

IRON ORE



Indian Minerals Yearbook 2017

(Part- III : Mineral Reviews)

56th Edition

IRON ORE

(FINAL RELEASE)

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

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Iron & steel is the driving force behind industrial development in any country. The vitality of the Iron & Steel Industry largely influences a country's economic status. The mining of iron ore, an essential raw material for Iron & Steel Industry, is arguably of prime importance among all mining activities undertaken by any country. With the total resources of over 33.276 billion tonnes of haematite (Fe_2O_3) and magnetite (Fe_3O_4), India is amongst the leading producers of iron ore in the world.

RESERVES/RESOURCES

Haematite and magnetite are the most important iron ores in India. About 79% haematite ore deposits are found in the Eastern Sector (Assam, Bihar, Chhattisgarh, Jharkhand, Odisha & Uttar Pradesh) while about 93% magnetite ore deposits occur in Southern Sector (Andhra Pradesh, Goa, Karnataka, Kerala, & Tamil Nadu). Karnataka alone contributes 72% of magnetite deposit in India. Of these, haematite is considered to be superior because of its higher grade. Indian deposits of haematite 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 NMI database based on UNFC system, the total reserves/resources of haematite as on 1.4.2015 have been estimated at 22,487 million tonnes of which 5,422 million tonnes (24%) are under 'Reserves' category and the balance 17,065 million tonnes (76%) are under 'Remaining Resources' category. By grades, Lumps constitute about 56% followed by Lumps with Fines (17%), Fines (16%), and the remaining 11% are Black Iron ore, Lump low & medium grade, Beneficiable grade, Others, Unclassified, Not-known and Lump & fines & blue dust unclassified grade. Major reserves/resources of haematite are located in Odisha (7,559 million tonnes or 34%), Jharkhand (5,286 million tonnes or 23%), Chhattisgarh (4,858 million tonnes or 22%), Karnataka (2,467 million tonnes or 11%) and Goa (1,189 million

tonnes or 5%). The balance 5% resources of haematite are spread in Andhra Pradesh, Assam, Bihar, Madhya Pradesh, Maharashtra, Meghalaya, Rajasthan, Telangana and Uttar Pradesh (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 NMI database based on UNFC system, the total reserves/resources of magnetite as on 1.4.2015 have been estimated at 10,789 million tonnes of which 'Reserves' constitute a mere 53 million tonnes while 10,736 million tonnes are placed under 'Remaining Resources'. Classification on the basis of grades shows 20% resources are of Metallurgical grade while 80% resources belong to grades that are categorised as Unclassified, Not-known and Coal Washery. The resources of Others and Foundry grades constitute meagre proportions. India's 98% magnetite reserves/resources are located in five States, namely, Karnataka (7,802 million tonnes or 72% reserves) followed by Andhra Pradesh (1,392 million tonnes or 13%), Rajasthan (617 million tonnes or 6%), Tamil Nadu (507 million tonnes or 5%) and Goa (226 million tonnes or 2%). Assam, Bihar, Chhattisgarh, Jharkhand, Kerala, Maharashtra, Meghalaya, Nagaland, Odisha and Telangana together account for the remaining 2% resources (Table-2).

EXPLORATION & DEVELOPMENT

The Exploration & Development details, if any, are given in the Review "Exploration & Development" in Volume-I of Indian Minerals Yearbook entitled "General Reviews".

PRODUCTION & STOCKS

The production of iron ore (excluding ROM) constituting lumps, fines and concentrates was at 192.08 million tonnes in the year 2016-17, showing an increase of about 21% as compared to that in the preceding year.

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There were 296 reporting mines in 2016-17 as against 330 in the previous year. Among them, 34 mines were in the Public Sector and 262 in the Private Sector. Besides, production of iron ore was reported as associated mineral by 12 mines in 2016-17 as against 16 mines in 2015-16. The contribution of Public Sector to the total production was about 36% as against about 40% in the preceding year. The remaining 64% of the production in 2016-17 was from Private Sector. Among 34 iron ore mines in Public Sector, 16 iron ore mines each producing more than one million tonnes annually accounted for about 95% of the total output in Public Sector during 2016-17. Out of 262 iron ore mines and 12 associated mines in Private Sector, 28 iron ore mines each producing more than one million tonnes annually accounted for about 81% of the total output of Private Sector during the year. Thus, 44 iron ore mines, each producing more than one million tonnes of iron ore annually, contributed about 86% of the total output in 2016-17. The captive mines reported production of 57.35 million tonnes comprising about 30% of total production and non-captive mines reported production of 134.73 million tonnes i.e. about 70% during 2016-17.

Gradewise analysis of the current year's output reveals that out of the total output (excluding ROM) of

192.08 million tonnes, iron ore lumps constituted 64.18 million tonnes (i.e. about 33%), fines constituted 126.73 million tonnes (i.e. about 66%) and concentrates constituted 1.16 million tonnes (i.e. about 1%).

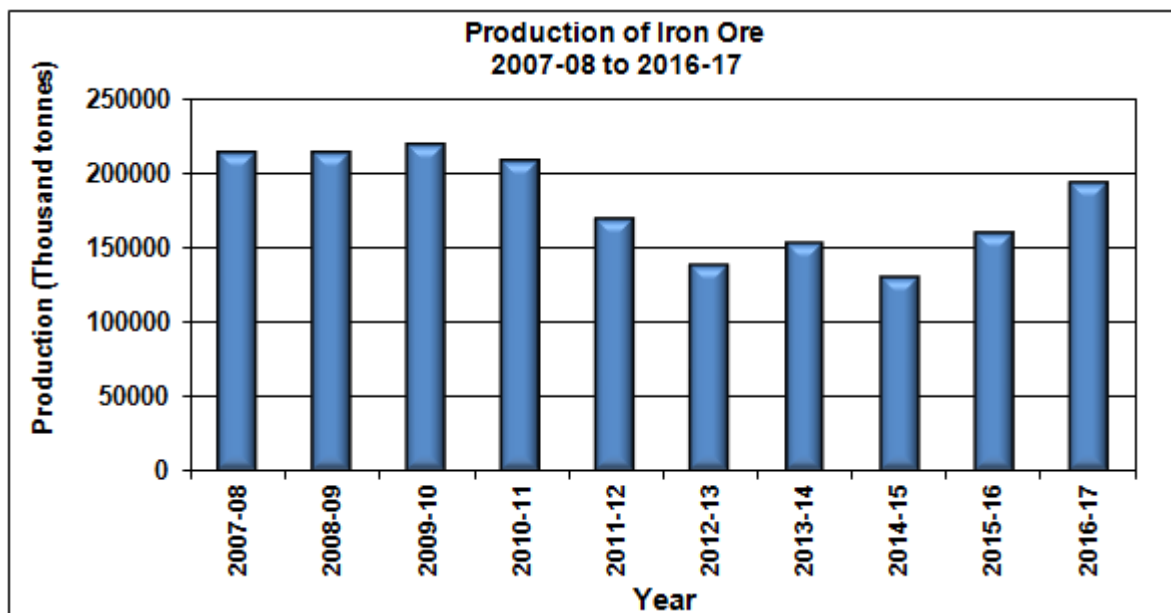
Among the States, Odisha recorded the highest production of 99.61 million tonnes, i.e., about 52% of the country's production in 2016-17. Chhattisgarh was at the second place with production of 31.07 million tonnes, i.e., 16% of the total production followed by Karnataka with production of 26.36 million tonnes i.e., about 14%, Jharkhand 21.34 million tonnes, i.e., about 11% of the country's production. The remaining 13.7 million tonnes, i.e., 7% production was reported from Andhra Pradesh, Goa, Madhya Pradesh, Maharashtra and Rajasthan.

STOCKS AT MINE-HEAD

The mine-head closing stock of iron ore for the year 2016-17 was 148.42 million tonnes as compared to 144.50 million tonnes in 2015-16.

EMPLOYMENT

The average daily employment of labour was 42,049 during 2016-17 as against 42,065 in the preceding year.



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**Table – 1 : Reserves/Resources of Iron Ore (Haematite) as on 1.4.2015
(By Grades/States)**

