LAW ON MINERAL SECURITY – IS IT A STRATEGIC AND CRITICAL *SINE QUA NON* FOR INDIA?

By M.Akshayaa
From TERI School of Advanced Studies, TERI University

1.Introduction

India is one of the top mineral producing countries in the world, next to China, Australia, United States of America and Russia with 77 Billion Dollars in mineral production value.[1] India is a mineral rich country and is the home for abundant mineral wealth producing 84 minerals including 4 fuel, 11 metallic, 49 non-metallic industrial and 20 minor minerals.[2] India has he 5th largest coal reserves in the world. It is the 4th largest producer of iron ore and 3rd in rank in producing aluminium. It ranks 5th in its bauxite and zinc production and 3rd in producing limestone and chromite. It is the 2nd largest producer of steel. Minerals play a significant role in our day-to-day lives. The minerals have such significant history throughout the world that various periods are known by the names of the minerals, starting from Stone Age to Copper age, Iron ages to Atomic age.[3] The Minerals are the bedrock of industrial sector due to its use as raw materials to the manufacturing industries.[4] Mining of minerals is so interwoven with mankind and money, that without mining there won't be any minerals and without minerals, industrial progress is not possible and without progress mankind has no meaning worth the name.[5] Thus, development of mines and minerals is integral not just to the progress of industrial sector and mankind but also for the economic working of our country.

"The real wealth of the Nation lies in the resources of the earth – soil, water, forests, minerals, and wildlife." ---Rachel Carson. Just like how water, forests and wildlife are conserved against its scarcity, minerals also need to secure in order to have for the future demand and supply.

The focus of this paper is to understand the concept of mineral security and tries to establish the need for such mineral security. It also brings out the debate between mineral reserves scarcity and mineral resources scarcity and discusses the policies adopted by other countries with regard to mineral or resource security. The paper delves into the kinds or minerals requiring security and their role in national defence sector and in greener and cleaner technologies. This paper also states the need for legal framework governing mineral security in India.

2.Mineral Security

Mineral security means the sufficient availability of mineral resources that is feasible and has the expected quality in spite of serious situations like severe global competition in the international market,

[1] Staista, (2020), *Leading mining countries worldwide in 2016, based on mineral production value (in billion U.S.Dollars)* (Bar Graph/Chart) https://www.statista.com/statistics/1114898/leading-mining-countries-worldwide-based-mineral-production-value/ (last visited on Dec.15, 2020).
[2] TERI, *Overview of Mining and Mineral Industry in India*, TATA Energy Research Institute, (2001) https://pubs.iied.org/pdfs/G00615.pdf (last visited on Nov 18, 2020).
[3] D.D. SETH, ENCYCLOPAEDIA OF MINING LAWS (7th ed. 2020).
[4] TERI, *supra* note 2.
[5] Seth, *supra* note 3.

hurdles in the import of minerals from countries which has abundant mineral wealth, and poor economy.[6] In other words, mineral security means to ensure that mineral resources are available for the future despite the critical circumstances and situations which the present and the future may hold, in order to meet the future demand and supply of minerals. The term mineral security is defined with respect to mineral resources and not mineral reserves. These two terms are very distinct and different from one another. Since minerals are the basic elements which contributes to technologies, its availability and accessibility are considered vital for the purposes of national security and industrial economy. Minerals are significant and crucial not only for everyday functioning of humankind but are also essential for maintaining and improving the quality of life and economic growth of the country.

The need for mineral security arises from the steady global population expansion and explosion as the demand for minerals increases with the increase and expansion of population which in turn results in the threat of future mineral scarcity.[7] Another reason for propagating mineral security is that rapid urbanisation and growth in prosperity of developing countries like India, China, Brazil etc., have been using raw materials at an inconceivably large scale along with other fast emerging economies.[8] Use of huge quantities of metals in modern technologies also adds to the need for mineral security. The need for mineral security is inevitable.

