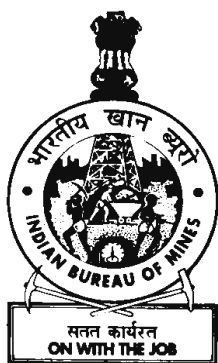


STATE REVIEWS



Indian Minerals Yearbook 2012

(Part- I)

51st Edition

**STATE REVIEWS
(Odisha)**

(FINAL RELEASE)

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

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ODISHA

Mineral Resources

Odisha is the leading producer of chromite, graphite, bauxite, manganese ore, iron ore, sillimanite, quartzite, pyroxenite and dolomite. The State hosts the country's sole resources of ruby and platinum group of metals. It accounts for the country's 95% chromite, 92% nickel ore, 69% cobalt ore, 55% bauxite, 51% titaniferous magnetite, 40% limestone, 36% pyrophyllite, 33% iron ore (hematite), 26% sillimanite, 25% each fireclay & garnet, 24% each coal & zircon and 20% vanadium ore resources.

Important minerals that occur in the State are: **bauxite** in Balangir, Kalahandi, Kandhamal, Keonjhar, Koraput, Malkangiri, Rayagada & Sundergarh districts; **china clay** in Bargarh, Boudh, Balangir, Keonjhar, Koraput, Mayurbhanj, Sambalpur & Sundergarh districts; and **chromite** in Balasore, Cuttack, Dhenkanal, Jajpur & Keonjhar districts. Chromite deposits of Sukinda and Nuasahi ultramafic belt constitute 95% of the country's chromite resources. Besides, **coal** occurs in Ib river valley coalfield, Sambalpur district & Talcher coalfield, Dhenkanal district; **dolomite** in Bargarh, Keonjhar, Koraput, Sambalpur & Sundergarh districts; **dunite/pyroxenite** in Keonjhar and Sundergarh districts; **fireclay** in Angul, Cuttack, Dhenkanal, Jharsuguda, Khurda, Puri, Sambalpur & Sundergarh districts; **garnet** in Ganjam, Kalahandi & Sambalpur districts; **graphite** in Bargarh, Boudh, Balangir, Kalahandi, Koraput, Nuapada & Rayagada districts; **iron ore (hematite)** in Dhenkanal, Jajpur, Keonjhar, Koraput, Mayurbhanj, Sambalpur & Sundergarh districts; **iron ore (magnetite)** in

Mayurbhanj district; **limestone** in Bargarh, Koraput, Malkangiri, Nuapada, Sambalpur & Sundergarh districts; **manganese ore** in Balangir, Keonjhar, Koraput, Rayagada, Sambalpur & Sundergarh districts; **Pyrophyllite** in Keonjhar district; **quartz/silica sand** in Boudh, Balangir, Kalahandi, Sambalpur & Sundergarh districts; **quartzite** in Balangir, Dhenkanal, Jajpur, Jharsuguda, Keonjhar, Mayurbhanj, Sambalpur & Sundergarh districts; **sillimanite** in Ganjam & Sambalpur districts; **talc/steatite/soapstone** in Mayurbhanj, Sundergarh & Sambalpur districts; **titanium minerals** in Dhenkanal, Ganjam, Jajpur & Mayurbhanj districts; and **zircon** in Ganjam district.

Other minerals that occur in the State are **asbestos** in Keonjhar district; **cobalt** in Cuttack & Jajpur districts; **copper** in Mayurbhanj and Sambalpur districts; **granite** in Angul, Boudh, Balangir, Cuttack, Deogarh, Dhenkanal, Ganjam, Keonjhar, Khurda, Koraput, Mayurbhanj, Nuapada, Rayagada & Sambalpur districts; **lead** in Sargipalli area, Sundergarh district; and **nickel** in Cuttack, Keonjhar & Mayurbhanj districts. Occurrences of **ruby** and **emerald** are reported from Balangir and Kalahandi districts, respectively. **Platinum Group of Metals** occur in Keonjhar district; **silver** in Sundergarh district; **tin** in Koraput and Malkangiri districts; and **vanadiferous magnetite** occurs in Balasore and Mayurbhanj districts (Table - 1). The various coalfields along with their reserves/resources are given in Table - 2.

Exploration & Development

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

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

(In million tonnes)				
Coalfield	Proved	Indicated	Inferred	Total
Total	25547.66	36465.97	9433.78	71447.41
Ib-River	8475.62	9451.89	5108.16	23035.67
Talcher	17072.04	27014.08	4325.62	48411.74

Source: Coal Directory of India, 2011-12.

