

STATE REVIEWS



Indian Minerals Yearbook 2012

(Part- I)

51st Edition

**STATE REVIEWS
(Jharkhand)**

(FINAL RELEASE)

**GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES**

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JHARKHAND

Mineral Resources

Jharkhand is one of the leading mineral producing States. It is one of the leading producers of coal, kyanite, gold, silver, bauxite and felspar. Uranium ore is mined and processed by Uranium Corporation of India Ltd (UCIL) for use as fuel in the country's nuclear power reactors through four underground mines, one opencast mine, two processing plants and a by-product recovery plant, all in East Singhbhum district of the State. Jharkhand accounts for about 36% rock phosphate, 28% coal, 26% iron ore (hematite), 30% apatite, 22% andalusite, 18% copper ore and 5% silver ore resources of the country.

Important minerals that occur in the State are **bauxite** in Dumka, Gumla, Latehar, Lohardaga and Palamau districts; **china clay** in Dumka, Hazaribagh, Lohardaga, East & West Singhbhum, Sahebganj and Ranchi districts; **coal** in Bokaro, Deoghar, Dhanbad, Giridih, Godda, Hazaribagh, Palamau, Pakur and Ranchi districts; **copper** in Hazaribagh and East Singhbhum districts; **dolomite** in Garhwa and Palamau districts; **felspar** in Deoghar, Dhanbad, Dumka, Giridih, Hazaribagh, Jamtara, Koderma, Latehar, Palamau and Ranchi districts; **fireclay** in Dhanbad, Dumka, Giridih, Godda, Hazaribagh, Latehar, Palamau, Ranchi and West Singhbhum districts; **gold** in East Singhbhum district; **graphite** in Palamau district; **iron ore** (hematite) in West Singhbhum district; **iron ore** (magnetite) in Gumla, Hazaribagh, Latehar,

Palamau and East Singhbhum districts; **kyanite** in Saraikala-Kharsawan and West Singhbhum districts; **limestone** in Bokaro, Dhanbad, Garhwa, Giridih, Hazaribagh, Palamau, Ranchi, East & West Singhbhum districts; **manganese ore** in East & West Singhbhum districts; **mica** in Giridih and Koderma districts; **ochre** in West Singhbhum district; **dunite/pyroxenite** in East Singhbhum district; **quartz/silica sand** in Deoghar, Dhanbad, Dumka, Giridih, Godda, Hazaribagh, Jamtara, Koderma, Latehar, Palamau, Ranchi, Sahebganj, Saraikala-Kharsawan and West Singhbhum districts; and **quartzite** in East & West Singhbhum districts.

Other minerals that occur in the State are **andalusite** and **rock phosphate** in Palamau district; **apatite, chromite, cobalt, nickel, gold** and **silver** in East Singhbhum district; **asbestos** in East & West Singhbhum districts; **barytes** in Palamau and East Singhbhum districts; **bentonite** in Pakur and Sahebganj districts; **garnet** in Hazaribagh district; **granite** in Deogarh, Dhanbad, Dumka, Giridih, Godda, Gumla, Hazaribagh, Koderma, Lohardaga, Palamau, Ranchi and East Singhbhum districts; **sillimanite** in Hazaribagh district; **talc/steatite/soapstone** in Giridih, Kodarma, Palamau, East & West Singhbhum districts; **titanium minerals** in Ranchi and East Singhbhum districts; and **vermiculite** in Giridih and Hazaribagh districts (Table - 1). The reserve/resources of coal and the various coalfields located in Jharkhand are given in Table - 2.

