Indian Minerals Yearbook 2021

(Part- I)

60th Edition

STATE REVIEWS (Bihar)

(ADVANCE RELEASE)

GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES

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BIHAR

Mineral Resources

Bihar is the principal holder of country's pyrite resources and possesses 94% of resources. The important mineral occurrences in Bihar are **coal** in Rajmahal coalfield; **limestone** in Kaimur (Bhabhua), Monghyr & Rohtas districts; **mica** in Nawada district; **quartz/silica sand** in Bhagalpur, Jamui, Monghyr & Nalanda districts; **quartzite** in Lakhisarai, Monghyr & Nalanda districts; and **talc/soapstone/steatite** in Monghyr district. Besides, occurrences of **bauxite** in Monghyr & Rohtas districts; **china clay** in Bhagalpur & Monghyr districts; **felspar** in Gaya, Jamui & Monghyr districts; **fireclay** in Bhagalpur & Purnea districts; **gold** in Jamui district; **granite** in Bhagalpur, Gaya, Jahanabad & Jamui districts; **iron ore (haematite)** in Bhagalpur district; **iron ore (magnetite)** in Gaya & Jamui districts; **lead-zinc** in Banka & Rohtas districts; and **pyrites** in Rohtas district are reported (Tables - 1 & 2).

Exploration & Development

GSI carried out exploration for coal, REE, limestone and chromite in Bhagalpur, Kaimur, Rohtas and Gaya districts. Details of exploration activities conducted by GSI during 2020-21 are furnished in Table-3.

Production

Limestone is the only major mineral produced in Bihar. The value of minor mineral's production is estimated as ₹. 4272 crores for the year 2020-21. There was a single reporting mine and that of limestone in Bihar in 2020-21.

Table – 1 : Reserves/Resources of Coal as on 1.4.2021 : Bihar

(In million tonnes)

Coalfield	Proved	Indicated	Inferred	Total
Total/Rajmahal	310	3143	11	3464

Source: *Coal Directory of India, 2020-21*

Table – 2 : Reserves/Resources of Mineral as on 1.4.2020 : Bihar

Mineral	Unit	Reserves				Remaining resources								Total resources (A+B)
		Proved STD111	Probable		Total (A)	Feasibility STD211	Pre-feasibility		Measured STD331	Indicated STD332	Inferred STD333	Reconnaissance STD334	Total (B)	
			STD121	STD122			STD221	STD222						
Bauxite	'000 tonnes	-	-	-	-	-	-	-	-	-	4114	-	4114	4114
Gold														
Ore	tonne	-	-	-	-	-	-	-	-	-	128884860	94000000	222884860	222884860
Metal	tonne	-	-	-	-	-	-	-	-	-	21.6	16	37.6	37.6
Iron Ore (Heamatite)	'000 tonnes	-	-	-	-	-	-	-	-	-	55	-	55	55
Iron Ore (Magnetite)	'000 tonnes	-	-	-	-	-	-	-	-	48850	589	-	49439	49439
Lead-Zinc Ore														
Ore	'000 tonnes	-	-	-	-	-	-	-	-	435	11000	-	11435	11435
Lead metal	'000 tonnes	-	-	-	-	-	-	-	-	-	24	-	24	24
Zinc metal	'000 tonnes	-	-	-	-	-	-	-	-	14.75	24	-	38.75	38.75
Limestone	'000 tonnes	11807	-	-	11807	3388	2558	1675	67926	135740	772343	10558	994188	1005995
Potash	Million tonnes	-	-	-	-	-	-	-	-	-	230	-	230	230
Pyrite	'000 tonnes	-	-	-	-	13462	-	9680	-	51419	1500000	-	1574561	1574561
Rare-Earth Elements	tonne	-	-	-	-	-	-	-	-	-	1459	-	1459	1459