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

Mineral	Unit	Reserves				Remaining resources				Total resources (A+B)				
		Proved STD 111	Probable		Feasibility STD211	Pre-feasibility		Measured STD331	Indicated STD332		Inferred STD333	Reconnaissance STD334	Total (B)	
			STD121	STD122		STD221	STD222							
Asbestos	tonne	-	-	-	-	-	-	10000	37200	9500	-	56700	56700	
Bauxite	'000 tonnes	132314	22855	144354	299523	56667	188316	310224	155081	562924	-	1510934	1810457	
China clay	'000 tonnes	2376	715	811	3901	-	1252	2476	35393	236421	1259	277025	280926	
Chromite	'000 tonnes	31263	6725	15085	53073	1116	1189	4335	35796	41431	21359	136948	190021	
Cobalt	Million tonnes	-	-	-	-	-	-	31	-	-	-	31	31	
Copper														
Ore	'000 tonnes	-	-	-	-	-	-	1420	2536	2095	-	6051	6051	
Metal	'000 tonnes	-	-	-	-	-	-	21.69	21.06	20.69	-	63.44	63.44	
Dolomite	'000 tonnes	119853	44549	2710	167112	19558	27887	76634	39474	268930	33063	505933	673045	
Dunite	'000 tonnes	3337	-	-	3337	-	4717	5267	384	627	-	10995	14333	
Fireclay	'000 tonnes	581	278	52	911	2135	11280	3774	42747	83045	-	169166	170076	
Garnet	tonne	-	3185605	-	3185605	5	-	-	-	348000	-	348005	3533610	
Granite														
(Dimen. stone)	'000 cum	-	80000	-	80000	-	-	-	330328	-	1432492	240	1763060	1843060
Graphite	tonne	495296	2172684	622933	3290913	-	1106192	1224811	98665	2923002	19890	5383739	8674652	
Iron ore														
(Hematite)	'000 tonnes	2422247	569186	321568	3313000	12844-	471517	138365	317074	1404450	107978	2617232	5930232	
Iron ore														
(Magnetite)	'000 tonnes	-	-	54	54	-	102	-	-	43	-	145	199	
Lead-Zinc														
Ore	'000 tonnes	-	-	-	-	-	961	119	-	670	-	1750	1750	
Lead metal	'000 tonnes	-	-	-	-	-	34.32	4.25	-	38.39	-	76.96	76.96	
Limestone	'000 tonnes	280588	466627	126717	873932	3225	49045	241871	44562	386952	49800	909055	1782987	
Manganese														
Ore	'000 tonnes	41354	4361	22784	68499	8244	14906	22714	9371	61343	3880	121548	190047	

(Contd.)

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Table - 1 (Concl'd.)

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						
Mica		-	-	-	-	6216000	52024000	-	20328000	26712000	-	105280000	105280000	
Nickel ore	Million tonnes	-	-	-	-	21	21	31	51	51	-	174	174	
Pt. Group of metals	tonne	-	-	-	-	-	7.7	-	-	6.5	-	14.2	14.2	
Pyrophyllite	tonne	3329278	1001802	525100	4856180	194121	3920129	80	40	1331393	17161	7435955	12292135	
Quartzite	'000 tonnes	3629	1151	1783	6563	4204	3744	681	-	34851	523	53837	60400	
Quartz-silica sand	'000 tonnes	438	69	860	1367	1503	2599	90	63385	3836	-	72573	73940	
Ruby	tonne	143	-	93	236	-	3165	286	38	1623	-	5113	5349	
Sillimanite	tonne	-	1602228	-	1602228	-	6557013	-	-	4943600	-	11500613	13102841	
Silver														
Ore	tonne	-	-	-	-	960500	119000	-	-	670000	-	1749500	1749500	
Metal	tonne	-	-	-	-	27.34	3.4	-	-	34.17	-	64.91	64.91	
Talc-steatite soapstone	'000 tonnes	123	178	112	414	31	109	-	-	265	-	406	820	
Tin														
Ore	tonne	-	-	-	-	12692	636	-	1166	1000	-	15494	15494	
Metal	tonne	-	-	-	-	34.63	500.78	-	22.2	10	-	567.61	567.61	
Titanium minerals*	tonne	-	4274178	-	4274178	-	-	950000	-	38280000	-	39230000	43504178	
Vanadium														
Ore	tonne	-	-	-	-	1220000	-	-	232000	3412795	-	4864795	4864795	
Metal	tonne	-	-	-	-	2135	-	-	487.2	10935.74	-	13557.94	13557.94	
Zircon*	tonne	-	146085	-	146085	-	-	-	-	-	-	-	146085	

Figures rounded off.

* Resources of Ilmenite, rutile and zircon as per Department of Atomic Energy are provided in the respective Mineral Reviews.

