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TOWARDS INDIA'S MINERAL SECURITY & MONETISING IT'S MINERAL WEALTH

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Australia, Africa, South America, Indian sub continent and Antarctica were part of the ancient supercontinent 'Gondwana' that broke up and moved away about 180 million years ago. Gondwana concept explains India's geological similarity with Eastern Africa, Western Australia and South America. But despite its rich mineral potential, India, unlike these regions, has not been able to uncover its mineral wealth.

Global economy, today, is defined by modern technology. Assured supply of mineral raw materials is becoming increasingly critical for every industry and manufacturing activity. High import dependence for raw materials, especially of strategic and critical minerals, renders a country vulnerable. Japanese were given a measure of their raw material vulnerability by China when they temporarily stopped Rare Earths supply to Japan in 2010 as retaliation to the Senkaku incident. Closer home, in early 2021, India witnessed a brief tightening of Covid vaccine raw material supply by United States.

Minerals excluding petroleum and natural gas contribute 8.2% & 8.1% respectively to the GDP of South Africa and Australia, but an abysmally low 1.69% to India's GDP[1]. In 2020-2021, India imported minerals (excluding coal) worth Rs 4,24,705 crores while its domestic mineral production was just about a quarter of that, at Rs 1,11,133 crores. Mining is the backbone of

[1] "Indian Mining : a Synopsis" August 2021, p.12, Federation of Indian Mineral Industries

manufacturing. With increasing demand from our growing economy, import dependency for critical and strategic minerals may reach a level where it could threaten our national security. India will face challenges even to meet its increasing demand for thermal coal and iron ore. Our growing appetite for energy is set to increase India's thermal coal import to 243 million tons by 2030, almost equaling the projected figure of 250 million tons for China. By 2030, India and China together are set to receive almost half of the entire global coal shipment of about 1100 million tons[2]. National Steel Policy 2017 projects India's per capita steel consumption to go up from 61 Kg to 158 kg by 2030. India will need to double its iron ore mining capacity by 2030 to meet this requirement[3]. As per Dr Amit Tripathi, President, Geo Exploration, policy discourse in India remains confined to bulk commodities (Iron ore, coal, Manganese, Limestone, Bauxite), while critical metals and their ore imports with high import bill garner little or no attention; this lack of focus manifests into India's annual import of Gold worth Rs 420,000 crores, Base metals of copper, Lead & zinc worth Rs 55,000 crores, Rs 3700 crores worth Aluminium and Silver worth Rs 19,000 crores. These are deep seated, difficult to find metals with high exploration costs. Bulk of the global exploration investment goes into these metals.

A country like India needs to uncover and realise its domestic mineral resources in a big way and where required, secure mineral supplies through leasing assets and forging mutually beneficial long term agreements with friendly countries. Current global geopolitical scenario offers India viable options for close cooperation with Central Asian Republics, African countries and even Afghanistan in this regard. Assured mineral supply also has a direct bearing on India's push towards 'Make in India' and 'Atmanirbhar Bharat'.

Inappropriate policies over 75 years have resulted in India's mineral wealth remaining largely unexplored and underexploited. Apart from surrendering valuable economic benefits, this has also made India import dependent for important minerals[4] and significantly so in respect of a large number of strategic minerals[5]. The Council on Energy, Environment & Water (CEEW), in a 2016 study, carried out for the Department of Science and Technology, identified minerals which are likely to pose supply risk to India by 2030,

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[2] "Seaborne Thermal Coal Demand to rise over next decade", Hellenic shipping news, 2 November 2020 (https://www.hellenicshippingnews.com/seaborne-thermal-coal-demand-to-rise-over-next-decade/)

[3] Times of India, 30 June 2021(https://timesofindia.indiatimes.com/business/india-business/india-needs-to-double-iron-ore-mining-capacity-by-2030/articleshow/83967298.cms)

[4] Ajey Lele and Parveen Bhardwaj, "Strategic Minerals, A Resource Challenge for India", Institute of Defence Studies and Analyses, New Delhi, Pentagon Press, New Delhi, 2014, pp 14-15.

[5] Keith Campbell, "Strategic Minerals and the aerospace and defence industries", 30 April 2015, Mining Weekly (https://www.miningweekly.com/article/strategic-minerals-and-the-aerospace-and-defence-industries-2015-04-30/rep_id:3650)

based on their economic value, significance in the manufacturing sector and availability. Some of the important minerals identified by the study as 'high supply risk category by 2030' for India are listed in the table below[6].