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						
All India	4053032	449917	918801	5421751	3444103	1573822	1496674	1762741	1798557	4498142	2491176	17065214	22486965
By Grades													
Lump, high grade	1207974	2751	213649	1424375	458544	40887	144840	198115	37065	195774	74865	1150092	2574466
Lump, medium grade	1021112	94231	325808	1441151	1726230	737324	645733	912442	997496	1141891	6039	6167154	7608306
Lump, low grade	122710	50314	89654	262679	195265	78584	132621	39796	127858	925985	225687	1725796	1988474
Lump, unclassified grade	204	28	16	248	56654	-	8791	16969	34488	152248	22800	291951	292200
Fines, high grade	271459	-	79169	350628	18995	1889	4849	146969	11174	25567	4890	214334	564962
Fines, medium grade	120083	62207	6571	188862	50161	265570	49801	337543	286918	494180	932	1485104	1673967
Fines, low grade	237700	31006	41557	310263	196422	119619	120401	11163	94702	401756	6094	950157	1260420
Fines, unclassified grade	389	-	593	982	343	669	130	8624	12908	118978	15200	156851	157833
Lumps & fines high grade	195566	12720	-	208286	84292	94614	67894	9748	8561	61307	112375	438791	647077
Lump & fines medium grade	440515	73933	84121	598568	134534	56987	101242	994	15969	201152	241259	752136	1350705
Lump & fines low grade	166999	5718	37294	210012	270249	73244	87740	27296	64404	431242	160391	1114567	1324579
Lumps & fines unclassified	123828	94850	26131	244809	73134	10373	21754	44082	100360	100693	4088	354485	599293
Black iron ore	-	-	-	-	7017	3014	1355	-	1059	6661	-	19106	19106
Lump low & medium grade	9529	5259	-	14788	-	13865	-	-	-	-	-	13865	28653
Beneficiable grade	31307	11183	714	43204	115078	44183	88181	1538	1003	64982	63708	378673	421877
Others	28413	-	2521	30934	19712	60	10861	708	1432	5197	745	38715	69649
Unclassified	60225	3356	8750	72331	36845	10699	8263	4746	3006	12094	27252	102905	175236
Not-known	2673	614	1148	4434	629	20000	1659	-	151	158432	1524850	1705721	1710155
Lump & fines & blue dust unclassified grade	12345	1746	1106	15197	-	2241	560	2009	-	-	-	4810	20007
By States													
Andhra Pradesh	17664	273	11832	29768	40595	49589	68425	377	4666	147628	13	311293	341062
Assam	-	-	-	-	-	-	-	-	-	4000	-	12600	12600
Bihar	-	-	-	-	-	-	-	-	-	55	-	55	55
Chhattisgarh	1067636	78071	241730	1387437	255074	61735	47394	921139	613433	801086	770827	3470687	4858124
Goa	297271	34709	26259	358239	301806	214187	134955	15286	11535	141558	11747	831075	1189313
Jharkhand	365111	29238	45022	439372	1081242	458866	457724	207324	597413	673009	1371468	4847045	5286417
Karnataka	416684	46169	87394	550247	518155	48231	211632	248299	44094	669239	176956	1916607	2466854
Madhya Pradesh	44203	3635	14225	62063	48412	3650	36774	23243	9008	146803	10	267900	329963
Maharashtra	11283	3032	2926	17241	9028	6673	8858	75724	71806	72588	32185	276862	294103
Meghalaya	-	-	-	-	-	-	-	-	-	225	-	225	225
Odisha	1830569	252615	489034	2572217	1180055	704302	530440	271349	426493	1773077	100730	4986447	7558664
Rajasthan	2103	2175	380	4658	8764	6105	471	-	11510	6897	-	33745	38404
Telangana	509	-	-	509	973	483	-	-	-	23977	27240	52673	53181
Uttar Pradesh	-	-	-	-	-	20000	-	-	-	38000	-	58000	58000

Figures rounded off.

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**Table – 2 : Reserves/Resources of Iron Ore (Magnetite) as on 1.4.2015
(By Grades/States)**

(In '000 tonnes)

Grade/State	Reserves			Remaining Resources							Total Resources (A+B)
	Proved STD111	Probable STD121 STD122	Total (A)	Feasibility STD211	Pre-feasibility STD221 STD222	Measured STD331	Indicated STD332	Inferred STD333	Reconnaissance STD334	Total (B)	
All India : Total	30352	2311 20037	52699	223388	15494 64091	1513195	1984566	6351286	584436	10736455	10789155
By Grades :											
Metallurgical	8355	- 3308	11663	165948	- 21530	690596	342792	964399	255	2185521	2197183
Coal washery	16782	- 15847	32629	265	675 11001	411	318	37512	15455	65636	98265
Foundry	-	-	-	330	125	-	-	381	-	836	836
Others	749	- 443	1192	3796	985 62	-	-	1791	-	6633	7826
Unclassified	4099	2311 196	6606	52978	13709 31493	822188	1641456	5066948	568677	8197449	8204056
Not-known	366	- 243	609	71	- 6	-	-	280254	48	280379	280989
By States											
Andhra Pradesh	-	-	-	43105	-	13800	1266666	68527	-	1392098	1392098
Assam	-	-	-	-	-	-	-	15380	-	15380	15380
Bihar	-	-	-	-	-	-	-	2659	-	2659	2659
Chhattisgarh	8087	- 3096	11183	-	42	-	-	-	-	42	11225
Goa	4364	- 626	4990	59509	14516 33512	-	-	151811	1997	261345	266336
Jharkhand	-	-	-	-	518 1986	411	3948	3722	82	10667	10667
Karnataka	319	127	446	120022	- 18375	1498957	479372	5345018	340000	7801744	7802190
Kerala	-	-	-	-	-	-	59912	23523	-	83435	83435
Maharashtra	359	- 225	583	149	63	-	-	90	-	302	885
Meghalaya	-	-	-	-	-	-	-	3380	-	3380	3380
Nagaland	-	-	-	-	-	-	5280	-	-	5280	5280
Odisha	74	-	74	8	-	27	-	43	-	79	152
Rajasthan	17148	2185 16090	35423	595	460 10113	-	-	554904	15422	581493	616916
Tamil Nadu	-	-	-	-	-	-	169388	110728	226921	507037	507037
Telangana	-	-	-	-	-	-	-	71500	14	71514	71514

Figures rounded off.

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**Table - 3 :Principal Producers of Iron ore
2016-17**

Name & address of producer	Location of mine	
	State	District
National Mineral Development Corporation Ltd, 10-3-311/A, Khanij Bhavan, Castle Hills, Masab Tank, Hyderabad -500 028,	Karnataka	Ballari
Steel Authority of India Ltd, Ispat Bhavan, Lodhi Road, New Delhi – 110 003.	Chhattisgarh	Dantewada
Tata Steel Ltd, Bombay House, 24, Homi Mody Street, Fort, Mumbai –400 001, Maharashtra.	Jharkhand	Singhbhum (West)
Rungta Mines (P) Ltd, 8A Express Tower, 42A-Shakespeare Sarani, Kolkata – 700 017, West Bengal.	Odisha	Durg
Serajuddin & Co., P-16, Bentink Street, Kolkata-700 069, West Bengal.	Odisha	Kendujhar, Sundergarh
Vedanta Ltd., Sesa Ghor, EDC complex, Patto, Panaji, Tiswadi-403 001 Goa.	Jharkhand	Singhbhum (West)
Rungta Sons (P) Ltd., 8A Express tower, 42A- Shakespeare Sarani, Kolkata-700 017, West Bengal.	Odisha	Kendujhar
Odisha Mining Corporation Ltd, OMC House, Unit-5, P.B. No.34 Distt. Khurda, Bhubaneswar-751 001 Odisha.	Odisha	Sundergarh
Kamaljeet Singh Ahluwalia, Near MMTC Weigh Bridge P.B.No. 3, Barbil-758 035, Distt. Kendujhar, Odisha.	Odisha	Kendujhar

Table - 3 : (Concl.d.)

Name & address of producer	Location of mine	
	State	District
Indrani Patnaik, A/6, Commercial Estate, Civil Township, Rourkela - 769 004 Odisha.	Odisha	Kendujhar
Mysore Minerals Ltd, No. 39, M.G. Road, Bengaluru - 560 001, Karnataka.	Karnataka	Ballari
Kaypee Enterprises, Near MMTC Weigh Bridge, P.B. No.3, At/PO-Barbil-758 035, Dist. Kendujhar, Odisha	Odisha	Kendujhar
Jindal Steel & Power Ltd., O.P. Jindal Marg, Delhi Road, Hissar-125 005 Haryana.	Odisha	Sundergarh
Aryan Mining & Trading Corpn. (P) Ltd., 61, Strand Street, Kolkatta-700 006, West Bengal.	Odisha	Sundergarh
Essel Mining & Industries Ltd, Industry House, 18 th Floor, 10, Camac Street, Kolkata- 700 017 West Bengal	Odisha	Sundergarh
Khatau Narbheram & Co., N.V. Ram Complex, Barbil-758 035, Distt. Kendujhar, Odisha.	Odisha	Kendujhar
Usha Martin Ltd, Mangal Kalash, 2A Shakespeare Sarani, Kolkata-700 071, West Bengal.	Jharkhand	Singhbhum (West)
Bonai Industrial Co. Ltd. Rungta Office, Main Road, P.O. Barbil-758035, Dist.Kendujhar, Odisha.	Odisha	Sundergarh
Mideast Integrated Steels Ltd, Mesco Tower, H-1, Zamrudpur Community Centre, Kailash Colony, New Delhi-110 048.	Odisha	Kendujhar
Feegrade & Co. (P) Ltd., 8A,Express Tower, 42A- Shakespeare Sarani, Kolkata- 700 017, West Bengal.	Odisha	Sundergarh

(Contd.)