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

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
GSI Coal (Taleher Coalfield) Angul	Similisahi- Kunjabiharipur block	-	-	-	-	-	Regional exploration for coal under G-2 stage, continued in 2010-12 with an objective to explore the westward continuation of regional coal seams of Barakar Formation already intersected in the adjacent Jalatap block and to appraise the coal resource potentiality of the area. All the ten Barakar coal seams (II to XI in ascending order) were intersected in the depth range from 300.35 m to 601.89 m with cumulative coal thickness of individual seam zones varying from 0.55 m to 37.72 m. Continuity of regional coal seams for 6 km along strike and 2.5 km along dip direction has been established in the block. An additional indicated resource of about 1500 million tonnes of coal has been assessed for this block. Exploration was completed in this block on 01.10.2011.
GSI Coal (Taleher Coalfield) Angul	Nuagaon North area	-	-	-	-	-	Exploration for coal by scout drilling (G-4 stage) commenced during FS 2010-12 and continued during the period under review, to explore the downdip continuity of regional coal seams of Barakar and Karharbari formations, already explored in adjacent Nuagaon-Telisahi and Kudanali Northeast blocks and to assess coal resource potentiality of the area. Five Barakar and one Karharbari seam zones with cumulative thickness varying from 1.22 m to 36.15 m were intersected within the depth range of 70.06 m and 626.35 m. Continuation of coal seams was established for 6 km along strike and 3 km along dip direction. The work is in progress.
-do-	Korara-Danara	-	-	-	-	-	Regional exploration (G-3 stage) for coal was initiated during FS 2010-12 to establish the updip continuity of Karharbari coal seam at shallow to quarriable depth and to assess the coal potentiality of the area. The subsurface data generated indicates that the targeted Karharbari seam (Seam-I) has not developed along the southwestern margin of the Talcher Gondwana Basin. Exploration was completed in this block on 31.03.2012.

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Table - 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
GSI Coal (Taleher Coalfield) Angul	Harichandanpur	-	-	-	-	-	Spill over drilling, has been continued in 2010-12 with an objective to establish the northward continuity of regional coal seam zones of Barakar and Karharbari Formations, already intersected in adjacent Tribira block and to assess coal resource potentiality of the area. Barakar seam zones II & III were intersected in the last borehole (BH-4) in the depth range from 413.65 to 471.05 m. Continuation of regional Barakar coal seams for 4 km along strike and 2.5 km along dip-direction was established. A total resource of 493.03 million tonnes of coal under Indicated category within a depth of 600 m has been assessed in this block, out of which 214.78 million tonnes occur within 0-300 m depth. Baseline data generated for CBM in borehole no. BH-4 indicates variation of in situ gas content from 0.06 cc./gm to 0.26 cc./gm. Investigation has been completed on 15.06.2011.
GSI Chromite Dhenkanal	South of Raibola- Kanheipal	-	-	-	-	6	Reconnaissance stage (G-4) investigation was carried out during FS 2010-12 for Chromite, to locate Chromite bodies in the transition zone of Easternghat Mobile Belt and Iron Ore Supergroup of rocks lying south of Sukinda Ultramafic Complex. In bedrock samples of serpentinite and gabbro, PGE value in six samples ranging from 64 ppb to 114 ppb. Test drilling in Tangeria area intersected a 1.10 m thick chromite band associated with ultramafic rock in one BH-2 between depths 60.90 m and 62 m. In BH-1 and BH-4 disseminations of chromite within ltramafic could be intersected. Since the sub-surface probe did not yield any encouraging result, scout drilling was discontinued. However, Pt+Pd value in chromiferous serpentinite and pyroxenite in core samples of BH-1 varies from 118 ppb to 198 ppb and 107 ppb to 642 ppb respectively. The work has been completed.

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Table - 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
GSI							
Iron ore Sundergarh	Sagasahi East block	-	-	-	-	-	Prospecting stage (G-3) investigation was carried out during FS 2010-12 for assessment of iron ore potential in the northern contiguous area of already explored Ghoraburhani Sagasahi Block. The investigation was aimed to examine the downdip continuity of the ore bodies already intersected in the adjoining Ghoraburhani block by drilling vertical boreholes on 200 m x 200 m grid up to a depth varying from 70.40 m to 100.10 m. The cumulative thickness of ore bodies intersected at 55% Fe cut off varies from 2 m to 90 m and has an av. iron content varying from 61.77% to 64.97%. The work will be continued during the next FS 2012-13.
GSI							
Iron ore Keonjhar	Chamakpur- Nayagarh	-	-	-	-	-	Reconnaissance stage (G-4) investigation was carried out for delineating detrital iron ore bodies in the eastern and southern margins of Horseshoe basin. Stratigraphically detrital iron ore bodies belong to the basal conglomerate horizon of the Kolhan Group and rest unconformably over granite and gritty quartzite. Detrital iron ore bodies are composed of clasts of hematite, jasper, Bill, quartz and rock fragments of approximately 1 cm to 16 cm size ranges. The population of iron bearing clasts (hematite with massive hard and soft laminated BHJ) range from 35% to 65% by volume within the isolated patches of detrital iron ore bodies. The app. dimensions of individual detrital iron ore bodies recorded are (i) Chamakpur-200 m x 100 m (ii) Mirgisingra-450 m x 250 m (iii) Kendra - 625 m x 125 m (iv) Basudebpur - 375 m x 75 m (v) Damupur - 300 m x 125 m. The pitting work carried out indicates possibility of development of thicker detrital iron ore bodies on granitic bodies. The work will be continued in the next FS 2012-13.