3.Mineral Reserves Scarcity vs. Mineral Resources Scarcity

It is a well-known fact that the minerals are non-renewable natural resources of the earth. When we hear the term 'non-renewable' the immediate question that arises is whether we have enough left-over minerals to satisfy the demand of growing population and the resultant economy. A reputed economist Thomas Malthus has predicted that the magnitude of growing population would certainly exceed the earth's capacity to provide mineral resources.[9] A number of authors have recently predicted the approaching scarcity and some have gone to the extent of exhaustion of raw materials within a few years. These are considered as alarmist views which is purely based on overly-plain analysis and misinterpretation of the meaning of the terms 'reserves' and 'resources'.[10] Resources refer to the availability of accumulate material (minerals) in such nature and quantity that it has potentially feasible for extracting such material. It can be classified into different categories depending on the level of geological and geographical information and assurance that such material exists. Reserves, on the other hand, refer to those resources and materials that were identified on exploration and assessment and which can be readily extracted on completion of assessment and is economical to extract those resources.[11] In

[6] Geography Revision, *Mineral Security*, https://geography-revision.co.uk/a-level/human/mineral-security/ (last visited on Dec.15, 2020).
[7] *Id.*
[8] *Id.*
[9] P.A.J.Lusty & A.G.Gunn, *Challenges to global mineral resource security and options for future supply*, 393 GEOLOGICAL SOCIETY, SPECIAL PUBLICATIONS (2015), https://sp.lyellcollection.org/content/393/1/265 (last visited on Dec.20, 2020).
[10] *Id.*
[11] *Id.*

other words, reserves depict only a small portion of the total amount of minerals resources that are available. The key point of difference is 'accessibility' and 'economic feasibility'.

Mineral security comes into existence only when there is mineral scarcity. Mineral scarcity is not so simple as to question 'how much is still remaining?' and 'when will the remaining mineral resources be exhausted?' The actual reality is that only a 0.01-0.001% of earth's mineral resources is extracted.[12] Larger share of earth's mineral resources is not extracted and exploited due to technological and economical restrictions and the requirement of large amounts of energy to do so. It is said that *"while scarcity is a fact of life, mineral scarcity in the absolute sense does not exist."*[13] In the 20th century, mineral scarcity has reduced due to the shrinking mineral reserves, technological improvement and advancement and growth as result of price shifts. Recycling and using substitutes have gained such a place that it to influences the availability and accessibility of minerals. Therefore, the variable in mineral reserves is not a physical one i.e., depleting resources but an economic one. In other words, scarcity of minerals is not draining and exhausting the existing stocks but in considering the quantity of minerals extracted that is profitable under the present conditions of the market. Mineral scarcity cannot be equated with time and quantity. The primary misconception in the mineral scarcity debate is the presumption that mineral reserves are static and not dynamic.[14] The mineral reserves are dynamic because with the advent in newer technologies to extract minerals, more of mineral resources become extractable and profitable mineral reserves. Declaring that the mineral resources are dynamic does not mean that there will not be any mineral scarcity in the future. It only means that it will depend not just on identified and known amount of minerals but also on technology used in mining, demand and production, energy price, mineral price and supply.

4.Mineral Security Policies

Mineral scarcity is generally associated with mineral supply which is primarily considered as a technological or technical issue. Most countries do not have a mineral policy which exclusively concentrates on the issues of mineral scarcity and mineral security save United States of America, China and Japan. In order to understand the various aspects of mineral security, the policies of these countries will be discussed in brief in order to better understand them.

4.1.United States of America

The United States Senator Lisa Murkowski has introduce a Bill named "American Mineral Security Act" which has also been reported by the Senate Committee on Energy and Natural Resource.[15] The aim and objective of the Bill is to reduce its dependence on foreign suppliers of critical minerals.[16] It seeks to facilitate availability and development of mineral production hat is

[12] The Hague centre for Strategic Studies, *Scarcity of Minerals: A strategic security issue*, HCSS REPORT (2009), https://hcss.nl/sites/default/files/files/reports/HCSS_Scarcity_of_Minerals.pdf (last visited on Dec.22, 2020).

[13] *Id.*

[14] *Id.*

[15] Govtrack, *S.1317: American Mineral Security Act*, https://www.govtrack.us/congress/bills/116/s1317 (last visited on Dec.22, 2020).

[16] S.1317, American Mineral Security Act.

environmentally responsible in order to meet the national critical and material requirement. This decision is due to the dependence of America on the import of almost fifty percent of 48 minerals from other mineral rich countries to supply them and especially, its situation with Lithium production.[17] The important features of this Bill includes the resource assessments, codification of the methodology used in labelling minerals as critical and such codification must be updated every three years and the new requirements to conduct geological surveys.[18] The Bill is yet to be passed by the House and Senate and signed by the President.