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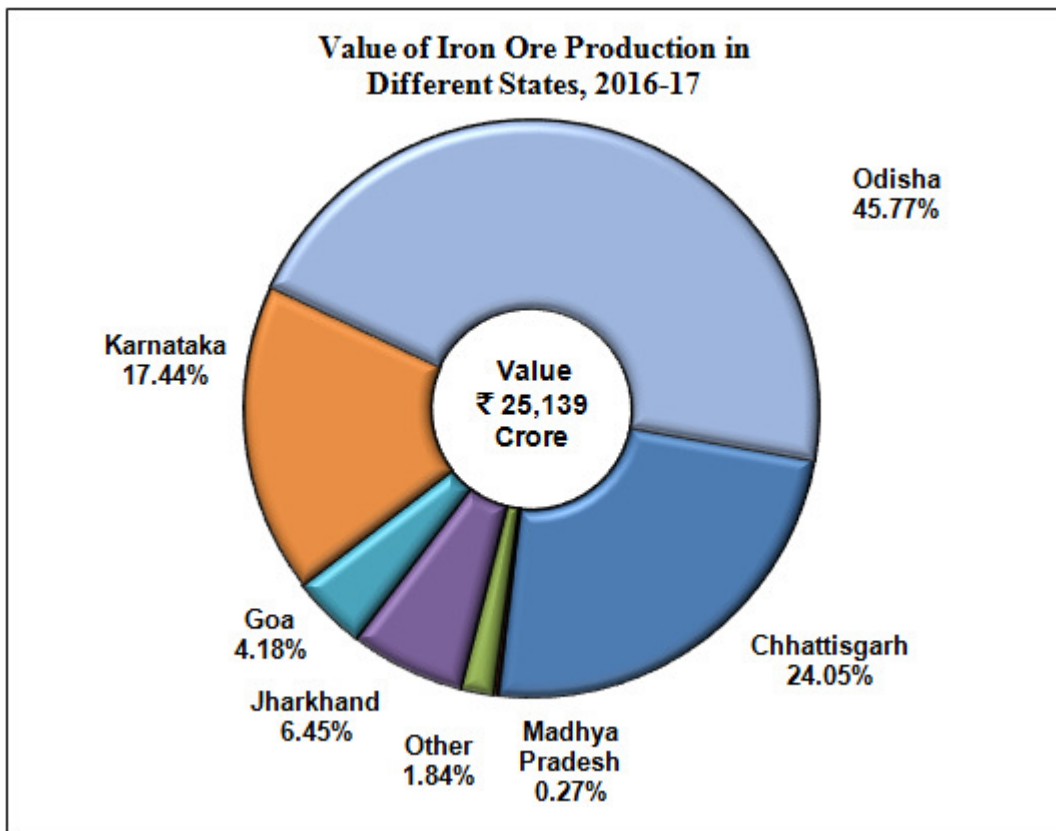
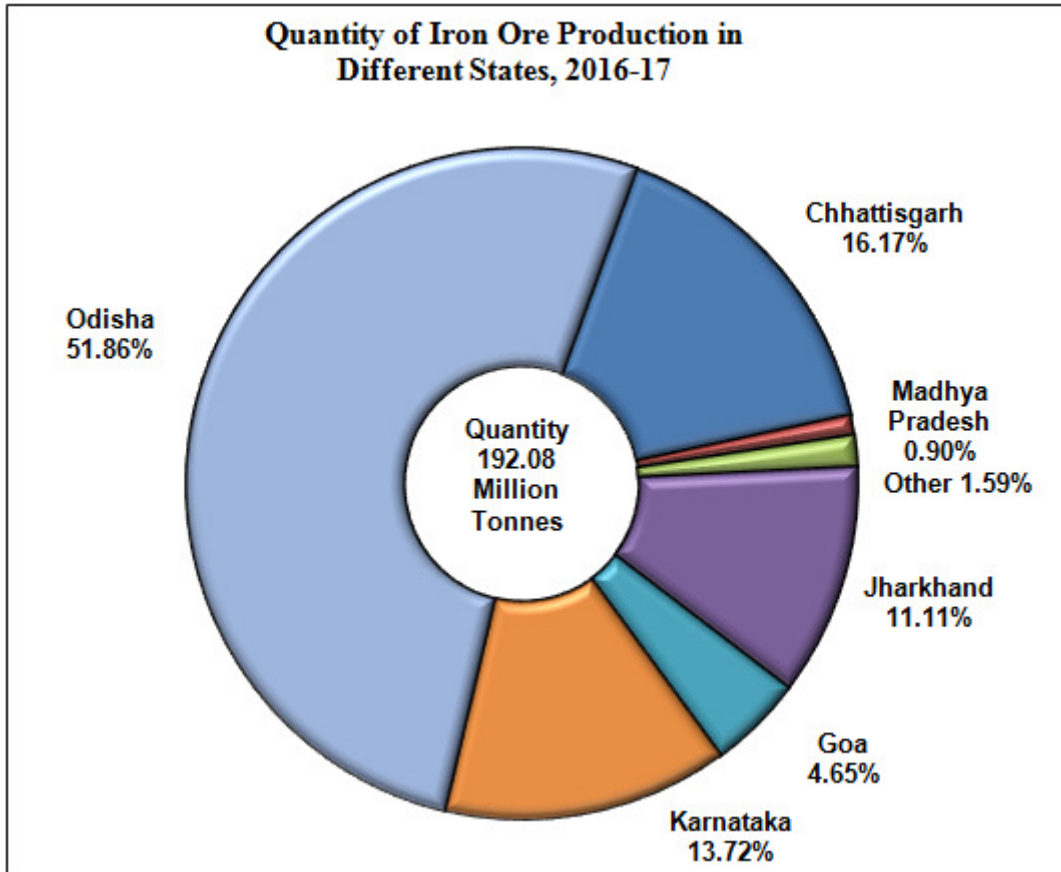
Table – 4 : Production* of Iron Ore, 2014-15 to 2016-17 (P)
(By States)

(Quantity in '000 tonnes; Value in ₹ '000)

States		2014-15		2015-16		2016-17 (P)	
		Quantity	Value	Quantity	Value	Quantity	Value
India	Total	129321	276636789	158108	223206636	192081	251388688
	Lumps	47331	126896782	54610	98878782	64186	103392057
	Fines	80912	146560518	102407	122489117	126736	144976490
	Concentrates	1078	3179489	1091	1838737	1159	3020141
Andhra Pradesh	Total	916	504259	493	283258	489	249379
	Lumps	637	425241	312	227859	305	197142
	Fines	279	79018	181	55399	184	52237
Chhattisgarh	Total	29388	85391078	26718	52780037	31068	60462471
	Lumps	10617	35702422	10214	24169097	11037	24549141
	Fines	18771	49688656	16504	28610940	20031	35913330
Goa	Total	-	-	1794	2132157	8933	10514030
	Lumps	-	-	260	377365	1993	2674696
	Fines	-	-	1534	1754792	6889	7773472
	Concentrates	-	-	-	-	51	65862
Jharkhand	Total	19237	23649275	19198	16494215	21335	16204479
	Lumps	6904	9470862	6154	6032530	5939	4903335
	Fines	12333	14178413	13044	10461685	15396	11301144
Karnataka	Total	20205	55165630	25036	34659850	26363	43850893
	Lumps	6799	22759146	7990	14927975	8893	16715165
	Fines	13406	32406484	17046	19731875	17470	27135728
Madhya Pradesh	Total	4193	2464797	2447	1475651	1730	677950
	Lumps	654	794722	268	174566	101	41432
	Fines	3539	1670075	2179	1301085	1627	633673
	Concentrates	-	-	-	-	2	2845
Maharashtra	Total	2143	2601529	1420	1500657	1321	1372343
	Lumps	407	626507	198	349230	231	350233
	Fines	1736	1975022	1222	1151427	1090	1022110
Odisha	Total	52022	103636933	79856	112112226	99614	115063744
	Lumps	21152	57013083	29103	52579559	35565	53919003
	Fines	30831	46548984	50694	59421386	64049	61144741
	Concentrates	39	74866	59	111281	-	-
Rajasthan	Total	1180	3201253	1146	1768585	1228	2993399
	Lumps	124	82779	111	40601	122	41910
	Fines	17	13851	3	528	++	55
	Concentrates	1039	3104623	1032	1727456	1106	2951434
Telangana	Total	37	22035	-	-	-	-
	Lumps	37	22020	-	-	-	-
	Fines	++	15	-	-	-	-

* Excluding ROM

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Table -5 (A) : Production of Iron Ore, 2015-16
(By Sectors/States/Districts/Grades)

(Quantity in '000 tonnes; Value in ₹'000)

Sector/ State/ District	No. of mines	Lumps										Fines										Total				
		Below 55% 55% Fe		58% 60% Fe		60% 62% Fe		62% 65% Fe		65% above Fe &		Total		Below 55% 55% Fe		58% 60% Fe		60% 62% Fe		62% 65% Fe		65% above Fe &		Total		
		Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	
India	330(16)	1716	1029	3089	6615	29941	12220	54610	98878782	4649	8217	6692	22877	45183	14789	102407	122489117	1091	1838737	158108	223206636					
Public Sector	33(1)	6	140	174	2653	14322	6261	23556	44235796	81	777	1821	13026	18681	4918	39304	50652130	-	-	-	62860	94887926				
Private Sector	297(15)	1710	889	2915	3962	15619	5959	31054	54642986	4568	7440	4871	9851	26502	9871	63103	71836987	1091	1838737	95248	128318710					
Andhra Pradesh	27(1)	312	-	-	-	-	-	312	227859	181	-	-	-	-	-	181	55399	-	-	-	283258					
Anantapur	2	25	-	-	-	-	-	25	12174	-	-	-	-	-	-	-	-	-	-	-	25	12174				
Kadapa	5	167	-	-	-	-	-	167	116100	155	-	-	-	-	-	155	40988	-	-	-	322	157088				
Krishna	2	-	-	-	-	-	-	-	-	++	-	-	-	-	-	-	-	-	-	-	++	102				
Kurnool	16(1)	75	-	-	-	-	-	75	71786	26	-	-	-	-	-	26	14309	-	-	-	101	86095				
Nellore	1	45	-	-	-	-	-	45	27799	-	-	-	-	-	-	-	-	-	-	-	45	27799				
Prakasam	1*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Chhattisgarh	15	216	94	82	484	3630	5708	10214	24169097	209	19	91	3000	8136	5049	16504	28610940	-	-	-	26718	5278037				
Dantewada	3	-	-	-	2	405	5700	6107	16994709	4	7	60	588	5165	4903	10727	20591679	-	-	-	16834	37586388				
Durg	5	-	-	-	444	3198	-	3642	6481212	-	-	-	2323	2799	-	5122	6955186	-	-	-	8764	13436398				
Kanker	4	40	11	70	34	26	8	189	335693	8	-	20	48	135	145	356	655216	-	-	-	545	990909				
Narayanpur	1*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Rajnandgaon	2	176	83	12	4	1	-	276	357483	197	12	11	41	37	1	299	408859	-	-	-	575	766342				
Goa	82(1)	143	68	4	44	1	-	260	377365	394	613	331	149	47	-	1534	1754792	-	-	-	1794	2132157				
North Goa	39	7	1	4	2	1	-	15	21220	89	20	20	38	15	-	182	152284	-	-	-	197	173504				
South Goa	43(1)	136	67	-	42	-	-	245	356145	305	593	311	111	32	-	1352	1602508	-	-	-	1597	1958653				
Jharkhand	21	180	27	842	1435	2840	830	6154	6032530	87	1355	44	3486	5124	2948	13044	10461685	-	-	-	19198	16494215				
Singbhum (West)	21	180	27	842	1435	2840	830	6154	6032530	87	1355	44	3486	5124	2948	13044	10461685	-	-	-	19198	16494215				
Karnataka	69	109	321	478	2066	4544	472	7990	14927975	482	2806	2488	7299	3822	149	17046	19731875	-	-	-	25036	34659850				
Bagalkot	3*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Ballari	53	109	313	369	1344	4441	472	7048	13417504	468	713	2283	7291	3591	149	14495	18367650	-	-	-	21543	31785154				
Chitradurga	9	-	8	109	722	103	-	942	1510471	14	2093	205	8	231	-	2551	1364225	-	-	-	3493	2874696				
Tumakuru	4*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				

(Contd.)