Figures rounded off

Table – 3 : Details of Exploration Activities in Bihar, 2020-21

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq. km)	No. of boreholes	Meterage		
GSI							
Gold							
Gaya	Ajaynagar	-	1	2	500	173	Preliminary exploration for gold around Ajaynagar, Gaya District, Bihar (G3): Exploration for gold in Ajaynagar block was taken up by means of DM of 1 sq. km, drilling of 500m, pitting & trenching of 110 cu.m with collection of 110 PTS, 63 BRS, petrological and petro-geochemical samples. The block comprised metabasalt, meta-acid volcanic (rhyolite), banded carbonate-chert, meta-tuff and quartz veins forming linear ridges trending NE-SW. Surface manifestations of mineralisation were observed in the form of wall-rock alterations like silicification and/or carbonatisation of metabasalt, shearing and occurrence of sulphides within metabasalt, sheared rhyolite and quartz veins, such as, pyrite, pyrrhotite and chalcopyrite. Analytical results of BRS and PTS indicates Au values ranging from 0.06 ppm to 1.27 ppm in quartz vein (n=50) and 0.06 ppm to 0.21 ppm in silicified metabasalt (n=60). Analytical results of 15 BRS yielded Au values ranging from 0.49 ppm to 1.56 ppm in silicified metabasalt (n=6) and from 0.06 ppm to 0.49 ppm in quartz vein (n=9). Sulphide bearing mineralised zone were intersected from 51m to 57 m, 70.50 m to 75.4m in Borehole BRAJ-1 and 18m to 22.05m, 27m to 46.5m in Borehole BRAJ-2.
Champaran	Siwalik Himalayas	-	100	-	-	57	Reconnaissance survey for placer gold in the foothills of Siwalik Himalayas, West Champaran District, Bihar (G4): Investigation for placer gold was carried out by LSM of 100 sq. km area, in the Siwalik Himalayas of Don Valley, West Champaran district, Bihar, along with collection of different geomedia samples. Panning of samples showed presence of fine gold flakes/ grains (5-200 nos.) in the pan concentrates of stream sediment, colluvial, and pit samples. Analytical results of 35 stream sediment samples received shows Ag value ranging from <0.01 ppm to 0.26 ppm; 19 nos. of pit samples showing Ag value ranging from <0.01 ppm to 0.24 ppm; 3 colluvial samples showed Ag value <0.01 ppm. Analytical results of 4 stream sediment samples and 2 pit samples received showed Scandium (Sc) value ranging from <4 mg/kg to 6 mg/kg and 5-6

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Table – 3 (contd)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq. km)	No. of boreholes	Meterage		
							mg/kg respectively and Yttrium (Y) value ranging from 208 mg/kg to 1,015 mg/kg and 90-125 mg/kg respectively. Heavy mineral study of the pan concentrates showed presence of garnet, sillimanite, kyanite, magnetite, ilmenite, rutile, tourmaline, zircon, and monazite.
REE & RM							
Munger	Barhulia Block	1:12500	100	-	-	-	Reconnaissance survey for REE and associated minerals in Barhulia Block, Munger District, Bihar (G4): Study was carried out at an area of 100 sq. km was covered by LSM (1:12500 scale), in Barhulia block along with pitting/trenching and collection of BRS, PCS, colluvial, alluvial, stream sediment samples and PS, XRD, SEM & EPMA studies. The arenaceous as well as argillaceous metasediment of Munger Group were exposed in the area along with laterite, hard compact, sand, silt and clay of Jamui Formation and lateritised sand and clay of Lalgarh Formation. The arenaceous metasediment comprised massive quartzite, gritty quartzite and foliated quartz while argillaceous metasediment comprised mainly slates and phyllites. The lithounits of Munger Group were also occasionally intruded by hard compact white quartz veins. The analytical result of bedrock samples received showed tREE values from 63.86-486.78 ppm.
Banka	Nari Block	1:2000	2	-	90	291	Preliminary exploration for REE and Rare Metals in Nari Block, Banka District, Bihar (G3): The exploration work included detailed geological mapping (1:2000 scale) of 2 sq. km. area, pitting & trenching of 50 cu.m and auger drilling of 90 m with collection of 51 pit & trench samples, 90 auger soil samples and 150 bedrock samples. The block form a part of Chhotanagpur Gneissic Complex and was represented by migmatite gneiss, boudinaged migmatite gneiss, granite gneiss, pegmatite and laterite. Bulk samples were collected from 05 pits (1 cu. m. each) and the panned heavies were sent for chemical analysis. Auger drilling on 200 m x 200 m grid pattern was carried out over the insitu soil profile. Available analytical data (15 nos.) indicated higher concentration of REE in bedrock samples collected from boudinaged migmatite gneiss and C-horizon developed over it, with values ranging from 410 to 889 ppm.