Table – 1 : Reserves/Resources of Minerals as on 1.4.2010 : Jharkhand

Mineral	Unit	Reserves				Remaining resources				Total resources (A+B)	
		Proved STD 111	Probable		Total (A)	Measured STD331	Indicated STD332	Inferred STD333	Reconnaissance STD334		Total (B)
			STD121	STD122							
		Feasibility STD211		Pre-feasibility							
				STD221	STD222						
Andalusite	'000 tonnes	-	-	-	-	-	-	4000	-	4000	4000
Apatite	tonne	-	-	-	-	-	2110000	3540000	-	7270000	7270000
Asbestos	tonne	-	-	-	-	3871	18309	124059	-	154893	154893
Barytes	tonne	-	-	-	-	-	-	35900	-	35900	35900
Bauxite	'000 tonnes	16023	7290	12863	31657	11341	5531	54447	536	110148	146323
Bentonite	tonne	-	-	609406	609406	3067	-	367527	-	370594	980000
China clay	'000 tonnes	8554	324	8731	17610	2031	1565	149957	18019	181081	
Chromite	'000 tonnes	-	-	-	-	-	-	623	-	736	736
Cobalt	million tonnes	-	-	-	-	-	-	2	7	9	9
Copper Ore	'000 tonnes	16540	49127	21151	86818	11720	17990	74857	64488	201307	288126
Metal	'000 tonnes	163.03	448.83	196.91	808.78	202.76	194.30	869.43	606.35	2285.49	3094.27
Dolomite	'000 tonnes	22700	-	-	22700	-	350	-	54	18330	41434
Dunite	'000 tonnes	373	-	570	943	130	-	607	780	6121	17358
Felspar	tonne	5675	-	274971	280646	-	40766	32510	120388	881045	1634788
Fireclay	'000 tonnes	828	-	775	1602	12	479	-	249	64151	66619
Garnet	tonne	-	58	234	292	-	-	-	-	21768	110071
Gold											
Ore (primary)	tonne	38059	-	-	38059	-	-	5164277	2949012	-	8113289
Metal (primary)	tonne	0.13	-	-	0.13	-	-	-	3.73	8.87	12.73
Granite											
(Dim. stone)	'000 cu m	-	-	-	-	-	-	651300	8197110	26930	8875340
Graphite	tonne	382036	72670	645823	1100529	47073	236783	2750	1855192	24350	11810340
Iron ore											
(hematite)	'000 tonnes	1840594	391052	72496	2304142	89372	14339	45282	199455	1000000	2292478
Iron ore (magnetite)	'000 tonnes	-	361	551	912	-	5	411	3948	32	6879
Kyanite	tonne	267222	524485	402325	1194032	-	-	-	1754900	3048500	5708533
Limestone	'000 tonnes	244259	4105	54713	203077	894	1630	1956	9460	1503	400961

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Table - 1 (Concl.)

Mineral	Unit	Reserves				Remaining resources					Total resources (A+B)			
		Proved STD 111	Probable		Total (A)	Feasibility STD211	Pre-feasibility		Measured STD331	Indicated STD332		Inferred STD333	Reconnaissance STD334	Total (B)
			STD121	STD122			STD221	STD222						
Manganese ore	'000 tonnes	1250	620	1586	3456	396	211	3053	-	-	6594	-	10254	13709
Mica	kg	-	-	-	-	-	-	-	-	-	1494430	170700	1665130	1665130
Nickel ore	million tonnes	-	-	-	-	-	-	-	2	7	-	-	9	9
Ochre	tonne	63695	-	4361	68056	-	-	-	-	-	-	-	147039	215095
Phosphorite/ Rock phosphate	tonne	858	-	328	1185	-	-	-	-	107370000	-	-	107370000	107370000
Quartz-silica sand.	'000 tonnes	563	40	8671	9238	2	989	3299	518	758	135745	6	140352	154766
Quartzite	'000 tonnes	1079	-	174	1253	-	-	-	197	275	38934	-	39405	40230
Sillimanite	tonne	-	-	-	-	-	-	-	-	-	83000	-	83000	83000
Silver														
Ore	tonne	-	-	-	-	-	-	-	-	-	23840000	-	23840000	23840000
Metal	tonne	-	-	-	-	-	-	-	-	-	5.22	-	5.22	5.22
Talc-steatite- soapstone	'000 tonnes	-	-	-	31	1	-	73	2	4	250	-	311	342
Titanium minerals	tonne	-	-	-	-	-	-	-	-	3630000	-	-	3630000	3630000
Vermiculite	tonne	-	-	-	-	-	-	-	-	-	30048	-	30048	30048

Figures rounded off.
Resources of ilmenite, rutile, leucoxene and zircon, as per Department of Atomic Energy, are provided in the respective Mineral Reviews.