IRON ORE

Table - 5 (A) : (Conclid.)

Sector/ State/ District	No. of mines	Lumps										Fines														
		Below 55% - 58% - 60% - 62% - 65% below					55% - 58% - 60% - 62% - 65% above					Below 55% - 58% - 60% - 62% - 65% below					55% - 58% - 60% - 62% - 65% above									
		Fe	Fe	Fe	Fe	Fe	Fe	Fe	Fe	Fe	Fe	Fe	Fe	Fe	Fe	Fe	Fe	Fe	Fe	Fe	Fe	Fe	Fe	Fe	Fe	Fe
		Qty	Value	Qty	Value	Total	Qty	Value	Qty	Value	Total	Qty	Value	Qty	Value	Total	Qty	Value	Qty	Value	Total	Qty	Value	Qty	Value	Total
Madhya Pradesh 19(11)	261	++	7	-	-	-	-	-	-	-	268	174566	2153	14	12	-	-	-	-	-	2179	1301085	-	-	2447	1475651
Balaghat	1	++	-	-	-	-	-	-	-	-	++	49	-	-	-	-	-	-	-	-	-	-	-	-	++	49
Gwalior	1	-	-	-	-	-	-	-	-	-	-	-	20	-	-	-	-	-	-	-	20	8519	-	-	20	8519
Jabalpur	15(11)	++	7	-	-	-	-	-	-	-	268	174517	2133	14	12	-	-	-	-	-	2159	1292566	-	-	2427	1467083
Sagar	2*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maharashtra	16	92	62	4	40	-	-	-	-	-	198	349230	847	93	274	8	-	-	-	-	1222	1151427	-	-	1420	1500657
Chandrapur	2	-	40	-	-	-	-	-	-	-	40	107056	21	-	18	-	-	-	-	-	39	58807	-	-	79	165863
Gadchiroli	2	-	-	-	2	-	-	-	-	-	2	3862	-	-	-	-	-	-	-	-	-	-	-	-	2	3862
Gondia	4	8	-	-	-	-	-	-	-	-	8	16438	2	-	-	-	-	-	-	-	2	2098	-	-	10	18536
Sindhudurg	8	84	22	4	38	-	-	-	-	-	148	221874	824	93	256	8	-	-	-	-	1181	1090522	-	-	1329	1312396
Odisha	66(3)	292	457	1672	2546	18926	5210	29103	52579559	293	3317	3452	8935	28054	6643	50694	6643	50694	59	111281	79856	59	111281	79856	112112226	
Keonjhar	38(2)	119	1	555	158	14533	4943	20309	34642407	161	1957	531	4006	22143	6259	35057	6259	35057	59	111281	55425	59	111281	55425	78082871	
Mayurbhanj	4	33	72	264	8	82	103	562	1403296	11	78	53	20	43	1	206	1	206	-	-	214742	-	-	768	1618038	
Sundargarh	24(1)	140	384	853	2380	4311	164	8232	16533856	121	1282	2868	4909	5868	383	15431	383	15431	-	-	15877461	-	-	23663	32411317	
Rajasthan	14	111	-	-	-	-	-	111	40601	3	-	-	-	-	-	3	-	-	528	1032	1727456	1146	1768585			
Bhilwara	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1032	1727456	
Jaipur	5	81	-	-	-	-	-	81	24886	-	-	-	-	-	-	-	-	-	-	-	-	-	-	81	24886	
Jhunjhunu	5	11	-	-	-	-	-	11	5386	3	-	-	-	-	-	3	-	-	-	-	-	-	-	3	528	
Sikar	2	19	-	-	-	-	-	19	10329	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19	10329	
Telangana	1*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Khammam	1*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

++ Negligible

* Only labour reported.

@ Excluding ROM

IRON ORE

Table – 5 (B) : Production of Iron Ore, 2016-17 (P)
(By Sectors/States/Districts/Grades)

(Quantity in '000 tonnes; Value in ₹'000)

Sector/ State/ District	No. of mines	Lumps										Fines										Total
		Below 55%- 55% Fe		58%- 60% Fe		62%- 65% Fe		65% above Fe &		Total		Below 55%- 55% Fe		58%- 60% Fe		62%- 65% Fe		65% above Fe &		Total		
		Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	
India	296(12)	1883	2139	4444	7544	32303	15873	64186	103392057	6068	15004	8726	17477	59532	19929	126736	144976490	1159	3020141	192081	251388688	
Public Sector	34	4	161	170	3052	13963	7942	25292	44894898	10	958	2643	10765	21696	6886	42958	59920452	-	-	68250	104815350	
Private Sector	262(12)	1879	1978	4274	4492	18340	7931	38894	58497159	6058	14046	6083	6712	37836	13043	83778	85056038	1159	3020141	123831	146573338	
Andhra Pradesh	19(1)	305	-	-	-	-	-	305	197142	184	-	-	-	-	-	184	52237	-	-	489	249379	
Anantapur	2	58	-	-	-	-	-	58	31018	-	-	-	-	-	-	-	-	-	-	58	31018	
Kaadapa	4	175	-	-	-	-	-	175	100989	140	-	-	-	-	-	140	36835	-	-	315	137824	
Krishna	1	-	-	-	-	-	-	-	-	++	-	-	-	-	-	++	-	-	-	++	22	
Kurnool	10(1)	48	-	-	-	-	-	48	48194	44	-	-	-	-	-	44	15380	-	-	92	63574	
Nellore	1	24	-	-	-	-	-	24	16941	-	-	-	-	-	-	-	-	-	-	24	16941	
Prakasam	1*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chhattisgarh	15	181	96	17	765	2612	7366	11037	24549141	164	187	276	3178	8772	7454	20031	35913330	-	-	31068	60462471	
Dantewara	3	-	-	1	20	560	7001	7582	18466278	3	37	239	1022	7124	6360	14785	28971375	-	-	22367	47437653	
Durg	5	-	-	-	528	2024	350	2902	5444884	-	12	-	2082	1447	425	3966	5475062	-	-	6868	10919946	
Kanker	4	41	69	13	131	28	15	297	415956	79	121	37	52	201	669	1159	1384179	-	-	1456	1800135	
Narayanpur	1*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Rajnandgaon	2	140	27	3	86	-	-	256	222023	82	17	-	22	++	-	121	82714	-	-	377	304737	
Goa	78(1)	781	799	285	100	28	1993	2674696	2290	3347	817	242	193	193	6889	7773472	51	65862	8933	10514030		
North Goa	35	543	370	221	97	28	-	1259	1661969	1226	2068	325	218	192	4029	4352295	-	-	5288	6014264		
South Goa	43(1)	238	429	64	3	-	-	734	1012727	1064	1279	492	24	1	2860	3421177	51	65862	3645	4499766		
Jharkhand	19	21	35	1019	1231	2552	1081	5939	4903335	6	1532	161	3174	5674	4849	15396	11301144	-	-	21335	16204479	
Singbhum (West)	19	21	35	1019	1231	2552	1081	5939	4903335	6	1532	161	3174	5674	4849	15396	11301144	-	-	21335	16204479	
Karnataka	58	162	585	611	2317	4897	321	8893	16715165	526	2549	3635	4234	6480	46	17470	27135728	-	-	26363	43850893	
Bagalkot	3	1	112	-	-	-	-	113	140967	177	-	-	-	-	177	147132	-	-	290	288099		
Ballari	46	152	342	603	1913	4782	321	8113	15658161	341	1370	3035	4075	5958	46	14825	24545136	-	-	22938	40203297	
Chitradurga	7	9	131	8	404	115	-	667	916037	8	1179	600	159	522	-	2468	2443460	-	-	3135	3359497	
Tumakuru	2*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Contd..

IRON ORE

Table - 5 (B) : (Concl.)

