

# 47 Iron Ore

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Iron & steel is the crux for industrial development in a country. The vitality of the Iron & Steel Industry largely influences the economic status of a country. Iron ore being the essential raw-material for iron & steel industry, its mining arguably is the cynosure of all mining activities undertaken by any country. With the total resources of over 25 billion tonnes of hematite ( $\text{Fe}_2\text{O}_3$ ) and magnetite ( $\text{Fe}_3\text{O}_4$ ), India is one of the leading producers as well as exporters of iron ore in the world.

## RESOURCES

Hematite and magnetite are the most important iron ores in India. About 60% hematite ore deposits are found in the Eastern Sector. About 87% magnetite ore deposits occur in Southern Sector, specially in Karnataka. Of these, hematite is considered to be superior because of its high grade. Indian deposits of hematite belong to the Precambrian Iron Ore Series and the ore is within banded iron ore formations occurring as massive, laminated, friable and also in powdery form.

As per UNFC system, the total resources of hematite as on 1.4.2005 are estimated at 14,630 million tonnes of which 7,004 million tonnes are under reserves category and 7,626 million tonnes under 'remaining resources' category. By grades, lumps constitute about 45% resources followed by fines 33%, lumps with fines 12% and the remaining 10% are of unclassified, others and not known grades. Hematite resources are located mainly in Orissa (33%), Jharkhand (28%), Chhattisgarh (19%), Karnataka (11%) and Goa (5%). The balance 4% resources are spread in Maharashtra, Madhya Pradesh, Andhra Pradesh, Uttar Pradesh, Rajasthan, Meghalaya and Assam (Table - 1).

Magnetite is another principal iron ore that also occurs in the form of oxide, either in igneous or metamorphosed banded magnetite-silica formation, possibly of sedimentary origin. As per UNFC system, the total resources of magnetite as on 1.4.2005 are estimated at 10,619 million tonnes of which reserves are merely 58 million tonnes while 10,561 million tonnes are remaining resources. Only 20% resources are of metallurgical grade while 79% resources are of unclassified, not known and other grades. The resources of coal washery and foundry grades are meagre. Magnetite resources are mainly located in Karnataka (74%), Andhra Pradesh (14%), Rajasthan (5%) and Tamil Nadu (4%). Goa, Kerala, Assam, Jharkhand, Nagaland, Bihar and Maharashtra together account for the remaining 3% share (Table-2).

## EXPLORATION & DEVELOPMENT

In 2006-07 and 2007-08, GSI, State Directorates of Chhattisgarh, Jharkhand, Karnataka, Maharashtra, Orissa and Rajasthan, MECL, NMDC, SAIL and M/s V.M. Salgaocar & Bro. Pvt. Ltd conducted exploration for iron ore. Details of exploration activities carried out by various agencies in 2006-07 and 2007-08 are furnished in Table-3.

## PRODUCTION, STOCKS & PRICES

The production of iron ore constituting lumps, fines and concentrates was at 206.5 million tonnes in the year 2007-08, showing an increase of about 10% as compared to that in the preceding year owing to better utilisation of resources and more demand.

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**Table – 1 : Reserves/Resources of Iron Ore (Hematite) as on 1.4.2005  
(By Grades/States)**

(In '000 tonnes)

Grade/State	Reserves						Remaining resources						Total resources (A+B)
	Proved STD111	Probable		Feasibility STD211	Pre-feasibility		Measured STD331	Indicated STD332	Inferred STD333	Reconnaissance STD334	Total (B)		
		STD121	STD122		STD221	STD222							
<b>All India : Total</b>	<b>4945329</b>	<b>995556</b>	<b>1063283</b>	<b>7004168</b>	<b>178449</b>	<b>101713</b>	<b>267013</b>	<b>491631</b>	<b>1031763</b>	<b>4021763</b>	<b>1533887</b>	<b>7626219</b>	<b>14630387</b>
<b>By Grades</b>													
Lump, high grade	537663	167697	108732	814092	51957	6433	3785	38419	32251	260525	1680	395050	1209142
Lump, medium grade	1183120	206967	282719	1672806	10862	37215	149835	154117	528826	997268	7932	1886055	3558861
Lump, low grade	471383	24548	43199	539130	6733	9073	25823	13392	70502	773926	103	899552	1438682
Lump, unclassified grade	8153	3309	6146	17608	63860	-	-	16768	32934	180257	-	293819	311427
Fines, high grade	146524	80538	17100	244162	4500	-	4500	45336	8676	43559	-	106571	350733
Fines, medium grade	1071378	400526	39430	1511334	900	11243	11839	177185	269655	612470	443	1083735	2595069
Fines, low grade	965434	66555	64349	1096338	13730	22844	18867	14020	72535	396927	4	538927	1635265
Fines, unclassified grade	16692	2364	3004	22060	268	1529	-	8452	12908	141181	-	164338	186398
Lumps & fines, high grade	213190	20308	12548	246046	24990	-	47000	-	-	47132	8285	127407	373453
Lumps & fines, medium grade	171128	12463	176304	359895	-	984	433	176	-	77513	13122	92228	452123
Lumps & fines, low grade	118088	6634	229556	354278	649	3951	-	17087	2400	204759	19619	248465	602743
Lumps & fines, unclassified	39853	2015	77693	119561	-	73	4755	6647	-	271340	2700	285514	405075
Black iron ore	-	746	1775	2521	-	2788	158	-	1059	8716	-	12721	15242
Others	715	887	17	1619	-	4440	18	34	-	562	-	5054	6673
Unclassified	1983	-	-	1983	-	-	-	-	-	-	-	-	1983
Not-known	25	-	710	735	-	1140	-	-	18	5630	1480000	1486788	1487523
<b>By States</b>													
Andhra Pradesh	24961	7377	7258	39596	205	-	-	377	1054	121807	-	123443	163039
Assam	-	-	-	-	-	-	-	8600	2400	1600	-	12600	12600
Bihar	-	-	-	-	-	-	-	-	-	55	-	55	55
Chhattisgarh	570227	190285	-	760512	101548	-	656	81555	526906	779609	480000	1970274	2730786
Goa	268126	93658	96919	458703	25018	33010	48403	3327	7906	136581	-	254245	712948
Jharkhand	2237629	35730	221065	2494424	-	343	328	30000	50000	460651	1000000	1541322	4035746
Karnataka	465677	190168	284584	940429	939	5524	1034	274600	43380	400813	9502	735792	1676221
Madhya Pradesh	21093	2355	10469	33917	8280	451	4500	4710	1760	151310	10	171021	204938
Maharashtra	9816	3520	661	13997	-	4852	-	79793	71806	62566	32343	251359	265356
Meghalaya	-	-	-	-	-	-	-	-	-	225	-	225	225
Orissa	1341025	470129	440623	2251777	42459	55443	211673	8668	315042	1863531	12032	2508848	4760625
Rajasthan	6774	2334	1705	10813	-	2090	419	-	11510	5016	-	19035	29848
Uttar Pradesh	-	-	-	-	-	-	-	-	-	38000	-	38000	38000

Figures rounded off.

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**Table – 2 : Reserves/Resources of Iron Ore (Magnetite) as on 1.4.2005  
(By Grades/States)**

(In '000 tonnes)

Grade/State	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						
<b>All India : Total</b>	<b>14339</b>	<b>38767</b>	<b>5397</b>	<b>58503</b>	<b>173273</b>	<b>9120</b>	<b>25460</b>	<b>1624796</b>	<b>1878483</b>	<b>6280882</b>	<b>568964</b>	<b>10560978</b>	<b>10619481</b>
<b>By Grades</b>													
Metallurgical	424	102	162	688	173096	840	25449	694836	338764	952024	45	2185054	2185742
Coal washery	14	816	2498	3328	-	5	11	411	318	4256	-	5001	8329
Foundry	329	125	-	454	-	-	-	-	-	303	-	303	757
Others	220	-	750	970	-	-	-	-	-	24158	-	24158	25128
Unclassified	13053	37595	1988	52636	177	8274	-	929549	1539401	5014051	568887	8060339	8112975
Not-known	299	130	-	429	-	-	-	-	-	286089	32	286121	286550
<b>By States</b>													
Andhra Pradesh	-	-	-	-	43034	-	-	13800	1266666	140027	14	1463541	1463541
Assam	-	-	-	-	-	-	-	4240	1600	9540	-	15380	15380
Bihar	-	-	-	-	-	-	-	-	-	2659	-	2659	2659
Goa	10738	37583	1791	50112	-	9071	-	-	3046	149943	1997	164057	214169
Jharkhand	14	836	2540	3390	-	5	11	411	3948	2472	32	6879	10269
Karnataka	-	-	-	-	130062	-	18375	1498957	479372	5345018	340000	7811784	7811784
Kerala	-	-	-	-	-	-	7074	-	56571	19790	-	83435	83435
Maharashtra	513	-	108	621	-	-	-	-	-	-	-	-	621
Meghalaya	-	-	-	-	-	-	-	-	-	3380	-	3380	3380
Nagaland	-	-	-	-	-	-	-	-	5280	-	-	5280	5280
Orissa	-	102	54	156	-	-	-	-	-	54	-	54	210
Rajasthan	3074	247	904	4225	177	43	-	-	-	522431	-	522651	526876
Tamil Nadu	-	-	-	-	-	-	-	107388	62000	85567	226921	481876	481876

Figures rounded off.

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**Table – 3 : Details of Exploration for Iron Ore, 2006-07 and 2007-08**

Year/Agency/ State/ District	Location/ Area/ Block	Mapping		Drilling		Sampling (No.)	Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
<b>2006-07</b>							
<b>GSI</b>							
<b>Chhattisgarh</b>							
Kanker	Aridongri area	-	-	-	-	-	Detailed mapping and sampling were conducted. An iron ore body of 550 m strike length and 4 to 5 m in width with Fe content varying from 57.22 to 69.5% was established.
<b>Jharkhand</b>							
Palamu	Chunga, Rajhara and Sokra area	-	-	-	-	-	Detailed mapping and sampling were conducted. Five magnetite bodies of dimensions 75 x 5 m to 100 x 10 m were sampled.
Singhbhum (West)	Ghatkuri block	-	-	86	-	86	Drilling could not be pursued due to lack of receipt of clearance to continue operation in forest areas.
<b>Karnataka</b>							
Bellary	NMDC block in parts of Sandur schist belt	-	-	-	-	-	Boreholes intersected mineralised zones of varying width. A total of 8 million tonnes of iron ore reserves with >55% Fe was estimated.
Bagalkot and Bellary	Parts of Hungund belt	-	-	-	-	-	The work has established 31 BIF bands of varying widths in Kamatagi block.
Gadag	In parts of Gadag belts	-	-	-	-	-	Regional targeting of iron ore was carried out and a number of BIF bands of thickness ranging from 7 to 15 m have been established.
<b>Orissa</b>							
Keonjhar	Burhipada, Juang and Pangaposi blocks	-	-	-	-	-	One borehole intersected iron ore bodies at varying depths.
-do-	Ghutang and Pathargada area	-	-	-	-	-	A small iron ore body of 0.5 m to 6 m width and 30 to 200 m length having 60.75 to 65.5% Fe content has been identified.
-do-	Bhoka-Mankado-munda area	-	-	-	-	-	About 100 to 150 m wide & 300 to 400 m long ferruginous shale body with iron content varying from 51.75 to 58.37% was recorded.
<b>Tamil Nadu</b>							
Namakkal	Valliapanpatti, Rajapalayam, Manipudur and Aniyapurampudur blocks	-	-	-	-	-	A resource of about 14.03 million tonnes of magnetite with Fe content of 31 to 37% has been assessed.
<b>West Bengal</b>							
Bankura	Saltora-Mejia block	-	-	-	-	-	Geophysical survey for magnetite was carried out along 41 traverses covering 3.9 km strike length.

(Contd.)

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Table - 3 (Contd.)