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Table – 2 : Reserves/Resources of Coal as on 1.4.2012 : Jharkhand

(In million tonnes)

Coalfield	Proved	Indicated	Inferred	Total
Total	40163.22	33609.29	6583.69	80356.20
Raniganj	1538.19	466.56	31.55	2036.30
Jharia	15077.57	4352.49	-	19430.06
East Bokaro	3351.87	3929.57	863.32	8144.76
West Bokaro	3629.03	1349.04	34.42	5012.49
Ramgarh	710.59	495.30	58.05	1263.94
North Karanpura	9499.42	6914.61	1864.96	18278.99
South Karanpura	2748.09	2048.56	1480.22	6276.87
Aurangabad	352.05	2141.65	503.41	2997.11
Hutar	190.79	26.55	32.48	249.82
Daltongunj	83.86	60.10	-	143.96
Deogarh	326.24	73.60	-	399.84
Rajmahal	2655.52	11751.26	1715.28	16122.06

Source: Coal Directory of India, 2011-12.

Exploration & Development

The details of exploration activities conducted by various agencies during 2011-12 are furnished in Table - 3.

Production

The value of mineral production in Jharkhand during 2011-12 at ₹ 16,147 crore decreased by 21% over the previous year mainly due to the decrease in average value of coal for the State and also decrease in the production of iron ore. Claiming the fifth position in the country the State accounted for 6% of total value of mineral production during 2011-12. Coal, the principal mineral produced in the State contributed 87% of the total value of mineral production in the State followed by iron ore 12%. Jharkhand was the leading producer of kyanite, pyroxenite and graphite (r.o.m); second largest producer of quartzite, coal and fireclay and third largest producer of copper ore & concentrates and quartz. The other principal

minerals produced in the State were bauxite, dolomite, kaolin, felspar and manganese ore. Among the important minerals, production of fireclay increased by about double and that of quartzite by 80%, graphite (r.o.m.) by 59%, kaoline by 52%, quartz by 41%, felspar by 18%, silica sand by 15%, pyroxenite 14%, kynite 13%, limestone by 8% and copper concentrates by 7 percent. However, during 2011-12 the output of manganese ore declined by 59%, dolomite by 56% and iron ore by 15% as compared with the previous year (Table-4).

The production value of minor minerals was estimated at ₹ 40 crore for the year 2011-12.

The number of reporting mines in Jharkhand during 2011-12 was 289 as against 297 in the previous year.

The index of mineral production in Jharkhand (base 2004-05=100) was 138.96 in 2011-12 as compared to 139.52 in the previous year.

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Table – 3 : Details of Exploration Activities in Jharkhand, 2011-12