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Table – 3 (contd)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq. km)	No. of boreholes	Meterage		
Lithium							
Jamui	Harni–Kalwadih-Charkapthal area	-	-	-	-	320	Reconnaissance survey for lithium and associated strategic minerals (REE, Rare Metals) in and around Harni–Kalwadih–Charkapthal area, Jamui District, Bihar (G4): The area falls in eastern part of the Chhotanagpur Gneissic Complex and comprised calc granulite, amphibolite and tremolite actinolite schist of Unclassified Metamorphics; Migmatitic granite gneiss of Chhotanagpur Gneiss; mica schist and quartzite of Bihar Mica Belt; and Younger granite, quartz vein, pegmatite & dolerite of Later Intrusives. A discontinuous body of pegmatite (3.5 km strike) was delineated in Janakpura, Khalari, Aharadih and north of Sakdari area in contact zone of mica schist and younger granite.The pegmatite was mined by locals up to depth of 20–30ft in the form of pits and trenches. Columbite pebble up to 2 cm diameter was observed in stream sediment in Village Jathar. A total of 100 BRS, 100 PTS, 80 stream sediment samples and 40 nos. panned concentrate were submitted for analysis.
Jamui	Parmania-Tetariya Area	-	-	-	-	-	Reconnaissance Survey for Lithium and associated Strategic Minerals (REE, Rare Metals) in and around Parmania–Tetariya Area, Jamui District, Bihar (G4): The area lies in the southern margin of Bihar Mica Belt within Chhotanagpur Gneissic Complex (CGC). The lithounits in the area fall under three different domains, which were Unclassified Metamorphic Group, Chhotanagpur Gneissic Complex and Bihar Mica Belt. The Unclassified Metamorphic Group include amphibolite, granulite and these occurred in the form of enclaves within gneissic complex. Migmatite gneiss, amphibole-bearing gneiss, porphyritic granite gneiss and granite gneiss belong to Chhotanagpur Gneissic Complex and garnet mica schist, mica schist and quartzite belonged to Bihar Mica Belt. Thirty pegmatite bodies were mapped and more than 10 pegmatite bodies were reported for the first time. Pegmatite bodies ranged in size from a few meters to 370 m in length and 15m to 65m in width. Fluorite-bearing zoned pegmatite was mapped near Village Ashurya with 400 m strike length and 40 to 70 m width intruded into sheared granitic

(contd)

Table – 3 (concld)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq. km)	No. of boreholes	Meterage		
							gneiss. The XRF analysis of the BRS showed maximum concentration of TiO_2 is 0.79%, Ga 32 ppm, Nb 54 ppm, Sc 14 ppm, Sr 135 ppm, Y 31 ppm) and Zr 324 ppm. In stream sediment samples, maximum concentration of TiO_2 was 1.10%, Ga 22 ppm, Nb 23 ppm, Sc 17 ppm, Sr 85 ppm, Y 35 ppm and Zr 362 ppm.

Table – 4 : Mineral Production in Bihar, 2018-19 to 2020-21
(Excluding Atomic Minerals)

(Value in ₹'000)

Mineral	Unit	2018-19			2019-20			2020-21 (P)		
		No. of mines	Quantity	Value	No. of mines	Quantity	Value	No. of mines	Quantity	Value
All Minerals		**1**		**42858862**	**1**		**42983377**	**1**		**42912978**
Limestone	'000t	1	240	138931	1	556	263446	1	1000	193047
Sulphur[#]	t	-	7050	-	-	6843	-	-	7135	-
Minor Minerals[@]		-	-	42719931	-	-	42719931	-	-	42719931

Note : *The number of mines excludes Minor minerals.*
 # Recovered as by-product from oil refinery.
@ Figures for earlier years have been repeated as estimates because of non-receipt of data.

Mineral-based Industry

The present status of each mineral-based industry is not readily available. However, the principal mineral-based industries in the Organised Sector in the State with their total installed capacities are furnished in Table - 5.

Table – 5 : Principal Mineral-based Industries

Industry/plant	Capacity ('000 tpy)
Cement	
Eco cement Durgawati Bhabhua	1000
Kalyanpur Cements Ltd, Banjari, Dist. Rohtas.	1000
Kanodia Cement Bhabhua Bangar Cement	1200
Shree Cement Ltd, Jasoia Aurangabad Grinding Unit, Aurangabad.	3600
Shree Cement Ltd, New Bihar Cement plant, Aurangabad	2000
UltraTech Cement plant, Patliputra	1900
Petroleum Refinery	
Indian Oil Corporation, Barauni.	6000

Note: *Data, for fertilizer industries, is taken from Indian Fertilizer Scenario, FAI Statistics,.*