Year/Agency/ State/ District	Location/ Area/ Block	Mapping		Drilling		Sampling (No.)	Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
<b>DGM</b>							
<b>Chhattisgarh</b>							
Dantewada South Bastar	North Bailadila	1:50,000	102	-	-	88	Five million tonnes of iron ore resources containing 60 to 66% Fe have been estimated.
Kabirdham (Kawardha)	Pandharia teh.	1:50,000	1770	-	-	279	A total of 1.15 million tonnes of iron ore resources was estimated.
Kabirdham & Rajnandgaon	Chelikama, Bachhrukona, Khara, Nachaniya, etc.	1:50,000 1:4,000	110 0.5	-	-	281	Six new localities of iron ore having strike length of about 15 km and width about 5 km have been identified. A total of 39.35 million tonnes of iron ore resources was estimated.
Kanker	Rawghat	1:50,000	168	-	-	60	Fifteen million tonnes of high grade hematite resources containing 60 to 68% Fe have been estimated.
-do-	Aridongri	1:50,000 1:4,000	80 0.172	-	-	60	About 1.10 million tonnes of iron ore resources containing 64 to 68% Fe have been estimated.
<b>Maharashtra</b>							
Sindhudurg	Padve- Majgaon area	1:50,000 1:5,000	20.7 1.057	-	361	-	Mineralised zone 200 m wide extending over a length of 250 m and depth persistence up to 50 m was proved.
-do-	Around Nirukhe	1:50,000 1:5,000	10 0.04	-	-	-	Hematite quartzite body was observed in the area.
<b>Orissa</b>							
Sundergarh	Dholtapahar near Dengula	1:25,000 1:2,000	51 0.60	1	58.70	102	Soft laminated iron ore body is found exposed over an area of 480 x 140 m having thickness of 10 to 15 m. About 2.65 million tonnes of iron ore resources were estimated.
<b>Rajasthan</b>							
Jaipur and Jhunjhunu	Bagoli, Tonda, etc in Jhunjhunu dist and Kharab, Moriya - Banol etc in Jaipur dist.	1:50,000 1:10,000 1:4,000	190 22 6	-	-	117	About 46.52 million tonnes of geological resources were estimated in Jaipur dist. and 19.76 million tonnes in Jhunjhunu dist, respectively.
<b>NMDC</b>							
<b>Chhattisgarh</b>							
South Bastar Dantewada	Bailadila Deposit No.10	-	-	-	-	-	As on 1.4.2007 the total reserves of iron ore was estimated at 247.74 million tonnes.
-do-	Bailadila Deposit No.11 B	-	-	9	1000	-	As on 1.4.2007 the total resources of iron ore was estimated at 190.6 million tonnes in Deposit No.14; 63.1 million tonnes in Deposit 11-C and 147.3 million tonnes in Deposit 11-B, respectively.

(Contd.)

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Table - 3 (Contd.)

Year/Agency/ State/ District	Location/ Area/ Block	Mapping		Drilling		Sampling (No.)	Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
<b>SAIL</b>							
<b>Chhattisgarh</b>							
Durg	Dalli-Rajhara	1:2,000	220.42 (Hect.)	-	-	99	A total of about 32.98 million tonnes of hematite reserves was estimated.
<b>Mysore Minerals Ltd</b>							
<b>Karnataka</b>							
Bellary	Jambuna- thanahalli	-	-	-	-	-	A total of about 6.05 million tonnes of reserves was estimated.
<b>M/s V.M.Salgaocar &amp; Bro. Pvt. Ltd</b>							
<b>Goa</b>							
North Goa	Velguem/ Surla Mine	1:2,000	105.9	14	853	-	As on 1.6.2006, the total reserves estimated was 15.99 million tonnes.
North and South Goa	Sancordem/ Malpona Mine	1:2,000	42.9	-	-	-	As on 1.6.2006, the total reserves estimated was 9.9 million tonnes.
South Goa	Sigao Mine	1:2,000	26.17	5	210	-	As on 1.6.2006, the total reserves estimated was 11.56 million tonnes.
<b>2007-08</b>							
<b>GSI</b>							
<b>Chhattisgarh</b>							
Kanker	Aridongri area	-	-	-	-	-	Mapping revealed 3 iron ore bands with cumulative strike length of about 1 to 2 km with width varying from 2 to 3 m. Analytical results indicated Fe content ranging from 58.47 to 69.39%.
<b>Karnataka</b>							
Bellary	NMDC block in parts of Sandur schist belt	-	-	-	-	-	Drill indicated resources that were estimated at 2.98 million tonnes with 56.8% Fe; 2.36 million tonnes with 59.79% Fe and 2.15 million tonnes with 60.58% Fe.
Gadag	Near Singatarayankere Tanda area	-	-	-	-	-	Eight BHQ bands of 3 to 5 km in length and 4 to 12 m in width were delineated.
<b>Orissa</b>							
Keonjhar	Pathuripenth- Madhyapur area	-	-	-	-	-	About 0.043 million tonnes of iron ore resources have been estimated.
Sundergarh	Ghoraburhani block	-	-	-	-	-	The iron ore body at Ghoraburhani-Sagasahi area has a total strike length of 1.95 km with 40 to 250 m surface width. A resource of 6.2 million tonnes of iron ore with 55 to 60.6% Fe has been estimated.
<b>Rajasthan</b>							
Jhunjhunu & Khetri belt	In SE part of	-	-	-	-	-	Six blocks of iron ore deposits Sikar were identified.

(Contd.)

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Table - 3 (Contd.)

Year/Agency/ State/ District	Location/ Area/ Block	Mapping		Drilling		Sampling (No.)	Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
<b>Tamil Nadu</b>							
Tiruvanna- malai	Kelur and Chengam areas	-	-	-	-	-	A total of 9 BMQ bands having a cumulative strike length of about 10 km have been identified.
<b>DGM Chhattisgarh</b>							
Dantewada South Bastar	North Bailadila	1:50,000	280	-	-	105	Five million tonnes of iron ore resources containing 60 to 66% Fe were estimated.
Kanker	Rawghat	1:50,000	202	-	-	96	Fifteen million tonnes of high grade hematite resources containing 63 to 67% Fe were estimated.
Rajnandgaon	Northern part of Kabirdham & Rajnandgaon districts	1:50,000	2015	-	-	388	A total of 2.83 million tonnes of iron ore and 55 million tonnes of limestone resources was estimated.
<b>Jharkhand</b>							
Singhbhum West	Sasangdah	1:50,000 1:2,000	4.6 0.24	-	-	55	About 4.85 million tonnes of hematite resources were estimated up to 10 m depth.
-do-	Ganalata hill	1:2,000	35	-	-	18	About 156.8 million tonnes of hematite resources were estimated.
<b>Karnataka</b>							
Tumkur	Melanahalli, C.N.Halli	1:50,000	100	-	-	15	Two million tonnes of resources to a workable depth of 20 m were estimated.
<b>Maharashtra</b>							
Sindhurg	Padve- Majgaon area	-	-	-	53	-	Mineralised zone was proved 200 m wide over a length of 250 m and 50 m depth persistence.
<b>Orissa</b>							
Nabarangapur	Hirapur, Soragurha, etc.	1:25,000	54	-	-	108	Eight iron ore bands of 3,850 m cumulative length and up to 20 m average width were located.
Sundergarh	Dholtapahar area near Dengula	-	-	5	227	75	Drilling revealed the thickness of iron ore bands to be varying between 18.6 and 32.9 m.
<b>West Bengal</b>							
Bankura	Pathardihi	-	-	-	-	8	Approximately 650 m long and 20 to 60 m wide magnetite band was encountered near Pathardihi. Near Kansara, 80 m long and 15 to 30 m wide magnetite band was encountered.
<b>NMDC Chhattisgarh</b>							
South Bastar (Dantewada)	BIOM, Bachel Complex	-	-	11	843	-	-
-do-	BIOM, Kirundurg Complex	-	-	19	2133	-	Exploratory drilling is underway. The total reserves at Deposit No.14 was estimated at 185.95 million tonnes and at Deposit No.11 C was estimated at 65.68 million tonnes.

(Contd.)

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Table - 3 (Concl'd.)

Year/Agency/ State/ District	Location/ Area/ Block	Mapping		Drilling		Sampling (No.)	Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
<b>Karnataka</b>							
Bellary	Dolimalai iron ore mine	-	-	12	720.5	-	About 10 million tonnes of hematite reserves were estimated.
<b>SAIL Chhattisgarh</b>							
Durg	Dalli-Rajhara	1:2,000	220.42 (Hect.)	-	-	22	A total of about 31.9 million tonnes of hematite reserves was estimated.
<b>Jharkhand</b>							
Singbhum (West)	Gua iron ore mine	-	-	1	14	-	Exploration activities are in progress.
<b>Orissa</b>							
Keonjhar	Bolani Iron ore mines	1:2,000	13.21	-	-	-	As on 1.4.2008, balance mineable reserves of iron ore were estima- ted at 151.3 million tonnes.
<b>OMC Orissa</b>							
Keonjhar	Kurmitar Iron ore mine	-	18 Hect	61	4001.25	3808	About 74 million tonnes of iron ore reserves were estimated.
-do-	Balda-Palsa Jajang Iron ore mine	1:500	35.75 Hect	56	2333	405	About 2.05 million tonnes of iron ore reserves were estimated in 2007-08.
-do-	Khandbandh	1:500	26.75 Hect	32	1634.6	809	Total reserves of iron ore estimated was at 6.16 million tonnes in 2007-08.
-do-	Dubna- Sakradih Mining lease	-	-	20	822.6	648	About 2.15 million tonnes of iron ore reserves were estimated in 2007-08.
-do-	Barpada Kasia Iron ore mine	1:500	13 Hect	9	361.15	605	Total reserves of iron ore estimated was 4.22 million tonnes.
-do-	SGBK Lease	1:1,000	22.5 Hect	16	438.35	37	About 85,000 tonnes of iron ore reserves were estimated in 2007-08.
<b>M/s V.M.Salgaocar &amp; Bro. Pvt. Ltd</b>							
<b>Goa</b>							
North Goa	Velguem/ Surla Mine	1:2,000	105.9	3	238	-	As on 1.6.2007, the total reserves estimated was 14.3 million tonnes.
North and South Goa	Sancordem/ Malpona Mine	1:2,000	42.9	2	48	-	As on 1.6.2007, the total reserves estimated was 9.3 million tonnes.
South Goa	Sigao Mine	1:2,000	26.17	13	653.5	-	As on 1.6.2007, the total reserves estimated was 10.8 million tonnes.

## IRON ORE

There were 300 reporting mines in 2007-08 as against 290 in the previous year. Among them, 35 mines were in the public sector and 265 in private sector. The contribution of public sector to the total production was about 32% as against 33% in the preceding year. The remaining 68% production in 2007-08 was from private sector. Among 35 public sector mines, 20 mines (8 in Chhattisgarh, 4 in Karnataka, 5 in Orissa and 3 in Jharkhand), each producing more than one million tonnes annually accounted for 93% of the total output in public sector and 30% of the total production in the country during 2007-08. Out of 265 mines in private sector, 37 mines (17 in Orissa, 7 in Goa, 6 in Karnataka, 3 in Andhra Pradesh, 3 in Jharkhand and 1 in Madhya Pradesh) each producing more than one million tonnes annually accounted for about 59% of the total output of private sector and about 40% of the national production. Thus, 57 mines, each producing more than one million tonnes of iron ore annually, contributed about 70% of the total output in 2007-08. Out of 20 captive mines in the country, 14 were in the public sector and the remaining 6 in the private sector. The production of captive mines in the public sector was 25.5 million tonnes or 39% of the sectoral output in 2007-08. On the other hand, production of captive mines in private sector was 12.7 million tonnes or 9% of the output in the private sector.