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Table - 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
GSI Iron ore Keonjhar	Damurda Champu- asahi	-	-	-	-	-	Prospecting stage (G-3) investigation was carried out during FS 2010-12 for assessment of low grade iron ore bodies associated with BHJ & ferruginous laterite in the area. Detailed mapping in the northern part of Damurda ridge has brought out discontinuous linear iron ore bodies exposed in old quarry/pit sections. On the surface, the iron ore bodies are covered by ferruginous laterite of 1 m - 5 m thickness. The iron ore-bearing zone continues further north towards Bolani. The iron ore is mainly laminated and lateritic type. The maximum length of the ore bodies is about 160 m with a thickness of 2 m - 5 m. The exploration in Damurda block has indicated a moderate to low potentiality of iron ore mineralisation over a strike length of 2.2 km with 20.7 m average width and an average grade of 55.56% Fe. The work has been completed.
-do-	Damurda Sosuth block & Bolani South block	-	-	-	-	-	Prospecting stage (G-3) investigation for manganese initiated in FS 2009-10 was continued during FS 2010-12. The Damurda South block is occupied mainly by litho-units of Koira Group belonging to Iron Ore Supergroup. Manganese ore in the area occurs in three distinct litho associations - (a) with duricrusted laterite near to the surface (b) with brecciated chert and (c) with the ferruginous shale, saprolitic clay and wady shale. The nature of the ore is lumpy, friable and powdery. Polished section studies reveal that most of the lumpy ore is pyrolusite while powdery ore is psilomelane. Collophane banding is recorded in psilome-lane. Subsurface exploration so far carried out in DSB has helped in identifying mineralised zone over a strike length of 300 m and width over 300 m across the strike. The thickness of individual ore bands varies from 0.20 m to nearly 11.50 m and number of ore zones varies from 1 to 6. A total inferred manganese resource of 1.15 million tonnes (UNFC 333) has been estimated at 20% cut - off and an additional 0.608 million tonnes of marginal grade (10-20% Mn) resource also has been estimated. In addition to manganese, amorphous variety of graphite associated with dolomite has been intersected in four boreholes in the Damurda South block. The total carbon content of graphite bearing samples varies from 19.24% to 24.33%. Work has been completed.

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Table - 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
PGE							
Keonjhar	Banguar and Banaipank	-	-	-	-	-	General exploration stage (G-2) investigation was initiated to search for possible extension of potential ultramafics units in the Baniapani area under lease of OMC Ltd. The study indicates that the Bangur area is represented by a litho-melange consisting of assorted megacrasts of dunite, chromiferous dunite, chromitite, peridotite and other mafic-ultramafic litho associations, which is intruded by Bangur gabbro. A prominent NW-SE trending breccia zone in the footwall side of the OMC quarry acts as the host for PGE mineralisation. The petro-mineragraphi and SEM-EDX study of the breccia zone indicated the presence of PGE minerals. The EPMA studies confirmed the presence of PG minerals as isoferroplatinum, hollingworthite, spenylite, geversite and others. The mineralised breccia zone extends for about 550 m with intermittent ore bodies at varying depth totalling 8-14 m in thickness up to a depth of around 100 m below ground level.
DGM							
Bauxite	Around	1:25,000	51.02	-	-	406	The object of exploration was preliminary assessment of resource and grade of bauxite. The area forms a part of Eastern Ghats Mobile Belt (EGMB) comprising khondalite, pyroxene granulite, charnockite, granite gneiss, porphyritic granite gneiss, pegmatite, laterite & bauxite. Bauxite occurs associated with khondalite and the deposit is of blanket type. Length and width of the plateau varies from 0.6 m - 1.5 km and 0.5 km - 0.6 km respectively. Thickness of mineralised zone varies from 3-11 m. Resources will be estimated after complete analysis of samples.
Kalahandi	Lingapadar	1:2,000	1.20				
-do-	Around	1:25,000	70	-	-	410	Six blanket type bauxite bearing plateau have been located having average length and width of 0.5 km - 1 km and 0.20 km - 0.40 km, respectively. The thickness of aluminous laterite/bauxite horizon is about 3 m. Resources will be estimated after complete analysis of samples.
Kalahandi	Gopalpur	1:2,000	1.25				