4.2. China

China is the largest producer of minerals in the world and it produces more than 90% of the world rare earths production. However, due to its high 'burn rate', the Chinese authorities are worried about mineral scarcity.[19] As a result of its need and demand for minerals has led to its attempt to lock up critical minerals like cobalt and rare earths metals from Africa. As a result it has adopted the 'Two Resources, two Markets' policy which encourages the Chinese private mining entities to pursue mining deals throughout the world with the intent to bring in the critical minerals inside China.[20]

4.3. Japan

Mineral security has been a significant concern in Japan as it is dependent on imports for major portion of its metal supply.[21] In 2012, Japan came up with a strategy for resource securement as a move towards combatting mineral scarcity. In this strategy, it designated 30 minerals as strategic minerals and gave two criteria for designating minerals into strategic minerals.[22]

5.Types of Minerals Requiring Mineral Security

Minerals in want of security can be divided into two categories, namely, strategic minerals and critical minerals which are further elaborated below.

5.1.Strategic Minerals

There is no common universal definition for the term 'strategic minerals'. It changes from one nation state to another. What has been considered as strategic in one country would not be the same in another country. In general, strategic minerals is defined as those minerals which are needed in order to meet the industrial and essential civilian requirements along with the military and defence requirements of a nation when it is in national emergency, which are generally inadequate to meet these needs.[23] In India, the term 'strategic minerals' was first mentioned in Defence Science Journal in 1952 based on

[17] David B.Kobray, *United States: The American Mineral Security Act*, Mondaq (Jul.15, 2019), https://www.mondaq.com/unitedstates/mining/818488/the-american-mineral-security-act (last visited on Dec.25, 2020).

[18] *Id.*

[19] Bashar Malkawi, *China's Raw Material Strategy*, Asia & the pacific Policy Society (Jan.24, 2020), https://www.policyforum.net/chinas-raw-materials-strategy/ (last visited on Dec.30, 2020).

[20] *Id.*

[21] Hiroki Hatayama and Kiyotaka Tahara, *Criticality Assessment of Metals for Japan's Resource Strategy*, 56(2) Material Transactions 299 (2015), https://www.jim.or.jp/journal/e/pdf3/56/02/229.pdf (last visited on Dec.17, 2020).

[22] Resource Securement Strategies, Prime Minister of Japan and His Cabinet, 2012, http://www.kantei.go.jp/jp/singi/package/dai15/sankou01.pdf (last visited on Dec.12, 2020).

[23] RAE WESTON, STRATEGIC MATERIALS: A WORLD SURVEY (1984).

Dr.D.N.Wadia's speech made at the 2nd Defence Science Conference on 23rd April 1952. According to the article in Defence Science Journal, *"Strategic Mineral include, besides materials for combat munitions, all mineral raw materials, which are required for industrial sufficiency and preparedness for Defence."*[24] Simply put, strategic minerals are minerals that are very vital in preserving the sovereignty of a nation state.[25] It serves the requirements of industries which the country deems it to be strategic industries. Strategic industry is an industry which is regarded by government as very important for the safety and economy of the country.[26] Generally strategic industries were meant in a narrow sense to be associated with military and defence industries of a nation. With advancement of technology, the term has been widened to include energy industry, nuclear industry, space industry etc. Other industries such as electronics industry, information technology and communication industry products which are highly dependent on critical minerals have utility in varied sectors which include the defence sector.[27]

5.1.1.Minerals to Strategic Minerals to Strategic Mineral Security

Minerals are those substances which are procured by the process of mining, drilling, quarrying, digging, dredging or by any other operation from earth and also includes mineral oils, petroleum and natural gas.[28] However, the Mines and Minerals (Development and Regulation) Act, 1957 defines minerals as 'all minerals except mineral oils'.[29] Generally, the some minerals are identified as critical minerals (also called strategic minerals) based on the 'criticality' of geography of the mineral deposits and supply availability for domestic uses of a particular region or society.[30] The only difference between strategic and critical minerals is that strategic minerals have some kind of relevance to the State's defence or State's strategic architecture while critical minerals refer to the State's overall interest.[31] The question that now arises is how do the minerals get the status of being "strategic"? It all depends on various factors such as the length of supply (short or long supply), cost, controls and utility factor. Other factors based on which the strategic status is conferred are whether the nation state is proficient in technology and has the required financial investments. Also there are mineral-rich and mineral-deficient nation states. Based on the nature of mineral deposits of a particular nation state, the criticality and strategic importance of minerals are being fixed. There are no proper criteria set for conferring the strategic status on minerals. However, Dr.D.N Wadia identifies 23

[24] Dr.D.N.Wadia, *Strategic Minerals of India*, 2(4) DEFENCE SCIENCE JOURNAL 198 (1952).