Gradewise analysis of the current year's output reveals that, out of the total output of 206.5 million tonnes, iron ore lumps constituted 91.9 million tonnes or about 44.5%, fines 114 million tonnes or about 55.2% and concentrates 0.6 million tonnes or about 0.3%. Of the total output of iron ore lumps, 40.9 million tonnes or 44.5% was of grade 65% Fe and above, 36.7 million tonnes or 39.9% of grade 62% to below 65% Fe, 6.6 million tonnes or 7.2% was of grade 60% to below 62% Fe and the rest 7.8 million tonnes or about 8.4% of the production was of grade below 60% Fe. In the case of iron ore fines, 20.9 million tonnes or 18.4% of the production was of grade 65% Fe and above, 61.3 million tonnes or 53.8% of grade 62% to below 65% Fe and balance 31.7 million tonnes or about 27.8% of grade below 62% Fe. The grade of iron ore concentrates produced in Goa was above 64.5% Fe. The average Fe content of iron ore was about 63.5% in both the years.

Among the states, Orissa recorded the highest production of 68.5 million tonnes or about 33.2% of the country's production in 2007-08. Karnataka attained the second place with a production of 45.6 million tonnes or 22.1% of the total production

followed by Chhattisgarh 30.7 million tonnes or 14.9%, Goa 29.3 million tonnes or about 14.2%, Jharkhand 20.9 million tonnes or 10.1% and Andhra Pradesh 8.6 million tonnes or 4.2%. The remaining 1.3% production was reported from Madhya Pradesh, Maharashtra and Rajasthan.

In the year 2007-08, a total of 188.7 million tonnes of iron ore was despatched for internal consumption and for exports as against 175.9 million tonnes in the previous year. Out of this 52.8 million tonnes of iron ore was despatched for exports and 135.9 million tonnes for internal consumption. The corresponding figures for exports and internal consumption in the preceding year were 47.2 million tonnes and 128.7 million tonnes, respectively. Data on despatches for internal consumption given above includes 6 million tonnes and 10.7 million tonnes of despatches for 2007-08 and 2006-07, respectively, from the state of Goa, which was subsequently diverted for exports (Tables - 4 to 7).

The mine-head stocks of iron ore at the end of the year under review were 63.6 million tonnes as compared to 52.2 million tonnes recorded in the beginning of the year. The stocks relate to iron ore lumps, fines and concentrates in all the states (Tables- 6(A) & (B)).

The average daily employment of labour was 40,287 during 2007-08 as against 39,389 in the preceding year. The prices of iron ore during 2005-06 to 2007-08 are given in Table - 9.

*The Graphical Representation has been deleted*

IRON ORE

**Table – 4 : Principal Producers of Iron ore, 2007-08**

Name & address of producer	Location of mine	
	State	District
National Mineral Development Corporation Ltd, 10-3-311/A, Khanij Bhavan, Masab Tank, Hyderabad – 500 028.	Chhattisgarh Karnataka	Dantewada Bellary
Steel Authority of India Ltd, Ispat Bhavan, Lodhi Road, New Delhi – 110 003.	Chhattisgarh Jharkhand Karnataka Orissa	Durg Singhbhum (West) Chickmagalur Keonjhar Sundergarh
Tata Steel Ltd, 24, Homy Mody Street, Fort, Mumbai – 400 002.	Jharkhand Orissa	Singhbhum (West) Keonjhar
Essel Mining & Industries Ltd, 10, Camac Street, Kolkata – 700 017.	Orissa	Keonjhar Sundergarh
Sesa Goa Ltd, Altinho, Panjim, Goa – 403 001.	Goa Karnataka	North Goa South Goa Chitradurga
Rungta Mines Pvt. Ltd, 206, A. C. J Bose Road, Kolkata – 700 017.	Jharkhand Orissa	Singhbhum (West) Keonjhar
Ramesh Prasad Sao, Near Gandhi Park, Chaibasa, Dist. Singhbhum (West), Jharkhand.	Orissa	Keonjhar
Sarda Mines Private Ltd, Post Box No. 85, Barbil – 758 035, Dist. Keonjhar, Orissa.	Orissa	Keonjhar
Obulapuram Mining Co. (P) Ltd, Ennoble House, Raghavachari Road, Bellary – 583 101, Karnataka.	Andhra Pradesh	Anantapur
Orissa Mining Corporation Ltd, P. B. No. 34, Bhubaneswar – 751 001.	Orissa	Keonjhar Sundergarh
Kamaljeet Singh Ahluwalia, P. B. No. 3, Barbil – 758 035, Dist. Keonjhar, Orissa.	Orissa	Keonjhar
Patnaik Minerals Pvt. Ltd, P. O. Bonaikela, Joda, Dist. Keonjhar, Orissa..	Orissa	Keonjhar
Mysore Minerals Ltd, 39, M.G. Road, Bangalore – 560 001.	Karnataka	Bellary
Bharat Process & Mechanical Engineers Ltd, FD-350, Sector – 111, Salt Lake City, Kolkata – 700 106.	Orissa	Keonjhar
Indian Iron & Steel Co. Ltd, IISCO House, 50, Chowranghee Road, Kolkata – 700 071.	Jharkhand	Singhbhum (West)
V. M. Salgaocar & Bro. Pvt. Ltd, Salgaocar House, P. B. No. 14, Vasco-da-Gama, Goa – 403 803.	Goa	North Goa South Goa
Chowgule & Co. Ltd, Chowgule House, Marmugao Harbor, Vasco-da-Gama, Goa – 403 803.	Goa	North Goa

(Contd.)

IRON ORE

Table - 4 (Concl'd.)

Name & address of producer	Location of mine	
	State	District
Rungta Sons (P) Ltd, Rungta House, Chaibasa – 833,201, Dist. Singhbhum (West), Jharkhand.	Orissa	Sundergarh
Jindal Steel & Power Ltd, P. B. No. 6, Delhi Road, Hissar – 125 005, Dist. Hissar, Haryana.	Orissa	Sundergarh
MSPL Ltd, Welcom Co-operative Colony, Hospet – 583 203, Dist. Bellary, Karnataka.	Karnataka	Bellary
Dempo Mining Corporation Ltd, Dempo House, Compal, P. B. No. 116, Panjim, Goa – 403 001.	Goa	North Goa
Cosme Costa & Sons, Altino Mapusa, Goa.	Goa	North Goa
Y. Mahabaleswarappa & Sons, Sindigi Cloth Market Car Street, Bellary – 583 101, Karnataka.	Andhra Pradesh	Anantapur
Padam Kumar Jain, Chaibasa - 833 201, Dist. Singhbhum (West), Jharkhand.	Jharkhand	Singhbhum (West)
V. S. Lad & Sons, Prasanth Nivas, Krishna Nagar, Sandur – 583 119, Karnataka.	Karnataka	Bellary
Bonai Industrial Co. Ltd, Barbil-758 035, Dist. Keonjhar, Orissa.	Orissa	Sundergarh
Kaypee Enterprises, Post Box No. 3, P. O. Barbil – 758 035, Dist. Keonjhar, Orissa.	Orissa	Keonjhar
Anand Mining Corp'n. Ltd, Pathak Ward, Katni – 483 501, Madhya Pradesh.	Madhya Pradesh	Jabalpur
H. G. Rangangoud, H. No. 31/354, Neharu Cooperative Colony, Hospet, Dist. Bellary, Karnataka.	Karnataka	Bellary
Serajuddin & Co., P-16 Bentinck Street, Calcutta – 700 069.	Orissa	Keonjhar
Shri R. S. Shetye & Bros, Trinora Appts. 14, 1 <sup>st</sup> Floor, Near Municipal Market, Panaji – 403 001.	Goa	North Goa
S. B. Minerals, Post Box No. 56, K.R.Road, Hospet, Dist. Bellary, Karnataka.	Karnataka	Bellary
Gandamardhan Sponge Industries (P) Ltd, C/o. Shri Pratap Chandra Bahera, At & Post Narayanpur, Dist. Keonjhar, Orissa.	Orissa	Keonjhar
Doddanavar Bros, Near Fort, P. B. Road, Belgaum – 590 016, Karnataka.	Karnataka	Bagalkot
Usha Martin Ltd, Mangal Kalash, 2A Shekshpear Sarani, Kolkata – 700 071.	Jharkhand	Singhbhum (West)

IRON ORE

**Table – 5 : Production of Iron Ore, 2005-06 to 2007-08  
(By States)**

(Quantity in '000 tonnes; value in Rs. '000)

States		2005-06		2006-07		2007-08(p)	
		Quantity	Value	Quantity	Value	Quantity	Value
<b>India</b>	<b>Total</b>	<b>165230</b>	<b>108038760</b>	<b>187696</b>	<b>142043084</b>	<b>206452</b>	<b>184954025</b>
	Lumps	68312	49206806	88310	75495106	91877	96489360
	Fines	93305	53522555	98240	65930057	113970	87974513
	Concentrates	3613	5309399	1146	617921	605	490152
<b>Andhra Pradesh</b>	<b>Total</b>	<b>4148</b>	<b>2842076</b>	<b>4985</b>	<b>3599272</b>	<b>8602</b>	<b>8068064</b>
	Lumps	975	710457	2117	1351889	4646	4304038
	Fines	3173	2131619	2868	2247383	3956	3764026
<b>Chhattisgarh</b>	<b>Total</b>	<b>26084</b>	<b>23733808</b>	<b>28731</b>	<b>32676739</b>	<b>30699</b>	<b>43061418</b>
	Lumps	12055	13156385	12826	18647730	12557	21584332
	Fines	14029	10577423	15905	14029009	18142	21477086
<b>Goa</b>	<b>Total</b>	<b>24027</b>	<b>11071661</b>	<b>28723</b>	<b>19438965</b>	<b>29281</b>	<b>24138223</b>
	Lumps	4921	2336181	6656	3910153	5748	4128617
	Fines	18421	8556236	20921	14910891	22928	19519454
	Concentrates	685	179244	1146	617921	605	490152
<b>Jharkhand</b>	<b>Total</b>	<b>17975</b>	<b>5357410</b>	<b>18608</b>	<b>5511563</b>	<b>20929</b>	<b>6507970</b>
	Lumps	7102	2230210	8979	2988525	9303	2905318
	Fines	10873	3127200	9629	2523038	11626	3602652
<b>Karnataka</b>	<b>Total</b>	<b>39843</b>	<b>28763801</b>	<b>40719</b>	<b>32130403</b>	<b>45605</b>	<b>39919060</b>
	Lumps	14006	8822600	18946	14592134	19071	16702549
	Fines	22909	14811046	21773	17538269	26534	23216511
	Concentrates	2928	5130155	-	-	-	-
<b>Madhya Pradesh</b>	<b>Total</b>	<b>464</b>	<b>46044</b>	<b>1212</b>	<b>232735</b>	<b>2216</b>	<b>336538</b>
	Lumps	155	12467	136	15515	308	33553
	Fines	309	33577	1076	217220	1908	302985
<b>Maharashtra</b>	<b>Total</b>	<b>520</b>	<b>187599</b>	<b>523</b>	<b>380627</b>	<b>588</b>	<b>396291</b>
	Lumps	212	69338	333	245792	265	167643
	Fines	308	118261	190	134835	323	228648
<b>Orissa</b>	<b>Total</b>	<b>52151</b>	<b>36032752</b>	<b>64178</b>	<b>48069518</b>	<b>68516</b>	<b>62523445</b>
	Lumps	28868	21865559	38300	33740106	39963	46660294
	Fines	23283	14167193	25878	14329412	28553	15863151
<b>Rajasthan</b>	<b>Total</b>	<b>18</b>	<b>3609</b>	<b>17</b>	<b>3262</b>	<b>16</b>	<b>3016</b>
	Lumps	18	3609	17	3262	16	3016

*The Graphical Representations have been deleted*

**Table – 6(A) : Production of Iron Ore, 2006-07**  
(By Sectors / States / Districts / Grades)

(Quantity in '000 tonnes; value in Rs.'000)