Sector/ State/ District	No. of mines	Lumps										Fines													
		Below 55% Fe					55% - 65% Fe					Below 55% Fe					55% - 65% Fe								
		58% Fe	60% Fe	62% Fe	62% below Fe	65% above Fe	58% Fe	60% Fe	62% Fe	62% below Fe	65% above Fe	58% Fe	60% Fe	62% Fe	62% below Fe	65% above Fe	58% Fe	60% Fe	62% Fe	62% below Fe	65% above Fe	Qty	Value	Qty	Value
Madhya Pradesh	15(8)	101	-	-	-	-	-	-	-	-	1627	41432	101	41432	1627	633673	2	2845	1730	677950					
Gwalior	2	-	-	-	-	-	-	-	-	-	17	-	-	-	17	5115	-	-	17	5115					
Jabalpur	13(8)	101	-	-	-	-	-	-	-	-	1610	41432	101	41432	1610	628558	2	2845	1713	672835					
Maharashtra	16	51	34	87	45	14	-	-	-	-	844	350233	231	350233	844	1022110	-	-	1321	1372343					
Chandrapur	2	-	21	-	-	-	-	-	-	-	25	41222	21	41222	25	35919	-	-	57	77141					
Gadchiroli	2	-	++	87	4	14	-	-	-	-	-	146494	105	146494	-	24	-	-	105	146518					
Gondia	3	7	-	-	-	-	-	-	-	-	1	12837	7	12837	1	984	-	-	8	13821					
Kolhapur	1*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
Sindhudurg	8	44	13	-	41	-	-	-	-	-	818	149680	98	149680	818	985183	-	-	1151	1134863					
Odisha	62(2)	159	590	2425	3086	22200	7105	35565	53919003	427	7389	3591	6649	61144741	427	7389	3591	6649	61144741	99614	115063744				
Keonjhar	35(1)	5	3	929	289	17081	6942	25249	35909831	335	5037	959	3555	44977	43953197	-	-	70226	79863028						
Mayurbhanj	3	2	201	612	2	4	5	826	1400067	44	441	108	15	333315	-	-	-	1436	1733382						
Sundargarh	24(1)	152	386	884	2795	5115	158	9490	16609105	48	1911	2524	3079	16858229	-	-	-	27952	33467334						
Rajasthan	14	122	-	-	-	-	++	122	41910	++	-	-	-	55	2951434	1228	2993399								
Bhilwara	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1106	2951434					
Jaipur	5	76	-	-	-	-	++	76	23348	-	-	-	-	-	-	-	-	-	76	23348					
Jhunjhunu	5	3	-	-	-	-	-	3	4297	++	-	-	-	55	-	-	-	-	3	4352					
Sikar	2	43	-	-	-	-	-	43	14265	-	-	-	-	-	-	-	-	-	43	14265					

++ Negligible

* Only labour reported.

@ Excluding ROM

**Table – 6 : Production[®] of Iron Ore, 2015-16 and 2016-17
(By Frequency Groups)**

Production Group (In tonnes)	No. of mines		Production (In '000 tonnes)		Percentage in total production		Cumulative percentage	
	2015-16 (P)	2016-17 (P)	2015-16	2016-17 (P)	2015-16	2016-17(P)	2015-16	2016-17 (P)
Total	330(16)	296(12)	158108	192081	100.00	100.00	-	-
Up to 50,000	232(10)	175(10)	928	896	0.59	0.47	0.59	0.47
50,001 - 100,000	13(5)	20(1)	1412	1624	0.89	0.85	1.48	1.32
100,001 - 500,000	32(1)	39(1)	8695	10802	5.50	5.62	6.98	6.94
5,00,001 - 10,00,000	15	18	11111	13776	7.03	7.17	14.01	14.11
1,00,001 - 1,500,000	7	9	8296	11295	5.25	5.88	19.26	19.99
15,00,001 - 20,00,000	3	4	4909	6905	3.10	3.59	22.36	23.58
20,00,001 and above	28	31	122757	146783	77.64	76.42	100.00	100.00

IRON ORE

(P) : Provisional
@:Excluding ROM

IRON ORE

Table -7 (A) : Mine-head Closing Stocks of Iron Ore, 2015-16
(By States/Grades)

State	Lumps										Fines						Concentrates		Total Lumps, 58% & Concentrates
	Below 55% Fe	55% below 58% Fe	58% below 60% Fe	60% below 62% Fe	62% below 65% Fe	65% Fe & above	Total	Below 55% Fe	55% below 58% Fe	58% below 60% Fe	60% below 62% Fe	62% below 65% Fe	65% Fe & above	Total	Total				
																2216	2058	2303	
India	7270	2216	2058	2303	6373	2431	22651	27765	44290	5053	24008	16977	3652	121745	102	144498			
Andhra Pradesh	612	-	9	-	-	-	621	517	-	-	-	-	-	517	-	1138			
Chhattisgarh	18	10	10	14	54	453	559	246	110	3	833	1548	609	3349	-	3908			
Goa	231	7	17	4	1	-	260	700	314	28	6	1	-	1049	5	1314			
Jharkhand	392	531	94	40	120	276	1453	1796	34285	46	797	402	439	37765	-	39218			
Karnataka	4007	441	551	1130	1684	104	7917	1281	450	935	1139	683	104	4592	18	12527			
Madhya Pradesh	704	157	21	-	-	-	882	2799	451	54	-	-	-	3304	-	4186			
Maharashtra	80	2	++	25	++	-	107	338	++	12	-	-	-	350	-	457			
Odisha	1141	1064	1356	1090	4514	1598	10763	20049	8680	3975	21233	14343	2500	70780	65	81608			
Rajasthan	52	-	-	-	-	-	52	14	-	-	-	-	-	14	14	80			
Telangana	33	4	-	-	-	-	37	25	-	-	-	-	-	25	-	62			

++ Negligible

Table - 7 (B) : Mine-head Closing Stocks of Iron Ore, 2016-17 (P)
(By States/Grades)

State	Lumps										Fines						Concentrates		Total Lumps, Fines & Concentrates
	Below 55% Fe	55% below 58% Fe	58% below 60% Fe	60% below 62% Fe	62% below 65% Fe	65% Fe & above	Total	Below 55% Fe	55% below 58% Fe	58% below 60% Fe	60% below 62% Fe	62% below 65% Fe	65% Fe & above	Total	Total				
																2270	1896	1700	
India	7394	2270	1896	1700	5774	2190	21224	26919	49369	5552	22601	19741	2988	127170	30	148424			
Andhra Pradesh	628	9	-	++	-	-	637	540	-	-	1	-	-	541	-	1178			
Chhattisgarh	5	14	6	13	46	267	351	276	137	9	431	1309	362	2524	-	2875			
Goa	334	211	75	3	1	-	624	507	667	113	6	89	-	1382	17	2023			
Jharkhand	379	550	128	60	216	271	1604	1783	35307	51	157	1722	234	39254	-	40858			
Karnataka	4005	553	421	808	540	92	6419	1383	372	486	609	1130	44	4024	-	10443			
Madhya Pradesh	689	157	21	-	-	-	867	2818	450	54	-	-	-	3322	++	4189			
Maharashtra	87	5	++	1	++	-	93	427	++	++	-	-	-	427	-	520			
Odisha	1201	771	1245	815	4971	1559	10562	19171	12436	4839	21397	15491	2348	75682	-	86244			
Rajasthan	66	-	-	-	-	1	67	14	-	-	-	-	-	14	13	94			
Telangana	++	-	-	-	-	-	-	-	-	-	-	-	-	-	-	++			

++ Negligible

MINING, MARKETING & TRANSPORT

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

The method of mining and deployment of machinery vary from place to place depending upon characteristics of iron ore as per geological set up. 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 Odisha are also operated by the Private Sector.

Manual Mines

Generally, these mines are confined to float ores where mining is done by digging the ore with pick axes, crow bars, chisels and spades. The mined material is 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 man shift (OMS) is normally between 1.5 and 2 tonnes.

Mechanised Mines

Most of the mechanised mines are captive belongings of different steel plants and have been developed to cater to specific 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.

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. Width of working benches is maintained at more than 15 m and bench slope is maintained at about 80°. The ore produced is transported to short distances by dumpers up to 40-tonne capacity. For longer distances and barge loading, dumpers/trucks 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, Daitari and Dalli-Rajhara operated by SAIL, NMDC and OMC are fully mechanised. Kudremukh iron ore mine of KIOCL closed since December 2005 was also mechanised. 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. NMDC operates a couple of large mechanised iron ore mines in the country at Bailadila (Chhattisgarh) and Donimalai (Karnataka). With a strategic vision to augment production, the development of Deposit 11B mine at an enhanced capacity of 7.0 million tonnes ROM per annum has been taken up. The development of Kumaraswamy Iron Ore Mine with capacity of 7.0 million tonnes per annum is being taken up. The entire project is being executed through six packages. Orders have been placed for all the packages and the major works have been completed. To augment the production capacity of Kirandul complex, construction of 12.0 million tpy screening plant with loading facilities is envisaged. This plant caters to both Deposit 11-B & Deposit 14 of Kirandul complex. The entire project has been planned to be executed in seven packages.

The processing of iron ore in the country involves crushing, screening, washing and in some cases beneficiation and agglomeration. Crushing and screening are 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.

IRON ORE

The lumps and fines of iron ore are marketed after washing, screening and beneficiation. Fines are converted into 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 sub-grade minerals, mechanical beneficiation, dust suppression, monitoring of water & 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 in iron ore mining is the disposal of tailings and other deleterious silica minerals and phosphorous. 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 in crop yield and reduction in fish population in streams and navigation difficulties are the problems caused by silting. To overcome these 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 Ballari-Hosapete area, Karnataka, dust concentration (suspended particulate matter) 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 and 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 & sintering and 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. Iron ore pellet is a kind of agglomerated fines which has better tumbling index as compared to that of parent ore and can be used as a substitute used in blast furnaces in countries where lump ore is not available.

IRON ORE

The twenty pelletisation plants in the country, about which information is available have a total capacity of 59.30 million tonnes per annum. The JSW Steel Ltd has a manufacturing capacity of 9.2 million tonnes of pellets annually at Vijayanagar. The pellet production unit consists of India's first dry process pelletising plant, ideally suited for the soft iron ore of Ballari-Hosapete region. Amba River Coke Limited a wholly subsidiary Company of JSW Steel has set up a 4 million tpy pellet plant at Dolvi.