Mineral @	India's Import Dependency %	Mineral @	India's Import Dependency %
Aluminum	53	Lead	81
Antimony	100	**Magnesium**	49
Asbestos	91	manganese	68
Beryllium	100	**Molybdenum**	100
Bismuth	100	**Rare Earths**	100
Boron	100	Phosphate	81
Cadmium	100	**Titanium**	43
Cobalt	100	**Tungston**	100
Copper	68	**Vanadium**	100
Gallium	100	**Zinc**	100
Germanium	100	**Indium**	100
Iron	48	Zirconium	82
Lithium	100	Potash	100

(@ - Minerals shown in **red** are classified as strategic minerals based on their criticality in aerospace and defence Industries)

Mining is a systematic process. It starts with preliminary survey to identify mineralised areas worthy of further investigation for mineral deposits. Preliminary survey is followed by Prospecting which is the process of narrowing down the areas of enhanced mineral potential. Next stage is general exploration which involves identification and initial delineation of the identified deposit. General exploration is followed by detailed exploration. Detailed exploration involves a three dimensional delineation of the deposits which establishes the size, shape, structure, grade and other relevant characteristics of the deposit with a high degree of accuracy. Depending upon the outcome of detailed exploration, a feasibility study is carried out to assess technical soundness and economic viability of mining in the chosen

[6] Gupta et al., "Critical Non-Fuel Mineral Resources for India's Manufacturing Sector, A Vision for 2030"(https://www.ceew.in/sites/default/files/CEEW_Critical_Non_Fuel_Mineral_Resources_for_India_Manufacturing_Sector_Report_19Jul16.pdf)

area. Feasibility study also serves as the basis for investment decisions and is considered a bankable document for project financing. The actual setting up of a mine requires considerable lead time. Even with the benefit of good quality preliminary survey data, conducive environment, facilitating policy framework and best practices, the process from exploration to setting up of a mine and commencement of mining could take anything from 4 to 6 years and even longer.

The assessed breadth and volume of mineral deposits and reserves in a jurisdiction is not fixed and keeps increasing with new discoveries. Increased area coverage, combined with better and more accurate survey and exploration using modern technology results in discoveries of new mineral deposits. India has a landmass close to 3.3 million Sq Kms of which the Geological Survey of India has so far identified 0.57 million Sq Kms as India's Obvious Geological Potential Area (OGP). Some of India's well known geologists like Mr Biplob Chatterjee believe that with inclusion of the Himalayan belt, the Deccan trap, Peninsular Gneisses and Coastal belt, India's OGP holds the potential for a fourfold increase to about two million Sq Kms[7].

It is widely acknowledged that Geological Survey of India has world class baseline geological survey data of 1:50,000 map scale for almost 98% of the country and maintains one of the most exhaustive datasets in the world. This gives India a head start in terms of good quality base geological data. But sadly, as we proceed to the next level beyond the base geological data, to geophysical and geochemical data coverage, India's tally is a poor two to four percent as against Australia's 90–100 percent coverage[8]. Further, only about 10% of India's 0.57 million Sq Kms Obvious Geological Potential area has been explored so far and only about 1.5 to 2 % has been mined. India's inadequate exploration is causing incalculable loss to the country; the country's high grade iron ore resource base is estimated at 20 billion tons while only about 12% of it, just about 2.5 million tons, has been established through exploration. As we move up the mineral value chain to more expensive metals, the situation is even more alarming with exploration for these metals practically non-existent. Exploration is the foundation of the mineral chain[9]. India's exploration also suffers the disadvantage of being surface centric, confined to a depth of about 50 to100 m with little exploration

[7] Biplob Chatterjee & Rajesh Chadha, "Non-Fuel Minerals and Mining : Enhancing Mineral Exploration in India", Brookings India, Discussion Notes April 2020 (https://www.brookings.edu/wp-content/uploads/2020/04/Enhancing-Mineral-Exploration-in-India.pdf)

[8] Natasha Jha Bhaskar, "Examining the Potential if India-Australia Partnership in Mining", ORF Issue Brief, 17 April 2019 (https://www.orfonline.org/research/examining-the-potential-of-india-australia-partnerships-in-mining-49983/)