State / District	No. of mines	Lumps					fines					Concentrates		Total		
		Below 60% Fe	60% - 62% Fe	62% - 65% Fe & above	Total	Value	Below 62% Fe	62% - 65% Fe	65% Fe & above	Total	Value	Total	Value	Total	Value	
		62% Fe	65% Fe	65% Fe & above			62% Fe	65% Fe	& above							
<b>India</b>	<b>290(18)</b>	<b>9085</b>	<b>6447</b>	<b>32898</b>	<b>39880</b>	<b>88310</b>	<b>75495106</b>	<b>27368</b>	<b>50871</b>	<b>20001</b>	<b>98240</b>	<b>65930057</b>	<b>1146</b>	<b>617921</b>	<b>187696</b>	<b>42043084</b>
Public sector	40(0)	501	1487	13309	14105	29402	33555320	5150	21993	6214	33357	24157417	-	-	62759	57712737
Private sector	250(18)	8584	4960	19589	25775	58908	41939786	22218	28878	13787	64883	41772640	1146	617921	124937	84330347
<b>Andhra Pradesh</b>	<b>14(1)</b>	<b>377</b>	<b>121</b>	<b>1573</b>	<b>46</b>	<b>2117</b>	<b>1351889</b>	<b>292</b>	<b>2356</b>	<b>220</b>	<b>2868</b>	<b>2247383</b>	-	-	<b>4985</b>	<b>3599272</b>
Anantapur	3	130	-	1573	46	1749	1224941	-	2356	220	2576	2193086	-	-	4325	3418027
Cuddapah	6	162	121	-	-	283	120623	292	-	-	292	54297	-	-	575	174920
Kurnool	4(1)	84	-	-	-	84	6002	-	-	-	-	-	-	-	84	6002
Prakasam	1	1	-	-	-	1	323	-	-	-	-	-	-	-	1	323
<b>Chhattisgarh</b>	<b>11</b>	<b>87</b>	<b>607</b>	<b>2389</b>	<b>9743</b>	<b>12826</b>	<b>18647730</b>	<b>3018</b>	<b>9118</b>	<b>3769</b>	<b>15905</b>	<b>14029009</b>	-	-	<b>28731</b>	<b>32676739</b>
Dantewada	3	-	6	130	8529	8665	17363461	2964	4870	3769	11603	13144035	-	-	20268	30507496
Durg	5	34	576	2223	1175	4008	1214578	15	4248	-	4263	873279	-	-	8271	2087857
Kanker	2	-	-	++	39	39	17928	-	-	-	-	-	-	-	39	17928
Rajnandgaon	1	53	25	36	-	114	51763	39	-	-	39	11695	-	-	153	63458
<b>Goa</b>	<b>67</b>	<b>4277</b>	<b>1762</b>	<b>617</b>	-	<b>6656</b>	<b>3910153</b>	<b>14713</b>	<b>6197</b>	<b>11</b>	<b>20921</b>	<b>14910891</b>	<b>1146</b>	<b>617921</b>	<b>28723</b>	<b>19438965</b>
North Goa	29	2322	828	252	-	3402	1499410	9226	2831	-	12057	6434604	508	292521	15967	8226535
South Goa	38	1955	934	365	-	3254	2410743	5487	3366	11	8864	8476287	638	325400	12756	11212430
<b>Jharkhand</b>	<b>17(1)</b>	<b>83</b>	<b>351</b>	<b>6562</b>	<b>1983</b>	<b>8979</b>	<b>2988525</b>	<b>571</b>	<b>6489</b>	<b>2569</b>	<b>9629</b>	<b>2523038</b>	-	-	<b>18608</b>	<b>5511563</b>
Singbhum West	17(1)	83	351	6562	1983	8979	2988525	571	6489	2569	9629	2523038	-	-	18608	5511563

(Contd.)

Table - 6(A) (Concl.d.)

State / District	No. of mines	Lumps					Fines					Concentrates		Total		
		Below 60% Fe	60% - 62% Fe	62% - 65% Fe & above	Total	Value	Below 62% Fe	62% - 65% Fe	65% Fe & above	Total	Value	Total	Value	Total	Value	
<b>Karnataka</b>	<b>78(6)</b>	<b>2397</b>	<b>1451</b>	<b>10037</b>	<b>5061</b>	<b>18946</b>	<b>14592134</b>	<b>4719</b>	<b>12086</b>	<b>4968</b>	<b>21773</b>	<b>17538269</b>	<b>-</b>	<b>-</b>	<b>40719</b>	<b>32130403</b>
Bagalkot	2	591	-	-	-	591	590592	958	-	-	958	349703	-	-	1549	940295
Bellary	61(4)	1263	1154	9623	4720	16760	12925691	2592	10516	4968	18076	15269229	-	-	34836	28194920
Chitradurga	8(1)	372	71	312	341	1096	842105	384	1185	-	1569	1425013	-	-	2665	2267118
Tumkur	7(1)	171	226	102	-	499	233746	785	385	-	1170	494324	-	-	1669	728070
<b>Madhya Pradesh</b>	<b>5(3)</b>	<b>136</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>136</b>	<b>15515</b>	<b>1076</b>	<b>-</b>	<b>-</b>	<b>1076</b>	<b>217220</b>	<b>-</b>	<b>-</b>	<b>1212</b>	<b>232735</b>
Gwalior	1	14	-	-	-	14	2193	-	-	-	-	-	-	-	14	2193
Jabalpur	4(3)	122	-	-	-	122	13322	1076	-	-	1076	217220	-	-	1198	230542
<b>Maharashtra</b>	<b>10</b>	<b>171</b>	<b>112</b>	<b>50</b>	<b>-</b>	<b>333</b>	<b>245792</b>	<b>92</b>	<b>98</b>	<b>-</b>	<b>190</b>	<b>134835</b>	<b>-</b>	<b>-</b>	<b>523</b>	<b>380627</b>
Chandrapur	3	96	-	-	-	96	64748	-	-	-	-	-	-	-	96	64748
Gadchiroli	1	4	-	-	-	4	1221	-	-	-	-	-	-	-	4	1221
Gondia	3	15	17	-	-	32	25894	2	-	-	2	1116	-	-	34	27010
Sindhudurg	3	56	95	50	-	201	153929	90	98	-	188	133719	-	-	389	287648
<b>Orissa</b>	<b>87(7)</b>	<b>1540</b>	<b>2043</b>	<b>11670</b>	<b>23047</b>	<b>38300</b>	<b>33740106</b>	<b>2887</b>	<b>14527</b>	<b>8464</b>	<b>25878</b>	<b>14329412</b>	<b>-</b>	<b>-</b>	<b>64178</b>	<b>48069518</b>
Keonjhar	53(5)	565	1068	5617	21982	29232	25320964	1217	10377	7382	18976	11052413	-	-	48208	36373377
Mayurbhanj	6	8	-	34	136	178	182612	-	27	7	34	22357	-	-	212	204969
Sundergarh	28(2)	967	975	6019	929	8890	8236530	1670	4123	1075	6868	3254642	-	-	15758	11491172
<b>Rajasthan</b>	<b>1</b>	<b>17</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>17</b>	<b>3262</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>17</b>	<b>3262</b>
Jaipur	1	17	-	-	-	17	3262	-	-	-	-	-	-	-	17	3262

IRON ORE

**Table – 6(B) : Production of Iron Ore, 2007-08 (p)**  
(By Sectors / States / Districts / Grades)

(Quantity in '000 tonnes; value in Rs.'000)

State / District	No. of mines	Lumps					Fines					Concentrates			Total	
		Below 60% Fe	60% - 62% Fe	62% - 65% Fe & above	Total	Value	Below 62% Fe	62% - 65% Fe	65% Fe & above	Total	Value	Total	Value	Total	Value	
<b>India</b>	<b>300(15)</b>	<b>7757</b>	<b>6568</b>	<b>36668</b>	<b>40884</b>	<b>91877</b>	<b>96489360</b>	<b>31739</b>	<b>61282</b>	<b>20949</b>	<b>113970</b>	<b>87974513</b>	<b>605</b>	<b>490152</b>	<b>206452</b>	<b>84954025</b>
Public sector	35	770	385	15236	11738	28129	37069985	3338	25830	8224	37392	33577691	-	-	65521	70647676
Private sector	265 (15)	6987	6183	21432	29146	63748	59419375	28401	35452	12725	76578	54396822	605	490152	140931	14306349
<b>Andhra Pradesh 17 (1)</b>	<b>650</b>	<b>-</b>	<b>3936</b>	<b>60</b>	<b>4646</b>	<b>4304038</b>	<b>526</b>	<b>3392</b>	<b>38</b>	<b>3956</b>	<b>3764026</b>	<b>-</b>	<b>-</b>	<b>8602</b>	<b>8068064</b>	
Anantapur	6	-	3936	60	3996	4054445	-	3392	38	3430	3671720	-	-	7426	7726165	
Cuddapah	6	525	-	-	525	240142	526	-	-	526	92306	-	-	1051	332448	
Kurnool	4(1)	125	-	-	125	9409	-	-	-	-	-	-	-	125	9409	
Prakasam	1	++	-	-	++	42	-	-	-	-	-	-	-	-	++	42
<b>Chhattisgarh</b>	<b>11</b>	<b>13</b>	<b>61</b>	<b>4572</b>	<b>7911</b>	<b>12557</b>	<b>21584332</b>	<b>1184</b>	<b>10693</b>	<b>6265</b>	<b>18142</b>	<b>21477086</b>	<b>-</b>	<b>-</b>	<b>30699</b>	<b>43061418</b>
Dantewada	3	-	22	590	7908	8520	20474284	1118	6790	6265	14173	20381194	-	-	22693	40855478
Durg	5	-	-	3950	-	3950	1073309	-	3903	-	3903	1075958	-	-	7853	2149267
Kanker	2	-	-	7	3	10	4925	-	-	-	-	-	-	-	10	4925
Rajnandgaon	1	13	39	25	-	77	31814	66	-	-	66	19934	-	-	143	51748
<b>Goa</b>	<b>73</b>	<b>3326</b>	<b>2013</b>	<b>409</b>	<b>-</b>	<b>5748</b>	<b>4128617</b>	<b>17369</b>	<b>5553</b>	<b>6</b>	<b>22928</b>	<b>19519454</b>	<b>605</b>	<b>490152</b>	<b>29281</b>	<b>24138223</b>
North Goa	31	2006	618	142	-	2766	1791772	10298	2707	-	13005	10225370	123	119988	15894	12137130
South Goa	42	1320	1395	267	-	2982	2336845	7071	2846	6	9923	9294084	482	370164	13387	12001093
<b>Jharkhand</b>	<b>17</b>	<b>38</b>	<b>140</b>	<b>7030</b>	<b>2095</b>	<b>9303</b>	<b>2905318</b>	<b>1452</b>	<b>7809</b>	<b>2365</b>	<b>11626</b>	<b>3602652</b>	<b>-</b>	<b>-</b>	<b>20929</b>	<b>6507970</b>
Singhbhum West	17	38	140	7030	2095	9303	2905318	1452	7809	2365	11626	3602652	-	-	20929	6507970

(Contd.)

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Table - 6(B) (Concl.)