Jindal Steel & Power Ltd has a total installed capacity of 9 MTPA pellet plant at Barbil for production of different grades of pellets. The plant includes dry grinding facility that harnesses recuperation type of straight grate technology.

Essar Steel Pelletisation plant at Visakhapatnam has installed capacity of 8 million tonnes per annum. The plant receives iron ore slurry which after pelletisation is provided as vital raw material for their steel plant at Hazira (Gujarat). Setting up of integrated pelletisation facility of 12 million tpy is under progress at Paradip, Odisha, and is implemented in two phases by Essar Steel. Successful commissioning of Phase I (6 million tpy) has been completed, while the second phase is under construction. The 1st Phase pellet plant at Paradip has an assured supply of high-quality iron ore from the beneficiation plant at Dabuna. The plant's proximity to the Paradip port ensures expeditious shipment of pellets to their steel plant in Hazira. After completion of second phase, the capacity of pellet plant at Paradip, Odisha, would get scaled up to 12 million tpy and the total pellet plant capacity of the Company would get augmented to 20 million tpy.

NMDC is in the process of setting up two pellet plants, one at Donimalai in Karnataka with 1.2 million tpy capacity by using slimes of tailing dam of Donimalai and the second at Nagarnar with 2 million tpy capacity, along with 2 million tpy beneficiation plant at Bacheli interconnected by a slurry pipeline between Bacheli and Nagarnar in Chhattisgarh.

The construction of the above said 1.2 MTPA Pellet Plant at Donimalai has been completed and trial production is said to have commenced. Regarding the 2 MTPA Pellet Plant at Nagarnar, all the statutory clearances have been received and site development work has begun. Statutory clearances for slurry pipeline system and Ore processing plant at Bacheli are at various stages of completion.

As a diversification measure, the Government approved the construction of a 3 million tonnes per

year capacity pellet plant in Mangaluru in May, 1981. The capacity of the pellet plant was enhanced to 3.5 million tonnes with additions/modifications. The plant went into commercial production in 1987 and is now catering to both domestic and international customer.

The following Memoranda of Understanding (MoU) regarding pellet plant were signed in the presence of Hon'ble Prime Minister, Hon'ble Minister for Steel & Mines and the Chief Minister, Chhattisgarh on 09th May, 2015 :

1. An MoU was signed between Government of Chhattisgarh and NMDC for 139-km long slurry pipeline and 2MTPA pellet plant at Nagarnar in Bastar District involving an investment of ₹ 4,000 crore.

2. An MoU was signed between Government of Chhattisgarh and SAIL for setting up 1 MTPA pellet plant at Dalli-Rajhara, Balod District with an investment of ₹ 826 crore.

The installation of a 1.8 MTPY pelletisation plant by M/s Monnet Ispat and Energy Ltd has been completed and is at commissioning stage.

To ensure gainful use of the extra-fine iron ore fines which are generated while mining and processing, Tata Steel has implemented a 6 million tpy pelletising plant in Jamshedpur with capabilities to convert these fines into pellets for use as replacement of iron ore lumps as a blast furnace feed. This not only is aimed at contributing significantly to energy savings in the blast furnace operations but also at cutting the cost of operations. The Eastern region accounts for 55% of the total number of iron ore pellet units in the country, the rest 45% is equally divided between the Southern and Western part. The Northern region is devoid of any presence as far as the Iron Ore Pellet Industry is concerned – a key feature of this Industry, which is in sync with the pattern of spread of the Indian Sponge Iron Industry.

Steel plants are likely to increase usage of pellets in their production process to reduce pollution and increase productivity. Moreover, the forecast of spike in growth in Infrastructure, Real Estate and Automobile Sectors in the ensuing years is expected to augment demand for steel, which in turn would raise the demand and prices of pellets in the near future.

To encourage beneficiation and pelletisation of iron ore fines in the country, basic customs duty (Import Duty on Iron Ore @ 2.5 %) on the plants

and equipment required for initial setting up or for substantial expansion of iron ore pellets plants and iron ore beneficiation plants has been reduced from 7.5% to 2.5% w.e.f 17th March 2012. To ensure easy availability of raw material in domestic market at reasonable prices, export duty on iron ore at 30 % for >58% Fe iron ore and 0% for <58% Fe iron ore and iron ore pellets was imposed.

Sintering

In sintering process, iron ore fines, other iron bearing wastes and coke dust are blended and combusted. The heat fuses the fines into course lumps that can be charged to a blast furnace. The twenty-six sintering plants in the country, about which information is available, have a total capacity of about 70.05 million tonnes per annum. Most of the Integrated Steel Plants (ISP) in the country have their own sintering plants. Sinter plants receive raw material mostly from their captive mines. Steel Authority of India Ltd (SAIL) had started its commercial production in December 2012 at IISCO steel plant in West Bengal, with a capacity of 3.8 million tonnes per annum. The installation of a 0.75 MTPY sinter plant by M/s Monnet Ispat and Energy Ltd has been completed and is at commissioning stage. 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 provided in Table-8.

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 section. The post-liberalisation regime has witnessed Expression 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.

KIOCL also has its Pig Iron Complex (Blast Furnace Unit) at Mangaluru for manufacturing and supplying pig iron of Foundry Grade to the domestic market. However, the operation of this Unit is kept under suspension since 2009 due to negative contribution.

India is an important producer of pig iron. The production for sale of pig iron in the country in 2016-17 was 9.391 million tonnes (Provisional). Post-liberalisation, with setting up of several units in the Private Sector, not only imports have drastically reduced but also India has turned out to be a net exporter of pig iron. The Private Sector accounted for 92% of total production for sale of pig iron in the country in 2016-17 (Provisional). The production for sale of pig iron has increased from 1.6 million tonnes in 1991-92 to 9.391 million tonnes in 2015-16. As per National Steel Policy 2017, the demand for pig iron for merchant use, such as for castings and supplementary metallic in the electric arc or induction furnaces, is projected to increase to 17 MT by 2030-31.

Sponge iron

India is the world's largest producer of sponge iron or Direct Induced Iron (DRI) with a host of coal-based units located in the mineral-rich states of the country. Over the years, the coal-based route has emerged as a key contributor and accounted for 79% of the total sponge iron production in the country in 2015-16. The growth of Sponge Iron Industry during the last few years in terms of capacity has been substantial. The installed capacity of sponge iron increased from 1.52 million tonnes per annum in 1990-91 to around 43 million tonnes in 2015-16. Production has increased from 0.9 million tonnes in 1990-91 to 24.39 million tonnes in 2016-17. India has been the world's largest sponge iron producer every year since 2003. As per National Steel Policy 2017, the demand for sponge iron is projected to increase to 80 million tonnes by 2030-31.

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 availability of indigenous metal scrap is scarce, and therefore, to meet the domestic demand, scrap is usually imported. Sponge iron is a viable alternative for scrap and 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 ORE

Iron & Steel

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

Ferroalloys

Iron is an important constituent of ferro-alloys, like ferromanganese (high carbon, medium carbon and low carbon), ferrosilicon, ferrochrome (high carbon and low carbon)/charge-chrome, ferromolybdenum, ferrovandium, ferrotungsten, ferrosilicon-magnesium, ferroaluminium, ferro-silicon-zirconium, ferrotitanium, etc. Ferroalloys in turn are either used in Steel Industries to impart some special qualities or are exported. The details about the FerroAlloys Industry are provided in the Review on 'FerroAlloys'.

Cement

Iron ore lumps and powder containing +58% Fe, are normally used in the Cement Industry as they

improve burning properties, impart colour and balance the 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. As information available in Energy Statistics 2016, there are 18 washeries for coking coal and 34 washeries for non-coking coal with 29.69 million tpy and 101.55 million tpy installed capacity, respectively. Details on coal washeries are provided in the Review on 'Coal & Lignite'.

USES & SPECIFICATIONS

Iron ore is mainly used for manufacturing pig iron, sponge iron and steel. It is also used in Cement, Coal Washeries, Ferroalloys, Foundry, Vanaspati and Glass Industries. The specifications of iron ore consumed by major sponge iron plants are furnished in Table-9 and by major steel plants in Table-10.

**Table – 8 : Installed Capacity & Production of Pellets/Sinters, 2015-16
(By Plants)**

Name & location of plant	Annual installed capacity	Production				General specifications of concentrates/fines used
		2014-15		2015-16 (P)		
		2014-15	2015-16 (P)	2014-15	2015-16 (P)	
A) Pellet Plants						
i) Rashmi Metaliks Ltd, Shyamraipur, Gokulpur, West Midnapore, West Bengal	2100	969	1082	791	1723	NA
ii) JSW Steel Ltd, Vijaynagar Works, Vidyanagar, Toranagally, Ballari, Karnataka	9200	4710	5456	13602	14083	
iii) Arya Iron and Steel Company (AISCO) Barbil, Odisha	1200	687	494	757	544	
iv) Ardent Steel Ltd, Phuljhar, Kendujhar, Odisha	600	NA	NA	NA	NA	
v) Sarda Energy and Minerals Ltd, Siltara, Raipur, Chhattisgarh	600	NA	495	NA	769	

(Contd.)

IRON ORE

Table - 8 (Contd.)