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Metreage		
GSI Gold Ranchi	Sindauri- Ghanshyampur	-	-	-	-	-	Prospecting stage investigation (G-3) was carried out for gold to test the eastward continuation of already explored Sindauri East Block. Ore microscopic studies indicated the presence of gold with arsenopyrite. Analysis of core samples of BH-7 confirms presence of seven gold mineralisation zones associated with sulphide mineralisation between the depths of 40.45m and 166 m. The cumulative width and average grade of these zones are 11 m and 1.87 gm/ton respectively. The part analytical results of the core samples of BH-8 indicate extension of gold mineralisation further eastward. The work will be continued in the next FS 2012-13.
-do- Singbhum	Rudial Largadih Baldih block	-	-	-	-	-	Prospecting stage investigation (G-3) was carried out for gold to assess the gold potentiality of the block. The rock types are mainly carbonaceous phyllite, siliceous tuff, mafic/ultramafic volcanic rocks, subordinate chert band/acid volcanics and brecciated quartzite. Investigation carried out during FS 1994-98 established the occurrence of primary gold mineralisation hosted in sheared quartz reefs, which is characterised by profuse silicification, ferruginisation and carbonatisation. It extends for about 2 km in this block. Despite having good mineralised zones, due to poor core recovery in most of the boreholes the project was closed. In course of the present investigation very encouraging gold value (more than 1 ppm) has been recorded over trenches and channels put across the brecciated quartzite rock. Gold is associated with sulphide mineralisation represented by pyrite, chalcopyrite and arsenopyrite. Due to sheared and brecciated nature of the rocks only two boreholes could be completed (BH-1, BH-3) and one abandoned (BH-2). Chemical analysis of the core samples of BH-1 and parts of BH-2 and BH-3 so far available establishes a 4 m thick mineralised zone in brecciated quartzite unit between depths 78 m and 82 m. It contains gold value ranging from 50 ppb to more than 1 ppm. The work will be continued in Rudiya block in the FS 2012-13.

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Table - 3 (Concl.d.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling	Remarks Reserves/Resources estimated
		Scale	Area	No. of	Metreage		
-do- East-West Singbhum	Tilaitanr- Sobhapur	-	-	-	-	95	Prospecting stage investigation (G-3) for gold, Ni and Cr initiated was continued during FS 2010-12 in this area.. The area forms a part of Gorumahisani Badampahar Kunderkocha Jaikan Archaean Greenstone belt and exposes phyllite, tuffaceous phyllite, slaty phyllite, intraformational conglomerate, BIF, cherry quartzite, chlorite schist, ultramafics (talc-tremoliteschist, actinolite-tremolite schist), dolerite and granite. Gold is suspected to be associated with sulphide mineralisation, which is noticed in the form of pyrite, chalcopyrite grains hosted in quartz veins and veinlets emplaced in phyllitic rocks. Some sulphide mineralisation is also seen in mafic and ultramafic rocks. Bedrock samples have been collected from all these rock types including quartz veins. Out of 95 bedrock samples for which analytical results are available, 7 samples have shown gold values between 100 ppb to 4.45 ppm and yielded Cr values between 500 ppm and 1600 ppm. Out of 65 trench samples, 12 samples have analysed between 100 ppb and more than 1 ppm gold. Only one trench sample has yielded more than 500 ppm Cr. The work has been completed.

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Table - 3 (Concl.d.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling	Remarks Reserves/Resources estimated
		Scale	Area	No. of	Metreage		
GSI Iron ore Singbhum (West)	Silpunji- Kantoria block	-	-	-	-	-	Reconnaissance stage (G-4) investigation was carried out for iron ore to assess iron and manganese ore potentiality of the block. The mapped area forms part of core area of the synclinorium and the eastern limb of the Jamda-Koira synclinorium of the Iron Ore Group of rocks. It comprises upper shale formation with interbands of BHJ, intraformational conglomerates, quartzite, ferruginous brecciated cherty quartzite which is overlain by cover sediments of Kolhan Group represented by a sequence of ferruginous sandstone, feldspathic sandstone and capped by laterites, at places. The iron ore in the area is derived mainly from the lateritic iron ore and at places (Merelgera) it is also being mined from Bill. A few iron enriched bands associated with BHJ has been delineated among them the two bands located around Kantoria, Hesapi and south of Param Baljori are the most prominent. The band in the west of Hesapi has a strike continuity of a more than a kilometre and is most promising. Analytical results of 7 samples from this band revealed FeT% between 50% to 55% and 2 samples showed FeT% >55%. Analytical results received so far for laterites have indicated Fe value up to 41.50% and Mn value up to 21.55%. Lateritic iron ore typically occupies the contour heights between 460 m and 500 m on the top and slopes of the hillocks. Manganese mineralisation occurs as layers and lenses of various shapes and sizes within the Upper Shale Formation of Upper Bonai Group. Mineralogically it consists of pyrolusite and cryptomelane. The work has been completed.