State / District	No. of mines	Lumps				Fines				Concentrates		Total				
		Below 60% Fe	60% - 62% Fe	62% - 65% Fe & above	Total	Value	Below 62% Fe	62% - 65% Fe	65% Fe & above	Total	Value	Total	Value			
<b>Karnataka</b>	<b>86(6)</b>	<b>2144</b>	<b>3014</b>	<b>8794</b>	<b>5119</b>	<b>19071</b>	<b>16702549</b>	<b>5456</b>	<b>16638</b>	<b>4440</b>	<b>26534</b>	<b>23216511</b>	-	-	<b>45605</b>	<b>39919060</b>
Bagalkot	2	371	-	-	371	370650	832	-	-	-	832	624161	-	-	1203	994811
Bellary	67(4)	1632	2097	8468	4700	16897	14897611	2474	13874	4440	20788	18330728	-	-	37685	33228339
Chitradurga	9(1)	111	457	303	419	1290	1220571	1191	2657	-	3848	3851811	-	-	5138	5072382
Tumkur	8(1)	30	460	23	-	513	213717	959	107	-	1066	409811	-	-	1579	623528
<b>Madhya Pradesh</b>	<b>5(3)</b>	<b>293</b>	<b>15</b>	-	-	<b>308</b>	<b>33553</b>	<b>1908</b>	-	-	<b>1908</b>	<b>302985</b>	-	-	<b>2216</b>	<b>336538</b>
Gwalior	1	62	-	-	-	62	9648	-	-	-	-	-	-	-	62	9648
Jabalpur	4(3)	231	15	-	-	246	23905	1908	-	-	1908	302985	-	-	2154	326890
<b>Maharashtra</b>	<b>10</b>	<b>2</b>	<b>113</b>	<b>150</b>	-	<b>265</b>	<b>167643</b>	<b>13</b>	<b>310</b>	-	<b>323</b>	<b>228648</b>	-	-	<b>588</b>	<b>396291</b>
Chandrapur	3	-	65	31	-	96	45546	11	-	-	11	6520	-	-	107	52066
Gadchiroli	1	1	-	-	-	1	368	-	-	-	-	-	-	-	1	368
Gondia	3	++	28	-	-	28	21346	2	-	-	2	928	-	-	30	22274
Sindhudurg	3	1	20	119	-	140	100383	-	310	-	310	221200	-	-	450	321583
<b>Orissa</b>	<b>80(5)</b>	<b>1277</b>	<b>1210</b>	<b>11777</b>	<b>25699</b>	<b>39963</b>	<b>46660294</b>	<b>3831</b>	<b>16887</b>	<b>7835</b>	<b>28553</b>	<b>15863151</b>	-	-	<b>68516</b>	<b>62523445</b>
Keonjhar	48(3)	1230	981	4923	24659	31794	36657293	1567	13510	7311	22388	13069439	-	-	54182	49726732
Mayurbhanj	7	47	-	337	220	604	452184	1	30	17	48	21508	-	-	652	473692
Sundergarh	25(2)	-	229	6517	820	7565	9550817	2263	3347	507	6117	2772204	-	-	13682	12323021
<b>Rajasthan</b>	<b>1</b>	<b>14</b>	<b>2</b>	-	-	<b>16</b>	<b>3016</b>	-	-	-	-	-	-	-	<b>16</b>	<b>3016</b>
Jaipur	1	14	2	-	-	16	3016	-	-	-	-	-	-	-	16	3016

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**Table – 7: Production of Iron Ore, 2006-07 and 2007-08(p)  
(By Frequency Groups)**

Production group (in tonnes)	No. of mines		Production for the group (in '000 tonnes)		Percentage in total production		Cumulative percentage	
	2006-07	2007-08	2006-07	2007-08	2006-07	2007-08	2006-07	2007-08
<b>Total</b>	<b>290(18)</b>	<b>300(15)</b>	<b>187696</b>	<b>206452</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
Upto 500	5	5(1)	1	1	++	++	++	++
501 - 1000	3(1)	2(1)	3	2	++	++	++	++
1001 - 5000	15(2)	7(1)	51	22	0.03	0.01	0.03	0.01
5001 - 10000	4(1)	13	43	99	0.02	0.05	0.05	0.06
10001 - 25000	27(2)	14	455	238	0.24	0.12	0.29	0.18
25001 - 50000	28(5)	18(5)	1169	759	0.62	0.37	0.91	0.55
50001 - 100000	19(6)	33(1)	1950	2424	1.04	1.17	1.95	1.72
100001 - 500000	92	114(5)	23778	31550	12.67	15.28	14.62	17.00
500001 - 1000000	42(1)	37(1)	29821	27860	15.89	13.49	30.51	30.49
1000001 - 1500000	21	20	25673	24743	13.68	11.98	44.19	42.47
1500001 - 2000000	10	8	18153	14922	9.67	7.23	53.86	49.70
2000001 and above	24	29	86599	103832	46.14	50.30	100	100

**Table – 8(A) : Mine-Head Stock of Iron Ore at the beginning of the year, 2007-08**

(Quantity in '000 tonnes)

State	Lumps					Fines				Concen - trates	Total Lumps, fines & concentrates
	Below 60%	60% - 62%	62% - 65%	65% and above	Total	Below 62%	62% - 65%	65% and above	Total	Total	
<b>India</b>	<b>2749</b>	<b>2287</b>	<b>5850</b>	<b>3213</b>	<b>14099</b>	<b>12571</b>	<b>18187</b>	<b>7249</b>	<b>38007</b>	<b>94</b>	<b>52200</b>
Andhra Pradesh	60	29	59	3	151	76	60	5	141	-	292
Chhattisgarh	19	5	67	204	295	491	5935	2770	9196	-	9491
Goa	549	429	64	-	1042	1215	444	++	1659	51	2752
Jharkhand	13	313	448	-	774	31	655	-	686	-	1460
Karnataka	1512	660	2681	1145	5998	9577	2837	1223	13637	-	19635
Madhya Pradesh	22	-	-	-	22	18	-	-	18	-	40
Maharashtra	19	60	24	-	103	25	32	-	57	-	160
Orissa	554	791	2507	1861	5713	1138	8224	3251	12613	43	18369
Rajasthan	1	-	-	-	1	-	-	-	-	-	1

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**Table – 8 (B) : Mine-Head Stocks of Iron Ore at the end of the year, 2007-08 (p)**

(Quantity in '000 tonnes)

State	Lumps					Fines				Total
	Below 60%	60% - 62%	62% - 65%	65% and above	Total	Below 62%	62% - 65%	65% and above	Total	Lumps & fines
<b>India</b>	<b>7815</b>	<b>2321</b>	<b>7548</b>	<b>3575</b>	<b>21259</b>	<b>14432</b>	<b>21197</b>	<b>6687</b>	<b>42316</b>	<b>63575</b>
Andhra Pradesh	79	-	164	3	246	52	91	8	151	397
Chhattisgarh	3	4	248	537	792	558	5837	2162	8557	9349
Goa	762	382	39	-	1183	2343	421	2	2766	3949
Jharkhand	4	248	561	3	816	488	685	5	1178	1994
Karnataka	4485	1018	4005	1040	10548	8862	4361	951	14174	24722
Madhya Pradesh	176	2	-	-	178	49	-	-	49	227
Maharashtra	6	18	59	-	83	++	68	-	68	151
Orissa	2299	649	2472	1992	7412	2080	9734	3559	15373	22785
Rajasthan	1	-	-	-	1	-	-	-	-	1

**Table – 9 : Prices of Iron Ore, 2005-06 to 2007-08  
(Domestic Markets)**

(In Rs. per tonne)

Grade	Market	2005-06	2006-07	2007-08 (p)
Lump 63/63% Fe*	f.o.b.t. Marmugao (No. 9 berth)	\$ 35.88	\$ 42.10	\$ 46.10
Lump 62/62% Fe*	f.o.b.t. Marmugao (No. 9 berth)	\$ 34.14	\$ 40.62	\$ 44.48
Lump 61/61% Fe*	f.o.b.t. Marmugao (No. 9 berth)	\$ 32.57	\$ 38.76	\$ 42.44
Lump 60/60% Fe*	f.o.b.t. Marmugao (No. 9 berth)	\$ 31.31	\$ 37.26	\$ 40.80
Lump 60/59% Fe*	f.o.b.t. Marmugao (No. 9 berth)	\$ 29.84	\$ 35.51	\$ 38.89
Fines 63/63% Fe*	f.o.b.t. Marmugao (No. 9 berth)	\$ 30.88	\$ 36.75	\$ 40.24
Fines 62/62% Fe*	f.o.b.t. Marmugao (No. 9 berth)	\$ 29.99	\$ 35.68	\$ 39.07
Fines 61/61% Fe*	f.o.b.t. Marmugao (No. 9 berth)	\$ 29.11	\$ 34.64	\$ 37.93
Fines 60/60% Fe*	f.o.b.t. Marmugao (No. 9 berth)	\$ 28.50	\$ 33.92	\$ 37.14
Baila Lump 65% Fe**	f.o.b. Vizag (Andhra Pradesh.)	\$ 49.64	\$ 59.07	\$ 31.88
Baila Fine 65% Fe**	f.o.b. Vizag (Andhra Pradesh.)	\$ 38.51	\$ 45.83	\$ 50.99
Doni Lump 65% Fe**	f.o.b. Chennai (Tamil Nadu)	\$ 47.97	\$ 57.08	\$ 62.51
Doni Fine 65% Fe**	f.o.b. Chennai (Tamil Nadu)	\$ 38.51	\$ 45.83	\$ 50.18
Fines 62-65% Fe	f.o.r. Rungta mines (Jharkhand)	NQ	820	1058
Lumps 62-65% Fe	f.o.r. Rungta mines (Jharkhand)	997	1779	2415
Lumps +65% Fe	f.o.r. Rungta mines (Jharkhand)	2317	2888	3730

\* Prices are in US \$/tonne

\*\* Prices are in US\$/DMT

## MINING, MARKETING & TRANSPORT

Iron ore mining is carried out by opencast method by manual, semi-mechanised and mechanised operations.

The characteristics of iron ore vary as per the geological set up. Some ores are found in BHQ which exists as hard massive reef type of deposit while in other places, they occur as friable or powdery form as well as in combinations of both hard massive and powdery

form. Hence, the method of mining and deployment of machinery vary from place to place. Large mechanised mines are mostly in the public sector. Manual and semi-mechanised mines are mainly in private sector. Some mechanised mines in Goa, Jharkhand and Orissa are also operated in the private sector.

### Manual Mines

Generally, these mines are confined to float ores where mining is done by digging the ore with pickaxes, crowbars, chisels and spades. The mined material is

## IRON ORE

screened manually to separate +10 mm float ore which is then stacked separately. The waste is backfilled into the pits. In some reef workings, 35-40 mm diameter holes are drilled to 0.6 m depth, by hand-held jackhammers at a spacing of about 0.6 m and each hole is charged with 150-200 g gunpowder or special gelatine cartridges. Blasted tonnage per kg gunpowder is usually 2.5-3 tonnes. Blasted ore is manually loaded into trucks for transport to either railway sidings or to buyer's destination directly. Output per manshift (OMS) is normally between 1.5 and 2 tonnes.

### **Mechanised Mines**

Most mechanised mines are captive ones of different steel plants and have been developed to meet their requirements. Mining is done by formation of systematic benches in overburden and ore. The height of the benches normally varies from 10 to 12 m and width up to 20 m in the ore. Drilling holes of 300 mm diameter and till 12 m depth by crawler drills and use of explosives, such as ANFO, SMS and emulsion explosives for blasting are in practice. Loading is done by earth-moving machinery powered by diesel or electric engines, such as hydraulic excavators in the range from 1.9 cu m to 10 cu m. Ripper dozers and motor graders are also deployed for excavation and levelling purposes. Dumpers/trucks/tippers up to 120-tonne capacity were deployed in mines like Kudremukh (now closed) for transportation.

In some Goan mines, where ore is predominantly in powdery form, hydraulic shovels with boom height of 9 m are used for excavation and loading. Heavy-duty Ripper-Dozers are preferred for mining as Goan ores are soft. Height of the benches is restricted to 7 m for safe and efficient operations. Widths of working benches are maintained at more than 15 m and bench slope is maintained at about 80°. The ore produced is transported to short distances by dumpers of up to 40- tonne capacity. For longer distances and barge loading, dumpers up to 10 -tonne capacity are used. The barges carry the ore to harbours. The ore from the barges is loaded to ships either through berth or through transshippers.

Almost all the public sector mines including Kiriburu, Barsua, Gua, Bailadila, Donimalai, Kudremukh, Daitari and Dalli-Rajhara operated by SAIL, NMDC, OMC and KIOCL are fully mechanised. Kudremukh iron ore mine of KIOCL is closed since

December 2005. In private sector, mines operated in Goa region and Tata Steel's captive mines are mechanised. Approximately, 90% iron ore production comes from mechanised mines.