[9] Amit Tripathi, "India's Mineral Policy as it Evolves" (mineralexplorationacademy.com/mineral-policy-discussions/)

carried out for deep-seated, concealed minerals. Ministry of Mines data shows India's mapping coverage for surficial minerals @100% of its OGP area while the coverage for deep-seated minerals is only 22%. In contrast, mapping for deep-seated minerals in Australia is about 95% of its OGP[10]. This difference gets reflected in the ratio between surficial and deep seated minerals in our mineral production; India's ratio stands at 95:5, while it is 84:16 in case of Western Australia and close to 50:50 for Canada[11]. India spends a paltry US$ 17 per Sq Km for exploration, mostly by the government. In comparison, Chile spends $ 1202, Australia $ 246, Canada $ 192, US $ 106 and Brazil $ 51[12]. Exploration investment in all these countries comes predominantly from the private sector. China spends $ 67 per sq Km for exploration. Mineral exploration is a high risk venture with a success rate as low as 1:100 which makes exploration by governments using public money inadvisable, especially in democratic countries. In advanced mining jurisdictions like Western Australia, Canada, South Africa etc, rules provide adequate incentives, facilitating small mining companies called junior mining companies to carry out exploration. Junior mining companies are to mining what start-ups are to IT and tech industries and are funded by private investors who take risk as in IT and other tech start-ups. One successful exploration project compensates for many unsuccessful projects, as the junior mining companies can sell their mining concessions to big mining companies at considerable profit. With the Indian share market and investors coming of age, junior mining companies stand bright chances of attracting investment from domestic and foreign investors which in turn, will spread the risk of exploration over a larger body of shareholders who are prepared to risk their investment in mineral exploration just as they do in any other equity investment. Apart from attracting FDI into exploration and mining, this would also open doors to the huge Indian small investor community to participate in exploration and mining projects as shareholders. Role of the government would be restricted to providing stable legislation framework and simple processes, quick clearances and suitable tax incentives. It is relevant to note that in 2021, Indian "Start Ups" raised US$ 24 Billion. With appropriate policy modifications, India can attract large FDI into exploration and mining. In 2018, South Africa attracted $ 5.3 billion FDI into exploration and mining while Egypt and DRC received $ 6.8 billion and $ 4.3 billion respectively. In contrast, in 2020, India received only $ 241 million FDI in mining that too in the backdrop of a simultaneous domestic capital outflow of $ 142 million into mining from India.

China is a glaring example of a country reaping the benefits of its mineral wealth through investment in mineral exploration and development of mining

[10] Natasha Jha Bhaskar, Ibid
[11] Exploration of Mineral Resources, Background Paper, Federation of Indian Mineral Industries
[12] "Indian Mining : a Synopsis", ibid, p.29

industry. From being an insignificant gold producer in early 1970's with annual production of about 4 to 5 tons, China transformed into the biggest gold producer in the world with an annual output in excess of 400 tons by 2018. Compare this with our own gold mining record; from about 5 tons output in 1960, India's gold production has dipped to a meager 1.2 ton a year. India imported 1050 tons of gold in 2021 worth US$ 55.7 Billion[13]. This is a huge outflow of forex even after discounting our average annual gold jewellery export of $ 9 billion. China's track record in transforming itself from a marginal producer of Rare Earths in early 1980's to securing total global monopoly in Rare Earths supply by 2010 is another example of what can be achieved by a country through concerted efforts in discovering and mining its mineral wealth. India, on the other hand, has stubbornly refused to exploit its huge Monazite deposits for extraction of Rare Earths and other heavy minerals. Although Indian commentators complain about democracy inhibiting growth in India, what has actually hindered India in its mineral wealth exploitation is the failure to harness its asset, innovation led by private sector, into exploration and mining. In contrast, China has made full use of the advantage of its command economy, to achieve the goal of global mineral dominance.