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Table - 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
-do- Koraput	Dumerigurha, Niranga & Garahamunda	1:25,000	54	-	-	98	The object of exploration was to assess the bauxite resource along with other economic minerals, if any, in the area. The area forms a part of Eastern Ghats Mobile Belt (EGMB) comprising litho units like khondalite, quartzite, pyroxene gneiss, charnockite, granite gneiss, etc. Two sets of joints were observed in granite gneiss. Four bauxite bearing plateau have been delineated with length varying from 250 - 1000 m and width from 150 - 300 m. Thickness of bauxite profile was found to be about 4 m. Occurrence of red ochre was also noticed near Village Maligan having dimension of 30 m x 10 m approx. Resource will be estimated after complete analysis of samples.
DGM Chromite Dhenkanal	Kandhara & Kandadahad	1:2,000	0.125	-	-	64	The object of exploration was to locate chromiferous ultramafics and HMI rocks in the unexplored western extension of Sukinda ultramafic complex. The area represents iron ore Super Group of rocks comprising of litho-units like quartzite, quartz mica schist, amphibolite, hornblende schist, talc-tremolite schist, mica schist, granite, granite gneiss, andalusite schist and dolerite. Three ultramafic bands having NW-SE trend were encountered around Village Karadapal. Investigation is continued. Resource has not been estimated.
-do- Jaipur	Telangi Chromite mine	-	-	01	42.5	86	The object of exploration was to assess the additional chrome reserve for future mine planning. The area forms a part of Sukinda Ultramafic Complex having litho-units like quartzite, shale, ultramafics volcanics/tuff of Iron Ore Super Group. Ultramafics are represented by serpentinised dunite and periodotite hosting chrome ore bands. The general trend of ultramafics is ENE-WSW dipping at high angle in southerly direction. Cumulative thickness of friable chromite band is 10.06 m as revealed from drilling in one borehole. Estimation of resource is in progress.

(Contd.)

Table - 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
-do-	-do-	1:1,000	0.0054	-	-	170	The object of exploration was to assess the low grade chromite (with threshold value + 10% Cr ₂ O ₃) and nickel (with 0.6 of nickel) associated with the over burden dump of Sukinda valley. The entire dump was grided in 20 m x 20 m interal and the dump was delineated by geological mapping. Resources were not estimated.
Diamond							
Nuapada	Darrimunda	1:2,000	0.5	-	-	02	The object of exploration was to locate and delineate the suspected primary source diamond and the lamproite bodies to examine diamond incidence in them. Two lamproite bodies have been delineated having individual length of 400 m and width varying from 0.5 - 3.5 m. Depth persistence has not been proved. Samples are under investigation. Resources will be estimated only after receipt of analysis report, if any.
Heavy minerals (Ilmenite, rutile, garnet, monazite, zircon, silimanite, etc.)	Balarampur	1:20,000	0.92	321	2280		The objective of exploration was to assess resource and grade of heavy minerals and identification of unexplored blocks along Ganjam & Puri coast. The area comprises of loose clayey sand, fine to medium sand and sticky clay. Heavy minerals occur within the sandy horizon up to a depth of 10 m. The mineralisation was observed to have been associated with inland dunes. Resources were not estimated.
Iron ore							
Kendhujhargarh	Karhakala & Surhang	1:25,000	65	-	-	07	Objective of exploration was to locate and assess potentiality of iron ore. The area is comprised of litho-units like quartzite, basic lavas, shale/tuffaceous shale, laterite and quartz vein. No BHJ as well as iron ore body was encountered. Resources were not estimated.
Limestone/ Dolomite	Around Badulpani, Karamtoli & Tangargaon	1:25,000	105	-	-		Objective of exploration was to locate possible occurrence of limestone/dolomite. The area was comprised of quartzite-mica-schist/mica schist, quartzite, granite, pegmatite and quartz vein. Occurrences of dolomite was not encountered. However, granite occurrences were noticed around Villages Tangargaon, Karamtoli and Deobahai which is suitable for decorative stone.