The processing of iron ore in the country involves crushing, screening, washing and in some cases beneficiation and agglomeration. Crushing and screening is adopted mainly for sizing the ore and also for removing the adherent gangue minerals. Dry and wet grinding is also resorted to in some cases.

The lumps and fines of iron ore are marketed after washing, screening and beneficiation. Fines are converted in to sinters for use in steel plants while pellets made from concentrates/fines are predominantly exported and also are utilised for internal consumption in sponge iron units.

## **ENVIRONMENTAL FACTORS**

Afforestation, waste dump management, top soil management, management of subgrade minerals, mechanical beneficiation, dust suppression, monitoring of water and air quality, vibration survey, publicity and propaganda are some common environmental restoration efforts pursued by all mechanised and semi-mechanised iron ore mines. Mining and beneficiation of ores carried out on large-scale cause environmental problems. A specific problem to iron ore mining is the disposal of tailings and other deleterious silica minerals and phosphorus. To safeguard the environment and prevent ecological degradation, thrust has been laid on green belt development, solid waste management, monitoring of liquid & air effluents and other crucial environmental parameters.

Goa region is prone to siltation of agricultural fields, nallahs, riverbeds and creeks due to wash off from iron ore dumps in rainy season. Loss of crop yield and reduction in fish population in streams and navigation difficulties are the problems due to silting. To overcome the problems, check dams and water filter beds at higher contours have been constructed. Tailing ponds are also being maintained at some mines. Afforestation is the mainstay in reclaiming the mined out areas in Goa. In a few cases, pits are used as water reservoir for pisciculture.

In Bellary-Hospet area, Karnataka, dust concentration (suspended particulate matters) is the main environmental problem. Environmental concerns

had led to closing down of mining operations at Kudremukh iron ore mine of KIOCL in December 2005 in compliance with the order passed by the Hon'ble Supreme Court in this regard. In Bailadila sector, Chhattisgarh, forest is fairly widespread and dense, supported by good rainfall and rich flora & fauna. The deforestation taking place due to mining and waste dumping needs to be compensated continuously by afforestation at suitable slopes and in township areas. In Jharkhand, afforestation of land is the main recourse adopted for reclamation of degraded lands or improvement in land uses.

## INDUSTRY

Iron ore is the basic raw material used for making pig iron, sponge iron and finished steel. The iron ore is used mainly in blast furnaces, mini-blast furnaces (MBF), DRI and sintering & pelletisation plants.

### Pelletisation

In general, the pelletisation process involves mixing of iron ore and required limestone with water which later is ground in ball mills to the desired size. The discharged slurry from ball mills is filtered in pressure filters. The filter cake from filters is then mixed with dry-ground coke fines to which bentonite is mixed in suitable proportion to form green pellets in pelletising discs. The coke fines and bentonite are ground separately. The green pellets are then dried, heated and fired in indurating machine to produce iron ore pellets. There is an increasing trend for utilisation of pellets or sinters in the recent years. The use of pellets as feed in the blast furnace has several advantages because of their uniform size, known composition and strength.

The six pelletisation plants in the country have a total capacity of 19.35 million tonnes per annum. The new pellet plant of Jindal Vijayanagar Steel Ltd (now JSW Steel Ltd) at Vidyanagar, Bellary district, Karnataka, has annual capacity of 4.2 million tonnes. This pellet plant reportedly supplies 1.5 million tonnes pellets to its Corex Plant and exports around 2 million tonnes. The pellet plant uses coal fines and also off gases from the power plant to reduce production cost. Essar Steel Pelletisation plant at Vishakhapatnam has installed capacity of

8 million tonnes per annum. After meeting its own requirement at its hot briquetted iron (HBI) plant in Hazira, Gujarat, Essar supplies pellets to both domestic and international markets. The plant has an assured supply of high quality iron ore from the captive 8 million tpy beneficiation plant at Bailadila, Chhattisgarh. The iron ore slurry is pumped through a 267-km pipeline-the second largest in the world-to the pellets plant at Visakhapatnam.

KIOCL's pellet plant capacity was expanded to 4 million tonnes per annum with additions/modifications and installation of 0.5 million tonne Shaft Pelletisation Furnace. Owing to environmental concerns and consequent upon the Hon'ble Supreme Court's order thereupon effective 31st December 2005, mining activity at Kudremukh by KIOCL was halted. Alternatively, the Government's decision to allot iron ore from Donimalai deposits to KIOCL's Mangalore Pellet Plant which has a capacity 3.5 - 3.7 million tonnes pellets per annum, has furthered the prospects for pellet production. An arrangement has also been made to transport fine ore by train from Bellary Hospet region to Pellet Plant at Mangalore. KIOCL has installed three grinding facilities at the Mangalore Pellet Plant to crush iron ore received from Bellary sector. The grinding mill can process 15,000 tpd fines below 10 mm to produce 12,000 tpd pellet feed. This alternative arrangements have saved the Pellet plant at Mangalore from closure. KIOCL's pellets have excellent export market.

The pelletisation plants of Tata Steel at Noamundi and Chowgule & Co. Pvt. Ltd at Pale, Goa are not functioning.

### Sintering

The eight sintering plants in the country have annual capacity of 28.62 million tonnes. All integrated steel plants except IISCO Steel Plant (ISP) have their own sintering plants. These plants receive raw material mostly from their captive mines. Two sintering plants have come on stream, namely, Neelachal Ispat Nigam Ltd, Orissa (1,710 thousand tonnes) and SISCO, Mettur, Tamil Nadu (127.5 thousand tonnes), taking the annual capacity to about 30.45 million tpy.

Pellets along with sinters have resulted in growth in utilisation of iron ore fines and blue dust. Information on capacity and production of pellets and sintering plants is given in Table-10.

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**Table – 10 : Capacity & Production of Pellets/Sinters  
(By Plants)**

(In '000 tonnes)

Name & location of plant	Annual installed capacity	Production		Iron ore fines consumed		General specification of concentrates/fines used
		2006-07	2007-08	2006-07	2007-08	
<b>A) Pellet Plants :</b>						
i) Kudremukh Iron Ore Co. Ltd, Panambur, Mangalore, Karnataka.	3500	630	1927	630	1975	Fe 64.86% , SiO <sub>2</sub> 5.65%, Al <sub>2</sub> O <sub>3</sub> 0.62%, S 0.05%, Size - 10 mm.
ii) Mandovi Pellets Ltd, Near Borim Bridge, Shiroda, Goa – 403 103.	1800	200	523	222	569	Fe 62%, SiO <sub>2</sub> 2 to 3.5%, Al <sub>2</sub> O <sub>3</sub> 1.35 to 2%, Size -10 mm.
iii) Jindal Vijayanagar Steel Ltd, (JSW) Bellary, Karnataka.	4200	-	NA	7830	9581	Fe 63.5%, Al <sub>2</sub> O <sub>3</sub> < 2.5%, CaO > 0.07%, SiO <sub>2</sub> < 3.2%, P <0.04%, MgO > 0.05%.
iv) Tata Steel Ltd, Noamundi, Jharkhand	800	Nil	Nil	Nil	Nil	-
v) Chowgule & Co. Ltd, Pale, Goa.	550	Nil	Nil	Nil	Nil	-
vi) Essar Steel Ltd, Visakhapatnam, Andhra Pradesh.	8000	NA	NA	NA	NA	NA
<b>B) Sintering Plants :</b>						
i) Bokaro Steel Plant, Jharkhand.	6200	4691	5349	4126	4921	Fe 62.55%, SiO <sub>2</sub> 3.31%, Al <sub>2</sub> O <sub>3</sub> 2.38%, Size -3 to 10 mm.
ii) Bhilai Steel Plant, Bhilai, Chhattisgarh.	6334	6647	7229	5011	5153	Fe 60.91%, SiO <sub>2</sub> 5.71%, Al <sub>2</sub> O <sub>3</sub> 0.67%, Size (-) 10 mm.
iii) Durgapur Steel Plant, West Bengal.	3001	2569	2841	2134	2356	Fe 61.50 to 62.87%, SiO <sub>2</sub> 2.17 to 4.54%, Al <sub>2</sub> O <sub>3</sub> 2.38 to 3.03%.
iv) Rourkela Steel Plant, Orissa.	3070	3068	3444	2434	2808	Fe 62.83%, SiO <sub>2</sub> 2.48%, Al <sub>2</sub> O <sub>3</sub> 3.04%, Size -10 mm.
v) Visakhapatnam Steel Plant, Andhra Pradesh.	5256	5520	NA	4189	NA	Fe 64.50%, Al <sub>2</sub> O <sub>3</sub> 3.5%, SiO <sub>2</sub> 2%, Size (-) 10 mm.
vi) Tata Steel Ltd, Jamshedpur, Jharkhand.	8000	5875	5826	5324	5515	NA
vii) IDCOL, Kalinga, Keonjhar, Orissa.	8	NA	NA	NA	NA	Fe 62% min., Al <sub>2</sub> O <sub>3</sub> + SiO <sub>2</sub> 8% max., moisture 4%, SiO <sub>2</sub> 1.5-5%.
viii) Ispat Industries Ltd, Dolvi, Raigad, Maharashtra	2240	NA	NA	NA	NA	NA
ix) Neelachal Ispat Nigam Ltd, Orissa.	1710	-	NA	-	NA	NA
x) SISCO, Mettur, Tamil Nadu.	127.5	-	NA	-	NA	NA
xi) Jayaswal Neco Industries Ltd, Sitara Growth Centre, Raipur – 493 221, Chhattisgarh.	800	NA	NA	NA	NA	NA
xii) Jindal Steel & Power Ltd, Raigarh, Chhattisgarh.	2300	NA	NA	NA	NA	NA

## Pig Iron

Pig iron is one of the basic raw materials required by foundry and casting industry for manufacturing various types of castings for the Engineering sector. The post-liberalisation regime, has witnessed expressions of interest from a large number of entrepreneurs for setting up mini-blast furnaces for production of hot metal/pig iron. Commissioned pig iron units are mostly of stand-alone-type. Three units, namely, M/s Usha Martin Industries Ltd, M/s Jindal Steel & Power Ltd and Ispat Industries Ltd have integrated the mini-blast furnaces (MBF) and are using the hot metal in the charge-mix directly for manufacturing steel through electric arc furnace (EAF). Two units, in Karnataka (M/s Hospet Steel, a joint venture of Kalyani & Mukand) and in Tamil Nadu (M/s Southern Iron & Steel Company Ltd) have integrated their MBF with energy optimising furnace (EOF) for manufacturing steel. The excess hot metal produced by them supplements the pig iron production. Tata Metalliks Ltd, a subsidiary of Tata Steel, has been manufacturing pig iron at its plants located at Kharagpur in West Bengal and Redi in Maharashtra and has been catering to the domestic demand.

At Jindal Vijaynagar Steel Limited (now JSW Steel) in Karnataka, besides MBF, a Corex Plant (alternative to conventional MBF/BF) supplements the production of pig iron along with downstream steel making facilities. Ispat Metalliks (India) Ltd has set up a large blast furnace to produce 2 million tonnes per annum hot metal/pig iron at Dolvi, Raigad in Maharashtra. The excess hot metal, after meeting the requirements of the parent company, viz Ispat Industries Ltd, for manufacturing steel, is made available as pig iron for sale. M/s Neelachal Ispat Nigam Ltd had commissioned a blast furnace with 1.1 million tpy hot metal capacity and started production of pig iron at Dubari in Jajpur district of Orissa. Visa Steel Ltd commissioned a pig iron plant in March 2005, having a capacity of 2.25 lakh tonnes per annum at Kalinganagar in Orissa.

The gross pig iron manufacturing capacity in the country was about 4.833 million tonnes. Total production of pig iron in the country in 2007-08 was 5.3 million tonnes. The contribution of private sector units in the overall production of pig iron in the country continued to increase and accounted for about 82.4% production in 2007-08.