(In '000 tonnes)

Name & location of plant	Annual installed capacity	Production		Iron ore fines consumed		General specifications of concentrates/fines used
		2014-15	2015-16 (P)	2014-15	2015-16(P)	
vi) KIOCL Ltd, Panambur, Mangaluru, Karnataka.	3500	785	100	745	128	
vii) Tata Steel Limited, Jamshedpur	6000	5409	5941	13777*	15346*	
viii) Essar Steel Ltd, Visakhapatnam, Andhra Pradesh.	8000	NA	NA	NA		
ix) Essar Steel Ltd, Paradip Port, Odisha.	6000	NA	NA	NA		
x) Jindal Steel & Power Ltd, Barbil	9000	NA	NA	NA		
xi) Godawari Power & Ispat Ltd Siltara, Chhattisgarh	2100	1532	1581	1646	1650	NA
xii) BMM Ispat, Karnataka.	2400	NA	NA	NA		
xiii) Mandovi Pellets Ltd, Near Borim Bridge, Shiroda, Goa – 403 103.	1800	NA	NA	NA	NA	Fe 62%, SiO ₂ 2 to 3.5%, Al ₂ O ₃ 1.35 to 2%, Size - 10 mm
xiv) Jayaswal Neco Industries Ltd, Siltara, Raipur, Chhattisgarh.	1200	NA	NA	568	1292	
xv) Shri Bajarang Power & Ispat Ltd, Borjhara, Tilda & Gondwara, Raipur Chhattisgarh.	1200	NA	NA	NA	NA	
xvi) Xindia Steels Ltd, Kunikere & Hirebaganal Ginigera, Koppal, Karnataka.	800	NA	NA	NA	NA	
xvii) Rexon Strips Ltd, Kumakela, Lathikata Rourkela, Sundergarh, Odisha	300	NA	NA	3748	3748	
xviii) Orissa Manganese & Minerals Limited (OMML), Kandra Saraikela Kharsawan, Jharkhand	1200	NA	NA	NA	NA	
xix) MSP Steel & Power Ltd, Raigarh, Chhattisgarh	900	NA	NA	797	775	
xx) Usha Martin Ltd, Usha Alloy & Steel Division, Jamshedpur	1200	671	402	2461	2255	NA
B) Sintering Plant						
i) Bokaro Steel Plant, Jharkhand.	6900	5062	4695	3806	3482	
ii) Bhilai Steel Plant, Bhilai, Chhattisgarh.	6334	6797	7737	4792	5451	Fe 62.6% (min.), Size 0-10 mm or <10% & 1mm or >75%.

(Contd.)

IRON ORE

Table - 8 (Contd.)

(In '000 tonnes)

Name & location of plant	Annual installed capacity	Production		Iron ore fines consumed		General specifications of concentrates/fines used
		2014-15	2015-16 (P)	2014-15	2015-16 (P)	
iii) Durgapur Steel Plant, West Bengal.	3009	3170	2980	2425	2212	Fe >63%, SiO ₂ 2.17 to 4.54%, Al ₂ O ₃ 2.57 to 3.03%, Size +10 mm <10% , 1mm>75%
iv) Rourkela Steel Plant, Odisha.	5300	4009	4935	4517	5196	Fe 62.80%, SiO ₂ 2.28%, Al ₂ O ₃ 3.04%, Size -10 mm
v) RINL, Visakhapatnam Steel Plant, Plant No. -1& 2 , Visakhapatnam Andhra Pradesh.	5256	5101	NA	3791	NA	Fe 64.50% (min.), Al ₂ O ₃ 3.0% (max.), SiO ₂ 3%, (max.), Size (-) 10 mm
vi) RINL, Visakhapatnam Steel Plant, , Plant No. -3, Visakhapatnam, Andhra Pradesh.	3600	NA	NA	NA	NA	NA
vii) Tata Steel Ltd, Jamshedpur, Jharkhand.	8000	7370	7863	13777*	15344*	* Including lumps
viii) Usha Martin Ltd (Usha Alloys and Steel Division), Jamshedpur.	715	630	NA	1466	NA	NA
ix) JSW Ispat Steel Ltd, Dolvi, Raigad, Maharashtra 402 107.	2800	NA	NA	NA	NA	NA
x) Neelachal Ispat Nigam Ltd, Kalinga Nagar, Industrial Complex, Duburi-755 026, Distt. Jajpur, Odisha.	1711	NA	NA	897	914	Fe 63% (min.), Size + 10 mm
xi) Jindal Steel & Power Ltd, Raigarh, Chhattisgarh.	2300	NA	NA	NA	NA	NA
xii) Jayaswal Necco Industries Ltd, Siltara Growth Centre, Raipur-493 221, Chhattisgarh.	792	-	568	-	1292	Fe 56.5 %, CaO 9.0%, MgO 2.25%.
xiii) Bhushan Power & Steel Ltd, Sambalpur, Odisha.	1000	NA	NA	NA	NA	NA
xiv) JSW Steel Ltd Salem works , Pottaneri, Salem, Tamil Nadu.	1180	1245	1275	775	578	NA
xv) Kirloskar Ferrous Industries Ltd, Bevinahalli, Hitnal, Karnataka.	500	449	382	403	354	NA
xvi) Sunflag Iron and Steel Co. Ltd, Bhandara, Nagpur, Maharashtra.	250	296	337	552	535	NA
xvii) JSW Steel Ltd Vijaynagar works, Vidyanagar -583 175, Tornagallu, Ballari, Karnataka.	12950	13386	13155	13602	14083	NA
xviii) Kalyani Steel Ltd, M/s Hospet Steels Ltd., Ginigera, Koppal, Karnataka	500	247	256	162	119	Fe: 60 - 62%
xix) Mukund Ltd, M/s Hospet Steel Ltd, Ginigera, Koppal, Karnataka	500	336	336	184	166	Fe: 60 - 62%

(Contd.)

IRON ORE

Table - 8 (Concl'd.)

(In '000 tonnes)

Name & location of plant	Annual installed capacity	Production		Iron ore fines consumed		General specifications of concentrates/fines used
		2014-15	2015-16 (P)	2014-15	2015-16 (P)	
xx) Rashmi Metaliks Ltd, Shyamraipur, Gokulpur, West Midnapore, West Bengal.	580	199	251	1723	1410	NA
xxi) IISCO Steel Plant, Steel Authority of India, Burnpur, West Bengal.	3800	2190	663(up to June)	453	576	NA
xxii) Tata Metaliks Ltd, Kharagpur, West Bengal.	528	476	475	362	434	NA
xxiii) KIC Metaliks Ltd, Raturia, Angadpur, Durgapur, West Bengal.	336	194	188	238	234	NA
xxiv) Gerdau Steel India Ltd, Tadipatri, Anantpur, A.P.	470	447	485	286	308	NA
xxv) SBQ Steel Ltd, Gudur, Nellore, AP	240	-	-	-	-	-
xxvi) Sri Kalahasthi Pipes Ltd, Dipipe Sri Kalahasthi.	500	333	364	-	-	-

*Includes iron ore lumps & low-grade iron ore

Table - 9 : Specifications of Iron Ore Consumed by Major Sponge Iron Plants

Sl. No.	Name of the Plant	Specifications				
		Size	Fe	Al ₂ O ₃ + SiO ₂	P	S
1.	Orissa Sponge Iron Plant	5-18 mm	65% min.	4.5% max.	0.03% max.	N. A.
2.	Welspun Max Steel Ltd	9-16 mm	66%	2.6% max.	0.05%	0.01%
3.	Sunflag Iron & Steel Ltd	5-20 mm	67.5%	-	-	-
4.	NMDC Ltd (Sponge iron unit)	6-20 mm	55-58% & 64-66%	-	-	-
5.	Essar Steel Ltd	10-40 mm	67%	2.60% max.	0.05%	0.01%
6.	Jindal Steel & Power Ltd	10-30 mm	65% min.	3% max. (SiO ₂)	0.05%	-
7.	Tata Sponge Iron Ltd	5-18 mm	65% min.	5% max.	-	-
8.	Steel Exchange India Ltd	10-40 mm	62%	-	-	-
9.	Sarda Energy & Minerals Ltd	5-18 mm	65-66%	-	-	-
10.	OCL Iron & Steel Ltd	Sized	62% min.	-	-	-
11.	Nalwa Steel & Power Ltd	5-20 mm	63% min.	-	-	-
12.	Shri Bajrang Power & Ispat Ltd	5-18 mm	64% min.	-	-	-
13.	Jai Balaji Industries Ltd	5-18 mm 10-30 mm 10-150 mm	65% - -	5% - -	0.05% - -	0.03% - -

IRON ORE

**Table – 10 : Consumption and Specifications of Iron Ore, 2014-15 and 2015-16
(By Steel Plants)**

(In '000 tonnes)

Steel plant	Iron ore consumption				Specifications
	2014-15		2015-16 (P)		
	Lumps	Fines	Lumps	Fines	
Bokaro Steel Plant, Bokaro, Jharkhand.	2635	3806	2099	3481	Lumps: Fe-63.40%, SiO ₂ :2.25%, Al ₂ O ₃ 2.39%, Size: 10-40 mm Fines: Fe - 62.24%, SiO ₂ - 3.36%, Al ₂ O ₃ - 3.45%
Durgapur Steel Plant, Durgapur, West Bengal.	1244	2425	1178	2212	Lumps : Fe - 62.48%, Al ₂ O ₃ - 2.42%, Size: 10-50 mm Fines: Fe - 62.8%, SiO ₂ - 2.28%, Size : -10 mm
IISCO Steel Plant, Burnpur, West Bengal.	453	577	576	1865	Lumps: Fe - 62.86%, SiO ₂ - 2.56%, Al ₂ O ₃ - 2.56% (max.), Size: 10-40 mm
Bhilai Steel Plant, Chhattisgarh	3174	4792	2893	5451	
Rourkela Steel Plant SAIL, Rourkela, Odisha.	1761	3406	1835	3361	-
Tata Metaliks Ltd Kharagpur West Bengal.	277	362	260	434	-
Gerdau Steel India Ltd, Tadipatri, Anantpur, A.P.	168	286	130	308	
Kirloskar Ferrous Industries Ltd, Bevinahalli, Hitnal, Karnataka.	185	403	178	354	
Mukund Ltd, M/s Hospet Steel Ltd, Giniger, Koppal, Karnataka.	306	184	273	166	-
JSW Steel Ltd Salem works, Pottaneri, Salem, Tamil Nadu.	4669	13602	4315	14083	-
Kalyani Steel Ltd, M/s Hospet Steels Ltd., Giniger, Koppal, Karnataka.	219	162	213	119	-
SAIL Durg Chhattisgarh	3174	2893			

IRON ORE

TRADE POLICY

As per the Foreign Trade Policy (FTP) for 2015-20 and the amended Export and Import Policy incorporated in the FTP, the present export

policy for iron ore as construed is furnished below in brief. As per the policy, imports of iron ore lumps, fines, concentrates and agglomerated pellets are freely allowed.