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Table - 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
Limestone/ Dolomite Sundergarh	North of Surgura & Lephripara & Surgura	1:25,000	-	-	-		Object of exploration to locate & assess limestone/dolomite along with other economic minerals. The area comprised of litho units like conglomerate, quartzite, carbonaceous, phyllites/slates, limestone, dolomite, staurolite-garnet-schist. Dolomite occurrences were located to the North of Village Lephripara and is exposed for 1300 m x 100 m while other dolomite occurrence located around Village Surgura exposed for 30 m x 25 m. One Goethitic Iron ore occurrence was also noticed with dimension of 150 m x 20 m to the North of Village Kulabira. Estimation of resources is under progress.
OMC Chromite Jaipur	Kaliapani	-	-	07	1992.0	157	In this area dunite-peridotite are highly serpentinised or limonitised. Lease-hold area is covered with laterite and alluvium except a quartzite boulder patch N/V Gurujang & Patna. The chromite mineralisation is confined to the eastern part of the lease. Out of six chromite bands delineated in Sukinda valley, northern flank of three bands (Band-I, II & IV) were traced in this area. Main objective of exploration is to prove both the strike extension of chromite lodes as well as their depth persistence. The resources will be estimated after detailed exploration & correlation with the ore band.
-do-	South- Kalipani	1:2,000	102.0 (ha)	08	805.0	336	The chrome ore mineralisation is in the form of five continuous bands in this area which are 300 m (ave) apart from each other. These five bands have different physical & chemical characters. Band-V:- Moderately thick, hard lumpy, lensoid, irregular in strike direction. Band-IV:- Medium to high grade, moderately thick, lenticular but fairly continuous associated with chert bands (10-15 m), Band-III:- Thin, lenticular, partly lumpy (1-6 m), Band-II:- Moderately thick, lenticular (15-25 m) and Band-I:- Very thick, continuous, friable (50-70 m). During the year 0.35 million tonnes resources under (111) were estimated.
		1:1,000	16.0 (ha)				

(Contd.)

STATE REVIEWS

Table - 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
OMC Chromite Jaipur	Sukrangi	1:500	15.00 (ha)	16	2309.50	224	Out of six bands of chromite encountered in Sukinda Valley consists of three sub-parallel lodes. Updated band wise resources of chromite by DGM, Odisha is as Band-I - 0.23 million tonnes, Band-II - 3.40 million tonnes, Band-III 0.11 million tonnes. The ore formation is soft in nature. The over all dimension of the quarry is 975 m x 225 m x 54 m. Most of the 6 boreholes are barren, hence resources estimated under proved category is nil.
-do- Kendujhargarh	Bangur	1:200	0.60 (ha)	20	4496.0	1137	In chromite deposit of OMC, the ore bodies show a different mode of occurrence. Due to structural deformation, the ore bodies do not show persistency in their dimensions. Instead of well defined ore bands, they occurred as small lensoidal bodies with maximum of 25/30 m strike & also less within a wide zone of Serpentinised-Peridotite-Dunite rocks & Gabbro intrusives. About 0.25 million tonnes resources were estimated (at 10% Cr ₂ O ₃ cut-off).
Iron ore Kendujhargarh	Balda-Palsa- Jajang	1:500 1:1,000	25.50 (ha)	01	25.50	220	--
-do- Kendujhargarh	Koira-Kashira	1:500	50.0 (ha)	-	-	-	About 2.10 million tonnes (58-65% Fe) under (222) category iron ore resources were estimated.
Iron ore (Haematite) Sundargarh	Kurmitar Barsuan, Banel	1:2,000	164.0 (ha)	60	3260.0 3551	-	The iron ore bodies in most of the areas occur in the hill top within and above BHJ/BHQ. The litho units comprises of upper shale, BIF, lower shale & volcanics. The iron ores occur in the form of LIO, HMO, HLO, SLO and blue dust. Various structural imprints were noticed and recorded in BHJ and laminated iron ore bodies. About 29 million tonnes (58-65% Fe) under (111), 40 million tonnes (58-65% Fe) under (122) and 36 million tonnes (45-58% Fe) under (331) category iron ore resources were estimated.

(Contd.)

STATE REVIEWS

Table - 3 (Contd.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
Iron ore (Haematite) Sundargarh	Rantha, Barsuan Banel	1:500	89.0 (ha)	26	1578.60	491	About 4.25 million tonnes (58-65% Fe) under (111) category, 21 million tonnes (+45% Fe) under (222) category and 10.36 million tonnes under (334) category iron ore resources were estimated.
Kendujhar	Seremda Bhadrasah	1:500	12	08	200.30	201	About 0.323 million tonnes of iron ore resources were estimated during the year.
Sundargarh	Dubuna/ Sakradih	1:1,000	39.25	-	-	-	At the end of the year total iron ore resources were estimated at 32.01 million tonnes.
-do-	Koira- Bhaniapalli	1:2,000	60.0 (ha)	-	-	-	About 5.62 million tonnes (58-63% Fe) of iron ore resources under (122) category were estimated.
Manganese ore Sundargarh	Dalki	1:4,000	20	03	182.0	165	At the end of the year a total of 0.27 million tonnes manganese ore resources (+25% Mn) grade were estimated.
-do-	Dubuna- Sakradih	1:500	15.55	13 59	709.80 3130.0	452	A total of 0.08 million tonnes of manganese ore resources were estimated during the year. Out of which, 45,459 tonnes of (+25% Mn) grade and 35,012 tonnes of (15-25% Mn) grade.
-do-	Seremda Bhadrasah	1:500	21	01	30.50	16	--

Production

The value of mineral production in Odisha at ₹ 29,241 crore in 2011-12 increased by about 13% as compared to the previous year. The State contributed about 11% of the total value of mineral production and claims first position among the States in the country during the year under review. The important minerals produced in Odisha were coal, bauxite, chromite, iron ore, manganese ore, dolomite, limestone and graphite which together accounted for almost entire value of mineral production of the State in 2011-12.