[25] Suchit Sharma & Himesh Patel, *Strategic Minerals of India: A Review of Minerals Vital to India's Strategic Strength*, https://www.researchgate.net/publication/325089407_REVIEW_PAPER_STRATEGIC_MINERALS_OF_INDIA_STRATEGIC_MINERALS_OF_INDIA_A_Review_of_Minerals_Vital_to_India's_Strategic_Strength (last visited on Jan 21, 2021).

[26] Cambridge Dictionary, *Strategic Industry*, https://dictionary.cambridge.org/dictionary/english/strategic-industry (last visited on Jan. 23, 2021).

[27] Ajay Lele, *India's Need for Strategic Minerals*, 2 (2) NATIONAL SECURITY: VIVEKANANDA INTERNATIONAL FOUNDATION 247 (2019).

[28] The Mines Act (1952), §2(1)(jj).

[29] The Mines and Minerals (Development and Regulation) Act (1957), §3(aa).

[30] Mike Luft, *What are strategic Minerals?*, MINING FEEDS (Aug. 2, 2011) https://www.miningfeeds.com/2011/08/02/critical-mineral-companies (last visited on Jan.23, 2021).

[31] Lele, *Supra* note 27.

minerals and metals as vital for war in Defence Science Journal, namely, "*Aluminium, Antimony, Coal, Chromium, Columbium, Copper, Iron, Lead, Manganese, Molydenum, Mica, Nickel, Petroleum, Platinum, Pctash, Sulphur, Tantalum, Tin, Tungsten, Uranium, Vanadium, Zinc*" of which 10 strategic minerals, namely, were identified as deficient in India.[32] The Planning Commission in 2011 added some more minerals, namely, "*Cobalt, Lithium, Germanium, Gallium Indium, Niobium, Beryllium, Bismuth and Selenium and Rare Earths",* to the list of 23 strategic minerals in its report.[33]

Due to the deficiency in some of the strategic minerals in India, it is essential to adopt strategic mineral security practices such as stockpiling, import of strategic minerals and more and more exploration and excavation of strategic minerals in order to overcome the possibility of strategic minerals scarcity at the time of war or national emergency. Hence, strategic minerals must be secured at all costs.

5.1.2. Role of Strategic Minerals in National Security and Defence Industry

It has been said that the chief determinant of war has been the aim to have dominance over natural resources and that technologies have commanded the war fighting doctrines.[34] Strategic minerals play a substantial in building military industrial complex of a nation for the purpose of national security. Gone are the days where military and defence sector were only linked to guns, tanks, weapons, missiles, submarines, ships and aircrafts as the major contributor supporting the security infrastructure. At present, the notion of security has broadened from defence security to energy and environmental security[35]. It is the advancement in the technology which is crucial to a number of changes in warfare tactics and has led to the enlarged the reliance on strategic minerals.[36] Due to the national interest attached to the strategic minerals, they are often mined at unprofitable costs and stockpiled for future uses in maintaining trade and diplomacy in international market and to preserve the nation's war waging capacity.[37]

Nowadays strategic minerals are used in many industries which have national interest and are associated to the defence industry. One such industry is aerospace industry which is important not just for defence sector but also for electronics, sensor development sector and avionics related industries. Air Defence sector constitutes defence forces such as unmanned aerial vehicles, combat aircrafts, combat helicopters and unmanned aerial attack vehicles etc and are sometimes used as civilian air assets in national emergency.[38] In some cases, strategic minerals provide utility to both citizens and military. One such dual-use technology is the satellite technologies sector consisting of

[32] Wadia, *supra* note 24.

[33] Planning Commission, GOI, *Report of Working Group on Mineral Exploration and Development (other than Coal & Lignite) For the XII Five Year Plan (2012-2017)*, (2011) https://mines.gov.in/writereaddata/UploadFile/Report_of_working_group.pdf. (last visited on Jan.20, 2021).

[34] AJAY LELE AND PARVEEN BHARADWAJ, STRATEGIC MATERIALS: A RESOURCE CHALLENGE FOR INDIA (2014) https://idsa.in/system/files/book/book_strategicmaterail.pdf (last visited on Jan.19, 2021).

[35] *Id.*

[36] *Id.*

[37] Suchit Sharma, *supra* note 25.