In an effort to bring in transparency in allotment of mining concessions, Indian Government, in 2015, introduced the system of e-auctions and 2 stage bidding for mining assets. The new system also included a new 'Evidence of Mineral Content' (EMC) rule which necessitated a specified level of exploration of assets before it could be auctioned. Mining industry argues that, by introducing EMC, the government has taken exploration out of private sector participation and taken upon itself the humungous responsibility of exploration to discover new mineral deposits entirely through government projects funded by public money. Although an amendment was made to the rules in March 2021 to allow private entities to undertake exploration, as per Federation of Indian Mineral Industries, the amendment does not grant "any rights of grant of mineral concessions" to private entities, thus removing all incentives for undertaking high-risk exploration projects. In an article titled "All that glitters in Indian mining is not gold"[14], Meera Mohanty narrates the experience of 'Deccan Gold Mine Limited' company, founded by Charles Devenish, an Australian who has dedicated his life to development of mining in India. As per the article, Deccan Gold mines, India's only listed gold mining company, discovered gold in Ganajur in Karnataka after more than a

[13] The Economic Times, 4 January 2022 (https://economictimes.indiatimes.com/news/economy/finance/indias-spends-record-55-7-billion-on-gold-imports-in-2021-govt-source/articleshow/88684634.cms)

[14] The Economic Times, 31 May 2020 (https://economictimes.indiatimes.com/industry/indl-goods/svs/metals-mining/all-that-glitters-in-indian-mining-is-not-gold-say-exploration-compnies/articleshow/76122778.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst)

decade of relentless pursuit and considerable investment. The company says that having discovered gold deposit in Ganajur, they are now faced with the possibility of their discovery being expropriated for auctioning by the government quoting the 2021 amendment to the rules.

The Indian mining industry is extremely critical about the erosion of investor confidence caused by the removal of section 10A (2)(b) of the Mining Act, which as per them, provided safeguard to the concessionaires for their rights of mining and guaranteeing their vested rights[15]. They emphasise the need for consistency in mining rules and are of the view that while the auction system may have been introduced with a good intention to remove administrative discretion and corruption, what is needed is to follow the best global practices and adopt a judicious mix of auction and 'first come first serve' (FCFS) system based on a well defined facilitating policy. Miners also reiterate the importance of understanding the different dynamics and needs of mineral exploration industry, mining industry and the mineral based industry to be able to formulate a set of policy framework facilitating each of these entities.

Mining sector in India is a big employment generator. For a one percentage increase in the sector GDP, mining sector in India creates 13 times more jobs than agriculture and six times more jobs than manufacturing. Similarly, for every 1 direct job created in the mining industry, 10 additional indirect jobs are created in the economy[16]. In fact experts like Dr Amit Tripathi believes that "by removing regulations hindering the growth of these industries, the mineral sector could become engine of rapid rural growth unleashing industrialization of rural India and causing rise of income levels in rural areas" in India's post Covid economic revival[17]. Experts also believe that tremendous advantage can be derived by adopting an integrated mining & rural agriculture approach in many parts of India.

India needs to exploit and monetise its mineral wealth in a sustainable manner before technology, alternate supply chains and environmental concerns make some of these resources redundant. The new global approach calling for drastic reduction in coal dependence and also to move away from Nuclear power are pointers to the future. While such a switch may be viable for developed countries, for a country like India, even a gradual

[15] The Economic Times, 24 January 2021 (https://economictimes.indiatimes.com/industry/indl-goods/svs/metals-mining/removal-of-certain-section-of-mining-act-may-lead-to-irreparable-loss-of-investors-confidence-fimi/articleshow/80431869.cms?from=mdr)

[16] RK Sharma, "Explained:How mining Sector can create lakhs of jobs", Financial Express, 30 August 2019 (https://www.financialexpress.com/opinion/explained-how-mining-sector-can-create-lakhs-of-jobs/1690725/)

[17] Tripathi et al., "Unlocking explosive growth with rural employment and rapid industralisation" (mineralexplorationacademy.com/2020/06/10/unlocking-explosive-growth-with-rural-employment-and-rapid-industrialization/)

switch from coal needs careful consideration because of our large domestic coal deposits, huge anticipated growth in energy needs in the decades ahead, current dependence on coal as the main source of energy and its centrality to our energy security and the lead-time needed for adequate scaling up of alternate renewable energy sources. The country needs a well thought out unambiguous mining policy which enables private participation, formulated through consultation with all stake holders, ensuring consistency, transparency, level playing field, time-bound single window clearance, appropriate incentives in terms of tax benefits and mining concession rights and fast track courts. India also needs to seriously embark upon securing mineral resources abroad, for those critical minerals that it is inadequately endowed with.

CERTIFICATE

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