BOOK REVIEW


The volume under review is brought out by SAAEG to commemorate the yeomen services of late BPR to the development and advancement of geology and mineral resources of India and their sustainable exploration and development. It contains twenty (20) contributions covering diverse fields such as ferrous and non-ferrous metals, uranium, UNFC of minerals resources, the NMMDR Act 1957 and its revision in 2014 besides land acquisition, rehabilitation and resettlement of stake holders.

It begins with a tribute to B.P. Radhakrishna by his close associates M.S. Rao and R. Vaidyanadan which chronicles BPR’s contributions to the Mysore Geology Department, and the founding, nourishing and establishing the Geological Society of India as a world class publication centre besides the numerous leads and achievements in the development of mineral and water resources, especially gold in Karnataka State. His editorials covering diverse fields including eminent personalities of history and science reprinted in three volumes by the Society as ‘Random Harvest’ (2003, 2005, 2013) epitomizes his interests and concerns for the growth and development of India and the Indian heritage. BPR never took cognizance of the numerous awards and recognitions that were bestowed on him and was a true ‘Karma Yogi’ in the spirit of Bhagavath Gita.

The lead article by Sikka and others (pp.1-72) provide a very incisive and exhaustive historical review (almost 25% of the issue) of the mineral exploration in India, tracing its past glory, present crisis and future scope and compares its status with the BRIC countries. This informative account includes craton-wise resources, their exploration status and future potential of major mineral resources besides the current constraints to develop the industry due to the self-defeating provisions of the MMDR and forest clearance policies. Sikka and others provide case histories of obtaining RP and PL in Chhattisgarh and Jharkhand and lists the mineral development hindrances in India and compares them with Canada. Unless our government system changes with positive attitude, faster growth in mineral industry will continue to perform poorly in India, the authors opine. Vasudev (pp.73-82) gives an account of the global best practices in mineral exploration and the need for India to adopt such practices so that India’s mineral development practices are sound, robust, sustainable and competitive. Murthy and Mukhopadhyay (pp.83-98) emphasize the importance of structural analysis of iron ore deposits from peninsular India with numerous case studies and stress the need to resort to magnetic and gravity methods to minimize the prohibitive cost from diamond drilling banded hematite jaspers and banded magnetite ores. Pichamuthu and Sawkar (pp.99-104) discuss the National Mineral Policy 2008 and its effect on FDI, infrastructure development, mineral exploration and the role of private sector in mining especially with reference to Karnataka. They also discuss briefly the effects of illegal mining and export of iron ores with the ‘connivance of politico-bureaucratic nexus along with police and forest officials’. Parakh (pp.105-110) reviews the challenges faced by the mining industry and analyses some of the important provisions of the National Mineral Policy 2008 and the MMDR 2011 as a sequel to the Hoda committee recommendations to improve the mineral industry. These include transparency in grant of mineral concessions, conservation of mineral resources, social concerns, environmental issues and administrative and financial issues. According to Parakh, land acquisition, environmental and forest clearances under the Forest Conservation Act 1980 and Environmental Protection Act 1986 need to be addressed convincingly for the sustainable development of the mineral industry.

Mohanty (pp.111-116) reviews the current status of iron ore mining industry in India and the challenges it faces due to high-alumina ores, illegal mining and legal interventions by the Justice Sha Committee. The National Steel Policy of 2012 envisages a production of 275 million tonnes of steel by 2025-26 which in turn would require iron ore production to increase to 400 million tonnes, almost double the current production level. Legislative constraints, environmental issues, community restrictions, anti-developmental attitudes of some NGOs, delay in decision making at all levels of the government and law and order situations in mining areas are all the challenges which the iron ore mining industry need to circumvent, so as to achieve the target of 400 MT production of iron ores by 2025. Gupta (pp.117-120) briefly reviews the status of iron ore reserves of India and opines that both hematite and magnetite ores together contribute to a reserve of 26.526 billion tonnes as on April 2010. In spite of such huge reserves, due to illegal mining and consequent ban on production, India has slipped from its iron ore production of about 220 MT with some 120 Mt of exports and currently imports iron ore to sustain its steel mills.