[38] *Id.*

rockets, sensors, robotics, satellite and radars among others.[39] The aerospace industry essentially has two parts, namely, (i) manufacture of combat equipment like guns, ammunitions and other weapons, (ii) facilitating military platforms such as ships, submarines, missiles, aircrafts, and tanks.[40] Nuclear industry plays a significant role in nation's security. Due to the national interest attached to the nuclear industry, sources of nuclear energy, namely, radium, lithium, plutonium, uranium and thorium have been conferred the status of strategic minerals.[41]

5.2.Critical Minerals

Minerals are many but there is no standard list of critical minerals. It differs from state to state. What is considered as critical mineral by one state will not be so critical in another state. Similarly, mineral which is considered as critical mineral in one industry will not be so critical in another industry. Critical minerals is understood to be metal and non-metals which are considered crucial for the economic health of emerging economies and world's major economies but are considered to have supply risk due to factors such as trade policy, geological scarcity, geopolitics involved and other like factors.[42] In India, the term 'critical minerals' was mentioned in Defence Science Journal in 1952 based on Dr.D.N.Wadia's speech made at the 2nd Defence Science Conference on 23rd April 1952. According to the article in Defence Science Journal, *"Critical Minerals are minerals of essential uses, the supply and procurement of which in adequate amount in the event of national emergency is uncertain".*[43] Critical minerals and strategic minerals are sometimes used interchangeably. However, there is a slight distinction between the two which is the relevance that the critical minerals has for the overall interests of the state while strategic minerals have relevance for the national security and defence of the state.[44] It is the geographical availability and the availability for domestic supply which determines the critical nature of minerals in any state or country or region.[45] There is high possibility that the threat of supply of critical minerals would cause harm to the economy of the country. In other words, a critical mineral may or may not be a strategic mineral but a strategic mineral will always remain a critical mineral.[46] It essentially means that the term 'critical minerals' is much wider than the term 'strategic mineral'. Such critical minerals are mostly used in the manufacturing industries like in the manufacture of solar panels, smart phones, flat screen television and monitors and various other high-tech technologies and applications.[47]

[39] *Id.*
[40] *Id.*
[41] *Id.*
[42] Australian Government Geoscience Australia, *Critical Minerals*, https://www.ga.gov.au/about/projects/resources/critical-minerals#:~:text=Critical%20minerals%20are%20metals%20and,trade%20policy%20or%20other%20factors (last visited on Feb.12, 2021).
[43] Wadia, *supra* note 32.
[44] Lele, *supra* note 31.
[45] Luft, *supra* note 30.
[46] Virginia T. McLemore, *Geology and Economics of Strategic and critical minerals*, https://geoinfo.nmt.edu/staff/mclemore/teaching/documents/Introduction.pdf (last visited on Feb.15, 2021).
[47] Australian Government, *supra* note 42.

5.2.1.Role of Critical Minerals in Greener Technologies

The change in approach from fossil fuel to green technology and green environment results in the need for production of numerous amounts of solar panels, electric vehicles, wind turbines and batteries. The demand for such green technology and green environment will escalate the demand for minerals which are required to produce them.[48] Some of the critical minerals which are required for greener technologies are rare-earth elements, gallium, lithium, tungsten, chromium, manganese, molybdenum, cobalt, nickel, palladium, platinum etc.[49] Critical minerals like indium, selenium, lithium, silicon, platinum, cobalt, arsenic, nickel, silver, germanium etc are used in energy technologies for producing thermal solar power, electricity, solar photovoltaic, wind power and hybrid and electric vehicles.[50] It is also used in electronics and for lighting purposes. Manganese, cobalt, lithium and graphite are critical minerals which are used in technology involving battery.[51] Minerals such as vanadium, terbium, rhenium, nickel, cobalt, europium etc are used by communications, aerospace and defence sector for utilising it in drones, fighter jets, radios, tanks, shielding and other combat equipment.[52]

The constraints faced by these critical minerals while moving towards greener technologies include inadequate geological availability, dependence on by-products, technical and technological constraints, lack of available economically minable resources, socio-environmental issues restricting long term availability and long term sustainability of mining of critical minerals and inadequate mineral beneficiation. [53]

5.2.2.Critical Mineral Security

Since critical mineral is those minerals that are affected by supply risk, economic risk and its adequate availability during national emergency it must be secured and stockpiled. The word 'critical' by itself gives rise to need for such resource security. The most critical question which arises is which minerals are treated as critical minerals and based on which criteria. In essential, what is the criterion which determines the 'criticality' of minerals. It all depends on various factors such as the length of supply (short or long supply), cost, controls and utility factor. Other factors based on which the 'criticality' is conferred are whether the nation state is proficient in technology and has the required financial investments. Also there are mineral-rich and mineral-deficient nation states. Based on the nature of mineral deposits of a particular nation state, the

[48] Bénédicte Cenki-Tok, *Critical Minerals are vital for renewable energy. We must learn to mine them responsibly*, THE CONVERSATION (Feb.17, 2020) https://theconversation.com/critical-minerals-are-vital-for-renewable-energy-we-must-learn-to-mine-them-responsibly-131547 (last visited on Feb.20, 2021).