Odisha was the leading producer of chromite with a share 99.7%, iron ore 40% and bauxite 39% in the total production of respective mineral in the country during the year 2011-12. The State was also the second largest producer of sillimanite, pyroxenite and dolomite with share of 30%, 28% and 22% of respective mineral. It

was third largest producer with a contribution of 24% of the national output of manganese ore.

Of the important minerals, production of garnet (abrasive) increased 8%, bauxite 4% and coal 3% as compared to that in the previous year whereas production of sillimanite decreased by 2%, graphite (r.o.m.) 8%, iron ore 12%, chromite 13%, dolomite and manganese ore 14% each and pyroxenite 88% during the year 2011-12. No production of kaolin and iolite was reported from the State in the current year (Table-4).

The production value of minor mineral was estimated at ₹ 86 crore for the year 2011-12.

The number of reporting mines in 2011-12 was 174 as against 192 in the previous year.

The index of mineral production in Odisha (base 2004-05 = 100) was 147.53 in 2011-12 as compared to 156.95 in the previous year.

STATE REVIEWS

**Table – 4 : Mineral Production in Odisha, 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		220		171636707	192		259380019	174		292413433
Coal	'000t	26	106409	58751300	28	102565	73545300	28*	105476	96399000
Bauxite	t	4	4879580	1909188	4	4856808	2305022	3	5045888	2372555
Chromite	t	18	3419031	10422275	18	4317159	25930985	18	3754293	26482785
Iron Ore	'000t	74	80896	95807348	77	76128	150907681	74	67013	162172471
Manganese Ore	t	40	605313	2165165	32	655984	3805668	28	565662	2451830
Dolomite	t	4	1316371	450677	3	1358156	551985	4	1174594	437571
Fireclay	t	4	51312	16015	-	-	-	-	-	-
Garnet (abrasive)	t	-	11080	36209	-	18474	65620	-	19889	84813
Graphite (r.o.m.)	t	21	46192	18636	12	20472	10394	5	18859	8497
Iolite	kg	1	758	40862	2	4	40	-	-	-
Kaolin	t	3	4558	2165	1	2601	2692	-	-	-
Sillimanite	t	1	14117	163009	1	17889	175742	1	17489	156176
Limestone	'000t	16	2937	843098	11	3923	1102597	10	3157	976930
Pyrophyllite	t	2	11926	2748	-	-	-	-	-	-
Pyroxenite**	t	-	229694	139195	-	198219	111201	-	24563	10090
Quartz	t	1	1570	257	1	11414	5262	1	6241	2088
Quartzite	t	4	29886	11093	2	4608	3063	2	3064	1860
Silica Sand	t	1	2800	700	-	-	-	-	-	-
Minor Minerals@		-	-	856767	-	-	856767	-	-	856767

Note: The number of mines excludes minor minerals.

** Relates to coal mines as on 31.03.2011.*

*** Associated with chromite.*

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

STATE REVIEWS

Mineral-based Industry

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

Table – 5 : Principal Mineral-based Industries in Odisha

Industry/plant	Capacity ('000 tpy)
Aluminium/Alumina	
Hindalco Industries Ltd, Hirakud *(Proposed expansion to 213 th. tonnes per year).	161.4* (aluminium)
NALCO, Damanjodi.	2100 (alumina)
NALCO, Angul.	460 (aluminium)
Vedanta Aluminium Ltd, Lanjigarh, Dist. Kalahandi.	1000 (alumina)
Vedanta Aluminium Ltd, Jharsuguda, Dist. Sambalpur.	500 (aluminium)
Asbestos Products	
UAL Industries Ltd, Korian, Dist. Dhenkanal.	30
Cement	
Bargarh Cement Ltd, Bargarh.	960
Ultra-Tech Cement Ltd, Jharsuguda (G).	800
OCL India Ltd, Rajgangpur, Dist. Sundergarh.	2000
Toshali Cements Pvt Ltd, Ampavalli, Dist. Koraput.	180
Fertilizer	
OCF-Paradeep.	325.20 (N ₂) 802.8 (P ₂ O ₅)
Paradeep Phosphates Ltd, Paradeep.	129.6 (N ₂) 331.2 (P ₂ O ₅)
SAIL Fertilizer Plant, Rourkela, Dist. Sundargarh.	360 (CAN)

(Contd.)

Table - 5 (Contd.)