## Sponge Iron

India is the largest producer of sponge iron in the world. The growth of sponge iron industry during the last few years in terms of capacity and production has been substantial. The installed capacity of sponge iron increased from 1.52 million tonnes per annum in 1990-91 to around 26.39 million tonnes in 2007-08. Production has increased from 0.9 million tonnes in 1990-91 to 20.38 million tonnes in 2007-08. There were 324 sponge iron units in the country. Out of these, 3 gas-based units had a capacity of about 8 million tonnes per annum and the rest were coal-based units.

Sponge iron is a good substitute for scrap which is required by the electric arc furnaces and induction furnaces or mini-steel plants in the country. The indigenous availability of metal scrap is not sufficient to meet the domestic demand. Therefore, scrap has to be imported. Sponge iron is produced by direct reduction of high-grade iron ore or pellets to metallic iron ore in solid state by using coal or natural gas as reductant. It is also known as Direct Reduced Iron (DRI) or Hot Briquetted Iron (HBI).

## Iron & Steel

The details of the Iron & Steel Industry are provided in the review on "Iron & Steel and Scrap".

## Ferro-alloys

Iron is an important constituent of ferro-alloys, like ferro-manganese (high carbon, medium carbon and low carbon), ferro-silicon, ferro-chrome (high carbon and low carbon)/charge-chrome, ferro-molybdenum, ferro-vanadium, ferro-tungsten, ferro-silicon-magnesium, ferro-aluminium, ferro-silicon-zirconium, ferro-titanium, etc. Ferro-alloys in turn are either used in steel industries to impart some special qualities or exported. Ferro-alloys industry has an annual capacity of producing over 3.64 million tonnes. The production was almost 2.0 million tonnes and 2.36 million tonnes in 2006-07 and 2007-08, respectively. The details about the ferro-alloys industry are provided in the Review on 'Ferro-Alloys'.

## Cement

Iron ore lumps and powder containing +58% Fe is normally used in the cement industry as they improve burning properties, impart colour and balance the

## IRON ORE

composition of the mix. Further details about the cement industry are provided in the Review on 'Cement'.

### Coal Washeries

Magnetite ore is used as heavy media in coal washeries. There are 19 washeries for coking coal and 9 washeries for non-coking coal with 32.8 million tpy and 26.5 million tpy raw coal capacity, respectively. Details of the coal washeries are provided in the Review on 'Coal & Lignite'.

### Ferric Oxide

NMDC has decided to set up a 300 tpy pilot plant for production of carbon free sponge iron powder at its R & D Centre, Hyderabad, at a total cost of Rs. 23.40 crore. A letter of intent was issued to M/s Gas Institute, National Academy of Sciences, Ukraine in January 2006. The project is among the initiatives of NMDC to develop value-added products from blue dust available in its iron ore mines at Bailadila. The product would initially be supplied to soft magnetic component manufacturers. Subsequently, other applications such as diffusion alloying, nano powder manufacture, etc. would be developed.

A technology for production of nano iron powder has been established on laboratory scale in collaboration with Moscow Institute of Steel & Alloys, Russia. A pilot scale laboratory facility is proposed to be set up at NMDC's R & D Centre at a total cost of Rs. one crore.

Various grades of ferrite powders such as RTP Ferrite Powder, PF - 6 (Power Ferrite), HP - 101 (High Permeability ferrites), HP - 10 (Low Loss Ferrite), and HP - 1001 (Very High Permeability Ferrites), were produced and supplied by NMDC to domestic consuming industries.

### Uses & specifications

Iron ore is used mainly for making pig iron, sponge iron and steel. It is also used in cement, coal washeries, ferro-alloys, foundry, vanaspati and glass industries. General user specifications of iron ore/fines/concentrates used in making pellets/sinters are given in Table - 10. The specifications of iron ore consumed by major sponge iron plants are furnished in Table - 11 and by major steel plants in (Tables - 10, 11 and 12).

## CONSUMPTION

In 2007-08, about 81 million tonnes iron ore was consumed in various industries like iron & steel, sponge iron, ferro-alloys, alloy steel, coal washery and cement. Iron & steel including sponge iron were major consumer of iron ore and an accounted about 98%. Plantwise consumption of iron ore in steel plants is furnished in Table-12. Industrywise consumption of iron ore from 2005-06 to 2007-08 is given in Table-13.

**Table – 11 : Specifications of Iron Ore Consumed by Major Sponge Iron Plants**

Sl. No.	Name of the Plant	Specifications				
		Size	Fe	Al <sub>2</sub> O <sub>3</sub> + SiO <sub>2</sub>	P	S
1.	Orissa Sponge Iron Plant	5-18 mm	65% min	4.5% max	0.03% max.	N. A.
2.	Vikram Ispat	9-16 mm	66%	2.6% max	0.05%	0.01%
3.	HEG Ltd.	5-18 mm	65% min	5% max	0.05%	0.03%
4.	Sunflag Iron & Steel Ltd.	5-20 mm	67.5%	-	-	-
5.	Sponge Iron India Ltd.	6-18 mm	62%	-	-	-
6.	Essar Steel Ltd.	10-40 mm	67%	2.60% max	0.05%	0.01%
7.	Jindal Steel & Power Ltd.	10-30 mm	65% min	3% max (SiO <sub>2</sub> )	0.05%	-
8.	Tata Sponge Iron Ltd.	5-18 mm	65-67%	5.6%	-	-
9.	GSAL India Ltd.	10-40 mm	62%	-	-	-
10.	Raipur Alloys & Steel Ltd.	5-18 mm	65-66%	-	-	-
11.	OCL India Ltd.	Sized	62% min	-	-	-
12.	Nalwa Steel & Power Ltd.	5-20 mm	63% min	-	-	-
13.	Shri Bajrang Power & Ispat Ltd.	5-18 mm	64% min	-	-	-

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**Table – 12 : Consumption and Specifications of Iron Ore, 2006-07 and 2007-08  
(By Steel Plants)**

(In '000 tonnes)

Steel plant	Iron ore consumption						Specifications
	Blast furnace (BF)				Steel melting shop (SMS)		
	2006-07		2007-08		2006-07	2007-08	
	Lumps	Fines (in sinters/ pellets)	Lumps	Fines (in sinters/ pellets)			
Bokaro Steel Plant, Bokaro, Jharkhand.	2113	4126	2341	4921	-	-	Lumps : Fe 63.53%, SiO <sub>2</sub> 2.50%, Al <sub>2</sub> O <sub>3</sub> 2.00% Size-10 to 40 mm, Fines : Fe 62.55%, SiO <sub>2</sub> 3.31%, Al <sub>2</sub> O <sub>3</sub> 2.38%
Bhilai Steel Plant, Bhilai, Chhattisgarh.	3017	5011	4286	5534	49	67	BF : Fe-64% (min), Size-10 to 40 mm, SMS : Fe 66%, (min), Size 40 to 100 mm, Sinters : Fe 62.6% (min), Size - 10 mm
Rourkela Steel Plant Rourkela, Orissa.	1110	2434	1093	2808	14	20	Lumps : Fe 63.23%, SiO <sub>2</sub> 1.69 %, Al <sub>2</sub> O <sub>3</sub> 3.01%, Size-10 to 50 mm, Fines:Fe 62.83% SiO <sub>2</sub> 2.48%, Al <sub>2</sub> O <sub>3</sub> 3.04%, Size -10 mm
Durgapur Steel Plant, Durgapur, West Bengal.	1165	2155	1127	2349	2133	2355	Lumps : Fe 61.90 to 63.80%, SiO <sub>2</sub> 1.70 to 3.60% Al <sub>2</sub> O <sub>3</sub> 1.90 to 2.43%, Size-10 to 75 mm, Fines : Fe 61.50 to 62.87%, SiO <sub>2</sub> 2.17 to 4.54%, Al <sub>2</sub> O <sub>3</sub> 2.58 to 3.03% Size -10 mm
IISCO Steel Plant, Burnpur, West Bengal.	1160	-	950	-	3	8	Lumps : Fe 60.0 to 63.5%, SiO <sub>2</sub> 2.5%, Al <sub>2</sub> O <sub>3</sub> 4.5% (max.) Size- 8 to 10 mm
Visvesvaraya Iron & Steel Ltd. Bhadravati, Karnataka.	488	-	440	-	-	-	Fe 62-63%, SiO <sub>2</sub> 1-2%, Al <sub>2</sub> O <sub>3</sub> 1-2% , Size 10 to 30 mm
Visakhapatnam Steel Plant, Visakhapatnam, Andhra Pradesh.	1947	-	4187	-	-	-	Lumps : Fe 66.9%, Al <sub>2</sub> O <sub>3</sub> 1.60%, SiO <sub>2</sub> 0.9%, Size 10 to 25 mm for BF, Fines : Fe 53.07%, Al <sub>2</sub> O <sub>3</sub> 3.5%, SiO <sub>2</sub> 2%, Size - 10 mm.
IDCOL, Kalinga Iron Works, P.O. Matkarmbeda – 758 036, Barbil, Dist. Keonjhar, Orissa.	151	6	263 <sup>(e)</sup>	6 <sup>(e)</sup>	-	-	Fe 65% SiO <sub>2</sub> + Al <sub>2</sub> O <sub>3</sub> 5% max, Size - 10 to 30 mm.

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**Table –13 : Reported Consumption of Iron Ore\* 2005–06 to 2007-08  
(By Industries)**

(In tonnes)

Industry	2005-06 (R)	2006-07	2007-08 (p)
<b>All Industries</b>	<b>60518200</b>	<b>76056800</b>	<b>81155600</b>
Alloy steel	418000(9)	418000(9)	2700(5)
Cement	950000(66)	1065700(67)	973900(56)
Coal washery **	47900(15)	43500(15)	43500(15)
Ferro-alloys	5400(9)	5400(9)	5400(9)
Iron & steel	40165800(13)	48441000(13)	50686900(12)
Sponge iron	18928000(e)	26080000(e)	29440000(e)
Others (chemical, foundry, glass, refractory)	3100(9)	3200(10)	3200(10)

Figures rounded off. Data collected on non-statutory basis.

Figures in parentheses denote the number of units in organised sector reporting consumption.

\* Does not include consumption of pellets & sinters; includes consumption of iron ore (fines) consumed in the production of pellets/sinters.

\*\* Magnetite.

## TRADE POLICY

The Foreign Trade Policy (FTP) for 2004-2009 was notified on 31.8.2004 and made effective from 1.9.2004. As per the amended Export and Import

Policy incorporated in the FTP, the export for iron ore effective from 1.4.2008 is furnished below in brief. The imports of iron ore lumps, fines, concentrates and agglomerated pellets are freely allowed.

Item	Export Policy	Nature of restrictions
(1) Iron ore other than those specified under Free category	STE	Export through MMTC
(2) Iron ore of Goa origin when exported to China, Europe, Japan, South Korea and Taiwan, irrespective of the Fe content	Free	
(3) Iron ore of Redi origin supplied to all markets, irrespective of the Fe content	Free	
(4) All iron ores of Fe content up to 64%	Free	
(5) Iron ore concentrate prepared by beneficiation and/or concentration of low grade ore containing 40% or less iron produced by KIOCL	STE	Export through KIOCL, Bangalore
(6) Iron ore pellets manufactured by KIOCL	STE	Export through KIOCL, Bangalore
(7) Rejects of iron ore chips and like generated from the manufacturing process after using imported raw material	Free	(i) The quantity of export of such rejects shall not be more than 10% of the imported raw materials i.e. pellets  (ii) The size of the rejected pellets chips (fines) shall be less than 6 mm

STE: State Trading Enterprise.

Source: Export-Import Policy, 2008-09.

## WORLD REVIEW

The world reserve base of crude iron ore is estimated to be around 340 billion tonnes. The reserve base of iron content of iron ore is estimated to be around 160 billion tonnes. The world reserve base of crude iron ore by principal countries is given in Table - 14.

In 2007, the world production of iron ore was 2,043 million tonnes as against 1,826 million tonnes in the previous year. China, Brazil, Australia, India and Russia were the principal producers. The world production of iron ore is given in Table-15.