[49] Australian Government, *supra* note 47.

[50] Society for Mining, Metallurgy and Exploration, *Critical and Strategic Minerals: Importance to U.S.Economy*, https://www.smenet.org/What-We-Do/Technical-Briefings/Critical-and-Strategic-Minerals-Importance-to-the (last visited on Feb.20, 2021).

[51] *Id.*

[52] *Id.*

[53] Arpita Khanna and Swati Ganeshan, *Critical Non-Fuel Minerals Security: Why India urgently needs to have a policy in place*, TERI POLICY BRIEF (Dec, 2010) https://www.researchgate.net/publication/340967067_Critical_non-fuel_minerals_security_Why_India_urgently_needs_to_have_a_policy_in_place (last visited on Feb.14, 2021).

criticality and strategic importance of minerals are being fixed. The study conducted by Department of Science and Technology (DST) and Council on Energy, Environment and Water (CEEW) in 2016 identifies two criterion for assessing and evaluating 'criticality' of minerals, namely, economic importance and supply risks.[54] The term economic importance here refers to the total score received from the distribution of mineral usage across various sector and industries with different economic importance.[55] The basis for supply risk is the lack of availability of critical minerals. This issue of availability takes five dimensions, namely,[56]

1. Geological availability
2. Technical availability
3. Environmental and social availability
4. Political availability
5. Economic availability

The supply risks faced by critical minerals drive studies and research towards identifying substitutability of critical minerals and recycling potential of such critical minerals. The DT CEEW (2016) study identifies 49 minerals which are at present and in future would be critical by classifying them into three categories, namely, most critical, moderately critical and least critical based on their high or low economic importance and high or low supply risk.[57]

6.Need for Legal Framework in India

India does not have any specific policy or legal framework governing mineral scarcity and mineral security. The National Mineral Policy, 2019 states economic and strategic importance of mineral resources security. It states that the functioning of overall economy and downstream industries is increasingly becoming dependent on the core factor of securing access to affordable, reliable, adequate and sustainable minerals. The policy also declares it top priority to ensure long term mineral security for the country. The government shall align downstream regulations for the exploration and development of minerals which are unavailable domestically in order to ensure sufficient supply of such minerals and to facilitate the acquisition of mineral assets by public and private Indian business entities in other countries.[58] Though mineral security has been provided as one of the objectives in the National Mineral Policy, 2019, no progressive step towards implementing and executing such a goal has been taken by the government.

The five dimensions of availability are[59]

a. Geological availability
b. Technical availability
c. Environmental and social availability
d. Political availability
e. Economic availability

India is mineral rich country producing 84 minerals. Despite its vast expanse mineral

[54] Vaibhav Gupta et al, *Critical Non-Fuel Mineral Resources for India's Manufacturing sector: A Vision for 2030*, DST CEEW (Jul.19, 2016) https://dst.gov.in/sites/default/files/CEEW_0.pdf (last visited on Feb.17, 2021).
[55] *Id.*
[56] National Research Council. *Minerals, Critical Minerals, and the U.S. Economy*. WASHINGTON, DC: THE NATIONAL ACADEMIES PRESS (2008) https://doi.org/10.17226/12034 (last visited on Dec.29, 2020).
[57] Gupta et al, *supra* note 20.
[58] National Mineral Policy, 2019
[59] National Research Council, *supra* note 56.

wealth, only 0.14% constitutes the mining leased area. This is due to the fact that India is blessed with wide untapped mineral wealth which is mostly in remote areas and in small quantities. These amount to identified mineral reserves of India. There are still undiscovered minerals in India which together with known minerals would amount to mineral resources base. In order to take advantage of the mineral abundance, it is essential to have geological availability i.e, to know where the mineral deposits are present and in how much quantities. For this purpose, geological survey has to be conducted. It has also been suggested that more and more exploration activities are to be taken up to locate more minerals in varying depths in order to ensure mineral security in India.[60] With regard to technical availability more and more innovations for mining technologies with causes lesser pollution must be made available and accessible. The third dimension is very much difficult in a country like India where anything and everything related to mining causes protests. The political availability is always present in India as they demand incentive or taxes or royalty and economic development to approve mining. The economic availability dimension is also related to the need for more and more exploration activities in order to located deposits which is economically and profitable and feasible to extract minerals.