Murthy and Rai (pp.121-134) advocate a re-assessment of iron ores of India and also a visit at India’s export policy on iron ores. According to them, the country’s iron ore reserve estimates of different ore types had been varying due to different approaches of estimation. Considering India’s own projection of steel production and its iron ore requirements, exports at c. 100-120 MT cannot be sustained. They suggest conservation of indigenous iron ore reserves for future use. Krishnamurthy (pp.135-152) provides an overview of AMD’s uranium exploration strategies and resource base of India, both past and current. Beginning with
a moderate resource base of some 60,000t of low grade (< 0.1\% ) U\textsubscript{3}O\textsubscript{8}, mainly from structure-controlled vein-type deposits of Singhbhum in the early 1970s India’s uranium resources have almost tripled in the last four decades using state-of-the-art approaches in exploration with quantum jumps in drilling inputs using both in-house and outsource options. The most noteworthy additions include the cluster of large, low grade, strata-bound dolostone hosted uranium deposits at Tummalapalle and others in the Cuddapah basin, Andhra Pradesh besides other types from different parts of India. Rao and Murthy (pp.155-158) provide an account of the need to beneficiate the secondary enriched hematitic ores that form the bulk of raw material for the steel industry. Such ores abound in the Bonai range, Dhalli-Rajarah iron ore belt, Rowghat belt, Sandur schist belt and Goa. ROM ore is crushed and four types of products are generated, namely – 40 mm to + 10 mm (blast furnace feed), - 10 to +10 mm (sinter feed). Ores of – 1 mm is termed as low grade fines and is further beneficiated using the environmental friendly, state-of-the-art, Brahmani River Pellet Flow Sheet (BRPL) based on Allmineral, Germany and Brazil technology and maximizes mineral conservation using only gravity and high-intensity magnetic methods. The slurry is transported by underground pipelines to the steel mill and the waste tailings are kept in tailing dams. Bhakthavatsalam (pp.159-170) emphasizes the need to adopt the ESSAR Steel practice of beneficiation of the iron ore fines (which has increased up to 70\% due to decreasing grades) through agglomeration. ESSAR procedures include beneficiation of iron ore fines at the Kirandul mine head and transporting the slurry through a 267 km pipeline, 2nd longest in the world, to Vizag port where they are pelletized with different grades and sent to different parts of the world, including India, for use in the steel industry. Santa Ram (pp.171-178) describe the application of geotechnics in developing the Cu-Pb-Zn mine at Askot deposit using the cut and fill mining method with paste-filling technology, located in the environmentally fragile Himalayan region of Uttarakhand. 

Rai (pp.179-186) provides a review of the current status, constraints and the way forward for adopting the UNFC for mineral resource classification in India. The main challenge to resolve has been one of classification, namely ‘proven’ category of Indian reserves of mineral commodities become ‘resources’ in the UNFC scheme. Ramam (pp.187-192) provides a review of the Indian bauxite resources placed at 3 billion tonnes, about a fifth of world resources, hosted mainly (70\%) in Odisha and Andhra Pradesh in the Eastern Ghats. Terrain –hostility and environmental concerns besides tribal stake-holders remains the stumbling block to realize the full potential of this resource. Murthy and Chatterjee (pp.193-214) provide an exhaustive account of estimating ore reserves of Precambrian hematitic ores from ‘bench plans’ in open cast mines for both simple and compound ores with examples from the Donimalai and Bailadila iron ore deposits. Basu (pp.215-240) discusses in detail the ‘Geodynamic model for Precambrian crustal evolution of central India’ based on the emplacement of Malanjkhand granite that hosts the world class porphyry Cu-Mo deposit. Nageshrwa Rao and others (pp.241-250) provide an account of the geochemistry and genesis of manganese ore deposits of Andhra Pradesh hosted in the khondalites of Vizianagaram district of Andhra Pradesh. Presence of high silica and dominance of CaO over MgO, K\textsubscript{2}O over Na\textsubscript{2}O, Ni over Co and Zn and Cu over Pb are the geochemical characters and indicate a continental weathering–related residual origin for these deposits. Mishra (pp.251-256) describes the special socio-administrative laws that prevail in the state of Meghalaya and the constrains thereof for the mining industry. Vyas (pp.257-262) discusses briefly the important aspects of land acquisition, rehabilitation and resettlement draft bill 2011 with reference to the National Mineral Policy (for non-fuel and non-coal minerals) 2008. A case study of successful rehabilitation of villagers due to micro-watershed management at Belawada village in Hoshangabad district is provided. It also briefly states the benefits to farmers and the industries that ensue from the 2014 Ordinance of land acquisition by Govt. of India. 

SAAEG and the editors must be complimented for the onerous task of assembling such important contributions in BPR’s honour. This special issue provides a wide-array of topics on sustainable mineral-resource development in India. It will be a good source book for planners, researchers, prospectors, exploration geologists and mine planners for taking forward India’s mineral industry in a sustainable fashion.

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