**Table – 14 : World Resources of Iron Ore (By Principal Countries)**

(In million tonnes)

Country	Reserve base	
	Crude ore	Iron content
<b>World : Total (rounded)</b>	<b>340000</b>	<b>160000</b>
Australia	45000	28000
Brazil	27000	14000
Canada	3900	2500
China	46000	15000
India*	9800	6200
Iran	2500	1500
Kazakhstan	19000	7400
Mauritania	1500	1000
Mexico	1500	900
Russia	56000	31000
South Africa	2300	1500
Sweden	7800	5000
Ukraine	68000	20000
USA	15000	4600
Venezuela	6000	3600
Other countries	30000	17000

*Source: Mineral Commodity Summaries, 2008.*

\* India's resources of iron ore as per UNFC system as on 1.4.2005 are estimated at 25 billion tonnes.

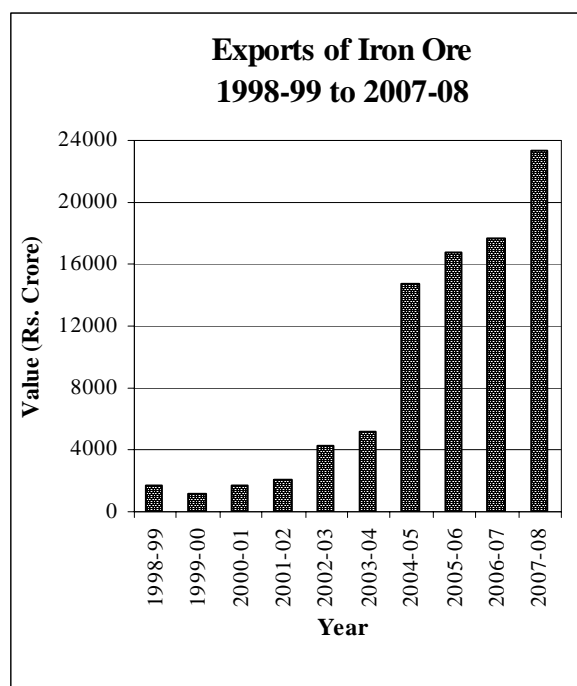
## FOREIGN TRADE

### Exports

Exports of iron ore decreased to 68.47 million tonnes in 2007-08 from 91.43 million tonnes in the previous year. In terms of value, the iron ore exports reached Rs. 233,997 million in 2007-08 from Rs.176,562 million. The exports in 2007-08 in terms of volume comprised iron ore fines (72%), iron ore lumps (22%), iron ore concentrates and iron ore pellets (3% each). Exports were mainly to China (89%), Japan (7%) and Rep. of Korea (2%) (Tables - 16 to 21).

### Imports

Imports of iron ore decreased to 293 thousand tonnes in 2007-08 from 483 thousand tonnes in the previous year. The imports in 2007-08 comprised 290 thousand tonnes iron ore pellets and 3 thousand tonnes of iron pyrites. Imports were mainly from Bahrain (Tables - 22 to 26).



**Table – 15 : World Production of Iron Ore (By Principal Countries)**

(In million tonnes)

Country	2005	2006	2007
<b>World : Total</b>	<b>1569</b>	<b>1826</b>	<b>2043</b>
Australia	262	275	299
Brazil	281	318	355
Canada*	28	34	33
China	421	588	707
India**	165	181	204
Iran	26	32	35 <sup>e</sup>
Kazakhstan	19	18	20
Russia	97	104	105
South Africa <sup>e</sup>	40	41	42
Sweden	23	23	25
Ukraine	69	74	78
USA	54	53	52
Venezuela	21	22	23 <sup>e</sup>
Other countries	63	63	65

*Source: World Mineral Production, 2003-2007*

<sup>@</sup> Including by-product of magnetite.

\* Including by-product of iron ore.

\*\* India's production of iron ore in 2005-06, 2006-07 and 2007-08 was 165 million tonnes, 188 million tonnes and 206 million tonnes, respectively.

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**Table – 16 : Exports of Iron Ore : Total  
(By Countries)**

Country	2006-07		2007-08	
	Qty (‘000 t)	Value (Rs. ‘000)	Qty (‘000 t)	Value (Rs. ‘000)
<b>All Countries</b>	<b>91425</b>	<b>176562481</b>	<b>68473</b>	<b>233996998</b>
China	76504	150834023	61250	217534005
Japan	8889	14897316	4844	10161635
Korea, Rep. of	2057	3815105	1153	2643826
Hong Kong	127	297138	191	1050240
Pakistan	689	1176679	308	577937
Netherlands	560	954109	232	555134
Australia	++	54	139	545380
Singapore	71	192590	108	342347
Romania	863	1210361	105	176984
Chile	834	1809103	-	-
Other countries	831	1376003	143	409510

**Table – 18 : Exports of Iron Ore : Fines  
(By Countries)**

Country	2006-07		2007-08	
	Qty (‘000 t)	Value (Rs. ‘000)	Qty (‘000 t)	Value (Rs. ‘000)
<b>All Countries</b>	<b>66183</b>	<b>124238851</b>	<b>48896</b>	<b>167642708</b>
China	56381	109543054	45314	159307261
Japan	5439	7324718	2047	4090897
Korea, Rep. of	1102	1681105	580	1351835
Hong Kong	2	3299	137	758464
Netherlands	560	954109	232	555134
Australia	++	54	139	545380
Pakistan	339	557761	166	305494
Romania	863	1210361	105	176984
Belgium	201	335648	-	-
Chile	834	1809103	-	-
Other countries	462	819639	176	551259

**Table – 17 : Exports of Iron Ore : Lumps  
(By Countries)**

Country	2006-07		2007-08	
	Qty (‘000 t)	Value (Rs. ‘000)	Qty (‘000 t)	Value (Rs. ‘000)
<b>All Countries</b>	<b>23046</b>	<b>47793601</b>	<b>15302</b>	<b>48044791</b>
China	17927	36761436	11819	40475413
Japan	3450	7572598	2693	5805013
Korea, Rep. of	955	2134000	573	1291991
Pakistan	350	618918	142	272443
Korea, Dem. People's Rep. of	-	-	42	103048
Singapore	71	192590	31	88820
Hong Kong	125	293839	++	169
Indonesia	32	95946	-	-
Kenya	31	35265	-	-
Oman	99	77332	-	-
Other countries	6	11677	2	7894

**Table – 19 : Exports of Iron Ore : Concentrate  
(Non-agglomerated)  
(By Countries)**

Country	2006-07		2007-08	
	Qty (‘000 t)	Value (Rs. ‘000)	Qty (‘000 t)	Value (Rs. ‘000)
<b>All Countries</b>	<b>1763</b>	<b>2958058</b>	<b>1917</b>	<b>5301553</b>
China	1763	2957790	1797	4906945
Hong Kong	-	-	54	291607
Japan	-	-	66	102692
Turkey	-	-	++	251
Nepal	-	-	++	35
Canada	-	-	++	14
Bhutan	++	50	-	-
Italy	++	173	-	-
Maldives	++	23	-	-
USA	++	22	-	-
Other countries	++	++	++	9

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**Table – 20 : Exports of Iron Ore : Pellets  
(By Countries)**

Country	2006-07		2007-08	
	Qty (‘000 t)	Value (Rs. ‘000)	Qty (‘000 t)	Value (Rs. ‘000)
<b>All Countries</b>	<b>433</b>	<b>1571750</b>	<b>2358</b>	<b>13007549</b>
China	433	1571743	2320	12844386
Japan	-	-	38	163033
Qatar	++	7	-	-
USA	-	-	++	130

**Table – 21 : Exports of Iron ore : Pyrites  
(By Countries)**

Country	2006-07		2007-08	
	Qty (‘000 t)	Value (Rs. ‘000)	Qty (‘000 t)	Value (Rs. ‘000)
<b>All Countries</b>	<b>++</b>	<b>221</b>	<b>++</b>	<b>397</b>
Bangladesh	-	-	++	253
Saudi Arabia	-	-	++	93
Nepal	++	91	++	49
South Africa	-	-	++	2
France	++	6	-	-
Oman	++	67	-	-
Uganda	++	57	-	-

**Table – 22 : Imports of Iron Ore : Total  
(By Countries)**

Country	2006-07		2007-08	
	Qty (‘000 t)	Value (Rs. ‘000)	Qty (‘000 t)	Value (Rs. ‘000)
<b>All Countries</b>	<b>483</b>	<b>2451762</b>	<b>293</b>	<b>1788435</b>
Bahrain	322	1671430	290	1773419
Finland	-	-	2	9470
Germany	-	-	1	2173
Austria	++	1573	++	1731
China	++	638	++	992
USA	++	158	++	329
South Africa	++	498	++	269
Italy	-	-	++	40
Brazil	161	770945	-	-
Iran	++	6461	-	-
Other countries	++	59	++	12

**Table – 23 : Imports of Iron Ore : Lumps  
(By Countries)**

Country	2006-07		2007-08	
	Qty (‘000 t)	Value (Rs. ‘000)	Qty (‘000 t)	Value (Rs. ‘000)
<b>All Countries</b>	<b>161</b>	<b>777406</b>	-	-
Brazil	161	770945	-	-
Iran	++	6461	-	-

**Table – 24 : Imports of Iron Ore : Concentrate  
(Non-agglomerated)  
(By Countries)**

Country	2006-07		2007-08	
	Qty (‘000 t)	Value (Rs. ‘000)	Qty (‘000 t)	Value (Rs. ‘000)
<b>All Countries</b>	-	-	++	<b>12</b>
Philippines	-	-	++	12

**Table – 25 : Imports of Iron Ore : Pellets  
(By Countries)**

Country	2006-07		2007-08	
	Qty (‘000 t)	Value (Rs. ‘000)	Qty (‘000 t)	Value (Rs. ‘000)
<b>All Countries</b>	<b>322</b>	<b>1671489</b>	<b>290</b>	<b>1773419</b>
Bahrain	322	1671430	290	1773419
Hong Kong	++	32	-	-
Sweden	++	27	-	-

**Table – 26 : Imports of Iron Ore : Pyrites  
(By Countries)**

Country	2006-07		2007-08	
	Qty (‘000 t)	Value (Rs. ‘000)	Qty (‘000 t)	Value (Rs. ‘000)
<b>All Countries</b>	<b>++</b>	<b>2867</b>	<b>3</b>	<b>15004</b>
Finland	-	-	2	9470
Germany	-	-	1	2173
Austria	++	1573	++	1731
China	++	638	++	992
USA	++	158	++	329
South Africa	++	498	++	269
Italy	-	-	++	40

## **FUTURE OUTLOOK**

The country has rich potential of iron ore, both in terms of quantity and quality. It can easily meet, both the domestic demand and the export market. India is among the leading exporters of iron ore in the world. There is a tremendous scope for using the mined ore within the country for augmenting steel production and export steel in lieu of iron ore on a large scale. India is well poised with brownfield expansion of heavy steel plants, backward integration re-rollers, forward integration of DRI or pig iron producers and emergence of a few greenfield projects. With necessary measures, this sector would gear up to provide employment and boost the economic development of the country.

The National Steel Policy (NSP), 2005 has set a target of 110 million tonnes of domestic steel production by 2019-20. This would entail requirement of about 190 million tonnes of iron

ore. Besides, there are targets set for export purpose as well. Therefore, in order to meet the total demand of iron ore, the Government plans to initiate steps including creation of additional mining capacity; encourage investment; issue environmental and forest clearances within specified time frame; propose investment plans for large number of idle mining leases; grant and renew leases against credible mining plans; and grant of fresh leases only against new norms that are in place for assessment of technical and financial capabilities of applicants; restrict long term export contracts to maximum five years; and encourage use of fines as sinters/pellets.

R&D efforts need to be intensified for developing new technologies to make the Indian steel industry competitive internationally as well as utilise more iron ore fines in the production of steel as a measure of conservation of iron ore resources.