Further, India does not have any specific policy or legal framework governing strategic mineral scarcity and strategic mineral security. Though Defence Science Journal states that India is well supplied with strategic minerals and have to only stockpile the 13 deficient strategic minerals, the recent discoveries and additions to the list of strategic minerals has brought with it the need for strategic mineral security. Though the significance of strategic mineral security has been provided as one of the objectives in the National Mineral Policy, 2019, no progressive step towards legislating and regulating it has been taken up by the legislature. However, the Ministry of Mines in India is taking steps to acquire strategic minerals like lithium and cobalt reserves abroad to power the country's initiative to move towards electronic vehicles.[61] The government is also looking into investing and acquiring other strategic minerals in which India is deficient with. In order to improve the investments from abroad, the Ministry of Finance has now allowed 74% foreign direct investment under automatic route in the defence industry subject to scrutiny on the grounds of security of the nation and notified the changes which are required in Foreign Exchange Management Act (Non Debt Instruments) Rules.[62]

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[60] TERI, *Why we need a New Mineral Exploration Policy for National Mineral Security*, Discussion Paper (Jun. 2017), https://www.teriin.org/sites/default/files/2018-05/NMEP_discussion-paper_june18.pdf (last visited on Dec.27, 2020).

[61] Rakhi Mazumdar, *India to acquire reserves of strategic minerals to power the country's move into EVs*, ECONOMIC TIMES INDUSTRY (May.30, 2019) https://economictimes.indiatimes.com/industry/energy/india-to-acquire-reserves-of-strategic-minerals-to-power-the-countrys-move-into-evs/articleshow/69583636.cms?from=mdr (last visited on Jan.24, 2021).

[62] KR Srivats, *FinMin nod for 74% FDI in Defence Sector under automatic route*, THE HINDU BUSINESS LINE (Dec.9, 2020) https://www.thehindubusinessline.com/news/finmin-nod-for-74-fdi-in-defence-sector-under-automatic-route/article33288079.ece (last visited on Jan.24, 2020).

Moreover, India has now made a recent discovery of its first lithium reserve in Karnataka and is exploring four other states in India anticipating more reserves.[63] The discovered lithium deposits amounts to 1,600 ton reserve.[64] This just shows that in India more than strategic mineral scarcity, there is lack of or rather inadequate exploration activities being done. In a country which ranks in the top 5 mineral rich-countries in the world, India has not yet crossed the exploration stage of discovering mineral deposits to go into major excavation as only 0.14% of the discovered mineral deposit land has been leased for the purpose of mining. The Ministry of Mines in its Strategic Plan recommends expansion of resource and resource base by improving procurement of strategic mineral internationally and to increase and improve exploration activities. It also recommends to internationally procure those strategic minerals which have low or no availability in India.[65] So, the remedies available for against strategic mineral scarcity is to import and stockpile strategic minerals that are deficient in India, and to undertake more and more exploration and excavation activities and to efficiently manage and balance deficient and surplus strategic resources. It is also essential to conserve and protect environment simultaneously to the massive mining to be done. All these objectives are already being done by the government. Hence, what is required is to have a comprehensive framework to govern and regulate the field of strategic and critical minerals mining and other activities to regulate the import, stockpiling, accounting, managing and violations.

Furthermore, in 2016, the National Exploration Policy was launched which provided for biennial update by Indian Bureau of Mines in the database for country's requirement strategic and critical mineral on the basis of global and domestic supply and demand and that this data from database would be used for the purpose of prioritizing the exploration of strategic and critical minerals.[66]

The Khanij Bidesh India Limited (KABIL) was formed in 2019 for the purpose of exploration of strategic and critical minerals and other overseas mineral assets with the goal to strengthen the nation's mineral security. In order to explore, identify, acquire, develop and process mine and sell critical, strategic and other overseas minerals for both the purpose securing minerals and commercial use KABIL ensures India's mineral security by way of supply side of energy minerals.[67] It has commenced

[63] *India finds its first ever Lithium reserves in Karnataka's Mandya, Exploration on in four other states*, SWARAJYA (Jan.11, 2021) https://swarajyamag.com/insta/india-finds-its-first-ever-lithium-reserves-in-karnatakas-mandya-exploration-on-in-four-other-states (last visited on Jan.24, 2021).