Industry/plant	Capacity ('000 tpy)
Iron & Steel	
Rourkela Steel Plant, Rourkela, Dist. Sundergarh.	3070 (sinter) 2000 (pig iron) 1671 (saleable steel) 1900(crude/liquid steel) 85 (tin plates)
Visa Steel Ltd, Kalinganagar, Dist. Jajpur.	225 (pig iron) 300 (sponge iron) 50 (charge-chrome)
OCL India Ltd, Lamloi, Dist. Sundargarh.	120 (sponge iron) 85 (billets)
Orissa Sponge Iron Ltd, Palaspanga, Dist. Keonjhar.	250 (sponge iron) 100 (steel ingot)
Neelachal Ispat Nigam Ltd, Dubri, Dist. Jajpur.	1711 (sinter) 1110 (pig iron) 1100(crude/liquid steel) 13 (fertilizer)
Pig Iron	
IDCOL Kalinga Iron Works Ltd, Barbil, Dist. Keonjhar.	170
Sponge Iron	
Action Ispat & Power (P) Ltd, Pandripathar, Dist. Jharsuguda.	250
Adhunik Metaliks Ltd, Chandrihariharpur, Dist. Sundergarh.	180
Beekay Steel & Power Ltd, Uliburu, Dist. Barbil.	105
Bhusan Steels & Strips Ltd, Meramandali, Dist. Angul and Dhenkanal.	300
Crackers India (Pvt) Ltd, Bobardhanpur, Dist. Keonjhar	60
Deepak Steel & Power Ltd, Topadihi, Dist. Keonjhar.	144
Dinabandhu Steel & Power Ltd, Kalinganagar, Dist. Jajpur.	60
Jay Iron & Steel Ltd, Balanda, Rourkela, Dist. Sundergarh.	60

(Contd.)

STATE REVIEWS

Table - 5 (Contd.)

Industry/plant	Capacity ('000 tpy)
MGM Steel Ltd, Nimidha, Dist. Dhenkanal.	100
Ganesh Sponge Pvt Ltd, Krushnachandrapur, Dist. Angul.	30
Kusum Powermet Pvt. Ltd, Kutugaon, Dist. Keonjhar.	100
Mayur Electro Ceramics Pvt. Ltd, Pratapgarh, Dist. Mayurbhanj.	15
Neepaz Metaliks Pvt Ltd, Sundergarh.	60
Rexon Strips Ltd, Kumakela, Dist. Sundergarh.	60
Rungta Mines Ltd, Unit-I, Karakola, Barbil, Dist. Keonjhar Unit-II, Kamando, Dist. Sundergarh.	330
Scan Sponge Iron Ltd, Rambahal, Dist. Sundergarh.	60
Scaw Industries Pvt. Ltd, Gundichapada, Dist. Dhenkanal.	100
Sponge sales (India) Pvt Ltd, Kutugaon, Dist. Keonjhar.	60
Sree Metallic Ltd, Loidapada, Dist. Keonjhar.	174
Suraj Products Ltd, Barballi, Dist. Sundergarh.	45
Surya Sponge Iron Ltd, Budhakendua, Dist. Jajpur.	84
Tata Sponge Iron Ltd, Joda, Dist. Keonjhar.	390
Vikram Pvt Ltd, Tumkela, Dist. Sundergarh.	60
Ferro Alloys Balasore Alloys Ltd, Balgopalpur, Dist. Balasore.	100

(Contd.)

Table - 5 (Concl.)

Industry/plant	Capacity ('000 tpy)
FACOR, Charge Chrome Plant, Randia, Dist. Bhadrak.	65
IDCOL Ferro Chrome & Alloys Ltd., Dist. Jajpur.	18
Indian Charge Chrome Ltd, Choudwar, Dist. Cuttack.	62.5
Indian Metals & Ferro Alloys Ltd, Therubali, Dist. Cuttack.	190
Nav Bharat Ferro Alloys Ltd, Khargprasad, Dist. Dhenkanal.	75
Rohit Ferro-Tech Ltd, Kalinganagar, Dist. Jajpur.	110
Jaypore Sugar Co. Ltd, Rayagada Superb Metals Alloys Pvt. Ltd, Rairangpur.	22.5 0.3
Tata Steel Ltd, Ferro-Manganese Plant, Joda, Dist. Keonjhar.	30.5
Tata Steel Ltd, Charge Chrome Plant, Bamnipal, Dist. Keonjhar.	55.2
Refractory IFGL Refractory Ltd, Kalunga, Dist. Sundergarh.	0.3
Orissa Industries Ltd, Lakhikata, Dist. Sundergarh.	125
Orissa Industries Ltd, Barang, Dist. Cuttack.	19
Tata Refractories Ltd, Belpahar, Dist. Jharsuguda.	172
Silicon Carbide Indian Metals & Carbide Ltd, Therubali.	NA
Synthetic Rutile IRE, Orissa Sands Complex, Ganjam (Presently non-operational).	100

(G) : Grinding units.