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Table - 3 (Concl.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling	Remarks Reserves/Resources estimated
		Scale	Area	No. of	Metreage		
DGM Coal Latehar	Jalta-Parsahi	1:4,000	-	08	2248.50	367	The area represents western part of Auranga Coalfield belt. Coal seams were not exposed on the surface.
-do- Ramgarh	Burhakhap	1:4,000	-	06	1270.50	278	Area is a part of lower Gondwana formation, Barakar sandstone, shale, shaly coal, coal, carbonaceous shales were found in the area. Extension depth & grade yet to be established. Resources were not estimated.
Iron ore Singhbhum (N)	Silpunji Kantoria, Noamundi	1:12,500	58.0	-	-	70	Occurrences of discontinuous lentoid residual deposits of iron ore were noticed in this area. The iron ore particularly in this area occurred within lateritic pockets developed over BHJ. small iron ore bodies were also noticed in the form of capping which are mostly confined to shale formation. At some places iron ore is being mined from BHJ. Resources of iron ore were not estimated.
Limestone Ramgarh	Ladi-Chikore	1:50,000 1:4,000	7.5 0.56	01	29.31	32	The area represented by proterozoic limestone, which is crystalline in nature and is interstratified with phyllite. About 1.03 million tonnes resources of limestone were estimated.

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**Table -4 : Mineral Production in Jharkhand, 2009-10 to 2011-12
(Excluding Atomic Minerals)**

(Value in ₹ '000)

Mineral	Unit	2009-10			2010-11			2011-12 (P)		
		No. of mines	Qty	Value	No. of mines	Qty	Value	No. of mines	Qty	Value
All Minerals		299		128358703	297		205198846	289		161467101
Coal	'000t	174	105917	114630000	174	108949	185716200	172*	109566	139887600
Bauxite	t	35	1670577	673016	36	1855993	627327	28	1830850	692085
Copper Ore	t	-	387843	-	-	396841	-	-	395745	-
Copper Conc.	t	1	13080	402092	1	12904	445678	1	13768	460321
Gold Ore	t	-	5066	-	-	4618	-	-	7754	-
Gold	kg	1	14	21251	1	14	28137	1	11	28532
Iron Ore	'000t	19	22547	11242048	20	22288	16907241	19	18942	19132126
Manganese Ore	t	3	39875	41472	2	44898	62094	2	18265	32766
Dolomite	t	1	422019	379817	1	429866	386879	1	190769	171692
Felspar	t	3	10778	1904	3	13315	2297	3	15648	2902
Fireclay	t	6	16145	1912	7	24305	3156	7	69143	11329
Graphite (r.o.m.)	t	9	26714	9518	10	45146	14995	11	71810	29251
Kaolin	t	13	106828	102218	11	93001	84327	8	141527	79714
Kyanite	t	1	4420	4862	1	3547	4207	1	4011	4757
Laterite	t	-	5084	667	-	1220	183	-	1550	310
Limestone	'000t	18	1924	384303	15	1996	453107	19	2164	448199
Ochre	t	-	-	-	1	1200	205	-	-	-
Pyrophyllite	t	1	1007	614	-	-	-	-	-	-
Pyroxenite	t	3	49638	13176	3	54986	14978	3	62747	19060
Quartz	t	9	68331	13420	9	61665	10196	9	87221	16393
Quartzite	t	1	10737	2147	1	24810	5458	2	44726	10992
Silica Sand	t	1	91597	32818	1	97560	30733	1	112140	36493
Talc/steatite/ soapstone	t	-	-	-	-	-	-	1	4041	1131
Minor Minerals@		-	-	401448	-	-	401448	-	-	401448

Note: The number of mines excludes minor minerals.