[64] Sohrab Darabshaw, *India reports finding of 1,600-ton lithium deposit*, MetalMiner (Jan.15, 2021) https://agmetalminer.com/2021/01/15/india-reports-finding-of-1600-ton-lithium-deposit/ (last visited on Jan.24, 2021).

[65] Ministry of Mines, *Unlocking the potential of the Indian Minerals Sector*, (Nov, 2011) https://www.mines.gov.in/writereaddata/UploadFile/Strategy%20Paper%20for%20Ministry%20of%20Mines.pdf (last visited on Jan.22, 2021).

[66] National Mineral Exploration Policy, 2016, Clause 7(iii).

[67] Indian Bureau of Mines, *Indian Mineral Industry and National Economy*, Indian Minerals Yearbook 2019 (Advance Release) https://ibm.gov.in/writereaddata/files/02052021174302IMINE_2019.pdf (last visited on Feb.19, 2021).

engagement with Argentina, Bolivia, Russia, Chile and Australia with federal agencies of respective states and with state-owned and central public enterprises.[68] Recently India has signed a MOU with Argentina, ie., KABIL with M/s. YPF of Argentina and M/s. Jemse of Jujuy Province of Argentina, for the purpose of sharing of information on scientific-technological development and for commercial purposes in the field of Lithium Deposits in response to the geopolitical strategy of China in capturing and acquiring key critical minerals.[69] India has also signed a joint deal with Australia to get lithium supply from Australia to provide for the 'Make in India' programme and to develop space and defence industry.[70]

These are some of the policies and actions taken by India towards securing critical minerals. In spite of such active role in securing critical minerals, there is much more yet to be done for India to be dispensed with worry over critical minerals. India's mineral policy has taken step only towards exploration of strategic and critical minerals. Even with exploration more active participation is required for such activities to cover the vast mineral-rich area in India. India allows 100% foreign investment through automatic route. Though this would encourage foreign investment, there is a risk of exploitation of strategic and critical minerals by foreign enterprises. Hence, it is not advisable to have 100% FDI in mining sector when the country is deficient with regard to certain strategic and critical minerals. In addition to exploration activities, institutional reforms must be made in a step towards organised way of securing critical minerals. Moreover, research and development must be taken up to identify substitutes for critical minerals and securing them and also to dwell into the issue of recyclability and reusing potential of critical minerals. International Interventions such as diplomatic ties and acquisition of mining rights overseas is also another way of securing critical minerals. Though efforts through joint deals and diplomatic ties are being made, more and more action is required in a timely manner. Although, India has some policy recognising the need for mineral security and exploration of critical minerals, three is no specific critical minerals strategy like in USA which has Critical Mineral strategy from 2003. Therefore, law regulating critical and strategic minerals security is very much the need. It shall contain provisions on accounting and auditing of critical minerals, maintenance of database, stockpiling, coordination between different agencies and departments in securing critical minerals.

With the steady increase in population and advent of advanced technologies and comforts, the demand for minerals will definitely rise which may cause scarcity in minerals. India needs to become domestically self-sufficient without depending upon other countries for its minerals. Therefore, it is indeed a necessity for India to come up with

[68] *Id.*

[69] Huma Siddique, *South-South Co-operation: India and Argentina ink a strategic agreement on Lithium*, FINANCIAL EXPRESS (Jul.19, 2020) https://www.financialexpress.com/defence/south-south-co-operation-india-and-argentina-ink-a-strategic-agreement-on-lithium/2022246/ (last visited on Feb.18, 2021).

[70] Reuters, *Australia and India sign joint deal on critical minerals like Lithium*, ECONOMIC TIMES (Jun.5, 2020) https://auto.economictimes.indiatimes.com/news/auto-components/australia-and-india-sign-joint-deal-on-critical-minerals-like-lithium/76208707 (last visited on Feb.17, 2021).

progressive action or strategy or legislation which would govern mineral scarcity and security by providing for exploration, assessment, classification of minerals into strategic and critical minerals.

7.Conclusion

To conclude mineral scarcity and mineral security is something which needs emergent attention from the policy makers and legislators. The debate of mineral scarcity is just in the beginning stage compared to the debates of water and energy scarcity. India must also take measure to further provide for mineral security plans and implement it soon. Moreover, India must undertake more exploration activities to overcome mineral scarcity as large portion of India's mineral resources have not yet been explored and discovered. To quote the Tamil poet Avvaiyar, "*கற்றது கைமண் அளவு, கல்லாதது உலகளவு*", which means "what you know is as little as handful of soil, and what you don't know is large as the world". This quote is very much apt when it comes to the extent of mineral resources which is not yet been discovered.

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