seriously woken up to the Chinese challenge. So have the other countries who are part of the Quad grouping, like India.However, India needs to act fast on exploration, excavation and setting up critical material value chains through adequate downstream investments. The reforms announced by the Indian government in sectors like mining, along with the emphasis on production linked incentive schemes for solar photovoltaic cells and advanced cell battery storage, will go a long way in addressing the constraints in India's quest for a shift to e-economy.

Comprehensive resource requirement and procurement plans are essential. India's Department of Science and Technology, in collaboration with the Council on Energy, Environment and Water, drafted the Critical Minerals Strategy for India in 2016, with a focus on India's resource requirements till 2030.

The Indian Critical Minerals Strategy has identified 49 minerals which will be vital for India's future economic growth. Initiatives such as the National Electric Mobility Mission plan 2020, has a projection of getting 6-7 million electric vehicles on Indian roads and completely switch to electric vehicles by 2030.

This would result in a demand for charging infrastructure that can support the electric vehicles across the length and breadth of the country. Apart from infrastructure, this is also expected to result in the growth in demand for lithium-ion batteries, which may grow to around 132 GWh by 2030, or demand for 10 kT (0.09 kg per KWh of lithium) for usage in cells and batteries.

There is also a requirement of access to raw materials, such as lithium deposits.

There is real potential for geological exploration of critical minerals in India. In 2019, India set up an expert committee on exploration and procurement of required critical minerals for tie-ups with other countries, particularly for sourcing cobalt and lithium from Australia, Argentina and Bolivia.

Khanij Bidesh India Ltd, (KABIL) a joint venture between three public sector companies, was set up for consistent supply of critical minerals through acquisition, exploration, mining and processing of strategic minerals. The National Mineral Policy of 2019 has also put forward a vision for accelerated growth of production of non-fuel minerals.

However, entities like KABIL need to be allowed to interact with private players with full autonomy, instead of just interacting and dealing with government entities abroad. Exploration and research and development in mining and mineral processing technologies needs to be enhanced and strategic acquisition of mines in other countries speeded up.

Investors coming to India need to be assured of security and title as well as tenure. Streamlining the post-leasing clearance mechanism is critical.

One unified regulatory authority, as envisaged in the National Mineral Policy, will help. India also requires state of the art Mining technology and equipment from countries like Australia. At the international level, there is already a recognition that critical materials are not "just another commodity". There are, now, genuine security concerns related to their criticality in building more diverse and reliable value chains, about their environmental and social sustainability, and technological challenges.

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Given the complexity of value chains that convert raw materials into finished products, individual projects need to be integrated in a functional manner with regional networks. Security of critical materials cannot be left to private sector alone. Thus governments are getting more involved in the process.

But no one country can control the entire critical material value chain and needs different partners contributing to mining, processing and manufacturing activities.

Examples of this collaboration is the Resilient Supply Chains Initiative (SCRI) between India, Australia and Japan agreed in September 2020, and more recently, the agreement among the Quad countries to set up a working group on critical materials and technologies. Going forward, India needs to take a complete government and industry approach to this important issue.

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