** Relates to coal mines as on 31.03.2011.*

@ Figures for earlier years have been repeated as estimates because of non-receipt of data.

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Mineral-based Industry

The principal large and medium-scale mineral-based industries in the organised sector in the State are given in Table - 5.

Table - 5 : Principal Mineral-based Industries in Jharkhand

Industry/plant	Capacity ('000 tpy)
Alumina	
Hindalco Industries Ltd, Muri.	450
Asbestos Products	
Hyderabad Industries Ltd, Jasidih, Dist. Deogarh.	60
Cement	
ACC Ltd, Chaibasa, Dist. Singhbhum.	870
ACC Ltd, Sindri, Dist. Dhanbad.	600
Lafarge, Jojobera, Dist. Singhbhum.	3000
Lemos Cement, Khalari, Dist. Ranchi.	109
Sri Durga Cement Ltd, Hosla, Dist. Ramgarh.	33
Sone Valley, Japla.	254
Ceramic	
Bihar Industrial Corp. Ltd, Madhupur, Dist. Deoghar.	0.48
Maithan Ceramics Pvt. Ltd, Dhanbad.	NA
Chemicals	
Bihar Caustic & Chemicals Ltd, Garhwa Road, Dist. Palamau.	92.75 (caustic soda lye)
Copper Smelter	
HCL, ICC, Ghatsila, Dist. Singhbhum (East).	20.5 (copper cathode) 84 (fabricated wire bar) 54(H ₂ SO ₄) 390 t (NiSO ₄) 480 kg (CuSO ₄) 14.6 kg (selenium) 9868 kg (Ag) 698 kg (Au)
Foundry	
Hindustan Malleables & Forgings Ltd, Jalan Nagar, Dhanbad.	NA
Iron & Steel	
Bokaro Steel Plant, Bokaro.	6200 (sinter) 4585 (pig iron) 3780 (saleable steel) 4360(Crude/liquid steel) 35.5 (H ₂ SO ₄) 27.2 (ammonium sulphate)

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Table - 5 (Concl'd.)

Industry/plant	Capacity ('000 tpy)
Tata Steel Ltd, Jamshedpur.	2500 (pellets) 4808 (saleable steel) 6800 (Crude/liquid steel)
Sinters & Pellets	
Tata Steel Ltd, Noamundi.	800
Pig Iron	
Usha Martin Industries, Jamshedpur.	110
Sponge Iron	
Bihar Sponge Iron Ltd, Chandil, Dist. Saraikela-Kharsawan.	186
Jai Durga Iron Pvt. Ltd, Jhumari Tellaiya, Dist. Koderma.	36
Zoom Vallabh Steels Ltd, Dugdha, Dist. Saraikela-Kharswan.	120
Ferro Alloys	
Anjani Ferro Alloys Ltd, Mihijam.	NA
Gautam Ferro Alloys Ltd.	5.5
Tin Plates	
The Tin Plate Co. of India Ltd, Jamshedpur.	379 (electrolytic tin plate)
Glass	
IAG Co. Ltd, Bhandainagar.	66.8
Refractory	
Allied Refractories (P) Ltd, Amaghata.	7.2
Bharat Refractories Ltd, Marar, Dist. Hazaribagh (Ranchi Road Refractories Ltd).	7.2
Bharat Refractories Ltd, Marar, Dist. Hazaribagh (IFICO Refractories Ltd).	42
Bharat Refractories Ltd, Bhandaridah, (Bhandaridah Refractory Plant) Dist. Bokaro.	26
Jharia Firebricks Pottery Works (P) Ltd, Dhansar, Dist. Dhanbad.	20
Mineral & Chemical Products, Kendposi, Dist. West Singhbhum.	1.5 (calcined china clay)
Raj Refractory (P) Ltd, Hardag, Dist. Ranchi.	6