HS Code	Item	Export Policy	Nature of restrictions
26011100	Iron ore other than those specified under Free category.	STE	Export through MMTC
26011100	Iron ore of Goa origin when exported to China, Europe, Japan, South Korea and Taiwan, irrespective of the Fe content.	Free	
26011100	Iron ore of Redi origin to all markets, irrespective of the Fe content.	Free	
26011100	All iron ore of Fe content up to 64%.	Free	
26011150	Iron ore concentrate prepared by beneficiation and/or concentration of low-grade ore containing 40% or less of iron produced by KIOCL Ltd.	STE	KIOCL Ltd, Bengaluru
26011210	Iron ore pellets manufactured by KIOCL Ltd.	STE	KIOCL Ltd, Bengaluru
26011290	Rejects of iron ore chips and like generated from the manufacturing process after using imported raw material.	Free	The quantity of export of such rejects shall not be more than 10% of the imported raw materials i.e. pellets. The size of the rejected pellets chips (fines) shall be less than 6 mm.

Source: Export-Import Policy, 2015-20 ; STE: State Trading Enterprise

**Table 11 - Estimated Consumption* of Iron Ore[@] 2014-15 to 2016-17
(By Industries)**

Industry	(In tonnes)		
	2014-15	2015-16 (R)	2016-17(P)
All Industries	114680000	126774300	142532900
Alloy steel	10600	39800	35500
Cement	1186500	1254100	759000
Ferroalloys	3100	78800	101700
Iron & steel (including pelletisation)	85525000	96778900	119215100
Sponge iron	27920000(e)	28592000(e)	22391300
Others (electrode,foundry, oil well drilling, paint, chemical, coal washery** & refractory)	34800	30700	30300

Figures rounded off.

*Includes actual reported consumption and/or estimates made wherever required.

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

** Magnetite.

CONSUMPTION

In 2016-17, about 142.53 million tonnes iron ore were consumed in various industries like Iron & Steel, Sponge Iron, Ferro-alloys, Alloy-steel, Coal Washery and Cement. Iron & Steel (83.6%) and Sponge Iron industries (15.7 %) were the major consumer of iron ore and accounted for over 99.3 % of the consumption. Plantwise consumption of iron ore in steel plants about which information is available is furnished in Table-10. Industrywise consumption of iron ore from 2014-15 to 2016-17 is given in detail in Table-11.

WORLD REVIEW

The world reserves of crude iron ore are estimated to be around 170 billion tonnes. In term of iron content, the iron ore reserves are estimated to be around 82 billion tonnes. The world reserves of crude iron ore and iron content by principal countries are furnished in Table - 13.

In 2016, the world production of iron ore was 3,305 million tonnes as against 3,300 million tonnes in the previous year. China (39%), Australia (26%), Brazil (13%), India (6%) and Russia (3%) were the principal producers. These five countries accounted for about 87% of the world production of iron ore. The world production of iron ore is provided in Table-13.

Australia

Australia's reported Economic Demonstrated Resources increased by year end 2014 to 54.4 Gt with 24.6 Gt of contained iron; however, the estimated resource life decreased to 75 years from the 85 years estimated in 2013.

The three leading miners in Australia—BHP Billiton Ltd., Fortescue Metals Group Ltd., and Rio Tinto Group—were three of the four leading iron ore mining companies in the world and accounted for over 70% of production in Australia in 2014. Operations in Australia were affected by seasonal cyclone. All three mining companies focused on adding capacity while reducing production costs, which ranged from less than \$20 per metric ton to around \$35 per metric ton for iron ore mined in situ.

BHP Billiton's share of production among Australian operations in FY 2014 rose to 193 Mt, a 21% increase from 159 Mt in FY 2013.

Fortescue's production in FY 2014 increased to 140 Mt, a 48% increase over the 94.6 Mt produced in FY 2013.

Rio Tinto's share of production among Australian operations in 2014 was 225 Mt, a 12% increase compared with the 200 Mt produced in 2013. Rio Tinto completed its first-phase expansion at Pilbara to reach a 290-Mt/yr capacity with a second-phase expansion planned to reach 330 Mt/yr in 2015 and 350 Mt/yr in 2017. The company continued investing in automated technologies to lower costs and improve efficiencies, which included converting four drills to an autonomous drilling system, expanding automated haulage systems, and testing autonomous heavy-haul rail system.

Brazil

Vale S.A.'s production in 2014, including Vale's share of production at the Samarco Mine, was 332 Mt, 7% greater than the 311 Mt produced in 2013. Of the total ore produced, pellets accounted for 55.1 Mt in 2014, an increase from 49.6 Mt in 2013. The Samarco Mine began operations at a fourth pellet plant, increasing capacity by 8.3 Mt/yr to 30.5 Mt/yr. Anglo American plc completed the Minas-Rio project. The Minas-Rio Mine, an open pit mine and processing facility, was expected to produce 11 to 14 Mt (wet basis) at 67% Fe in 2015 and 24 to 26.5 Mt in 2016.

China

In 2014, stockpiles of iron ore in China surpassed 100 Mt for the first time since 2012. Traders reportedly increased stockpiles of iron ore to use as collateral for credit. The China Metallurgical Mining Enterprise Association reported that 20% to 30% of iron ore mines in China closed or were idled in 2014 owing to low prices. Credit Suisse Group AG estimated that production in China will decline by 16% to 310 Mt in 2014 and to 275 Mt in 2015. Some mines in China, notably those owned by steel mills or central Government enterprises, were expected to maintain operations despite price forecasts ranging from \$70 to \$90 per ton. A study by the China Iron and Steel Association indicated that more than 20 major iron ore mines in China that were owned by major steel mills maintained consistent production rates throughout 2013. Producers in China's larger Provinces, such as Anhui, Guangdong, Hubei, and Sichuan, increased production in 2014.

Canada

The Mary River Mine began shipping iron ore to its port site for stockpiling in preparation for exporting in the summer of 2015, when the weather is favourable. Rio Tinto's subsidiary, Iron Ore Co. of Canada, completed the second stage of its concentrate expansion plan by installing new equipment and upgrading infrastructure, enabling an additional 1.3 Mt of concentrate capacity.

IRON ORE

Arcelor Mittal Mines Canada completed the transition of the Fire Lake Mine to year-round operations, increasing production to 6.26 Mt of crude ore from 2.5 Mt in 2013, which was shipped to the Mont-Wright Mine for concentrating. Cliffs Natural Resources Inc. idled its Wabush Scully Mine in Newfoundland and Labrador in March and began closure 5.6-Mt/yr-capacity facility, produced concentrates for pelletizing at the company's Pointe Noire plant in Quebec, which had been idled in the second quarter of 2013.

In November 2014, the company also began pursuing exit options for the Bloom Lake Mine, a 7.2-Mt/yr-capacity concentrate facility, owing to unfeasibility of the Phase 1 expansion and the mine's unprofitability. In December 2014, the mine was idled and its owners entered restructuring proceedings under Canada's Companies' Creditors Arrangement Act in January 2015.

India

Steel Authority of India Ltd. announced a \$1.4 billion investment for expanding iron and steel operations, specifically at the Rowghat and Chiria Mines; the mines were expected to increase capacity to 14 Mt/yr and 15 Mt/yr, respectively, after completion.

Mexico

Authorities in Mexico closed 11 mineral loading docks, seized \$15 million worth of mining equipment, and confiscated 119,000 t of iron ore being exported by an organized crime group at the Port of Lazaro Cardenas in March 2014. About 300,000 t of iron ore was stolen from mining companies in Michoacan in 2013, with an additional 100,000 t stolen from the nearby Port of Manzanillo in Colima in the first quarter of 2014. Authorities estimated that additional funds, averaging \$15 per ton of iron ore, were being surrendered by miners, shippers, and foreign traders throughout the supply chain to the cartels.

Liberia

Arcelor Mittal S.A. delayed the \$1.7 billion expansion of its iron ore mine in Liberia, owing to volatile iron ore pricing and regional effects of the Ebola virus disease.

Cameroon

Noble Group Ltd. signed a 10-year contract, pending financier approvals, to purchase all iron ore produced at Sundance Resources Ltd.'s Mbalam-Nabeba project in Cameroon and the Republic of Congo that is not allocated to project equity participants. The project has reserves containing an estimated 436 Mt of iron ore at 62.6% Fe, and will have a planned 35-Mt/yr production capacity.

Pakistan

The Metallurgical Corp. of China signed an agreement with the government of Punjab Province to explore iron ore deposits in Chiniot. The Chiniot district was estimated to contain 600 Mt of iron ore resources, including 500 Mt of inferred or undiscovered resources and 100 Mt of indicated resources, of which 27 Mt were measured reserves. A study carried out by the Geological Survey of Pakistan indicated that the deposit contained iron grades ranging from 44% to 77% Fe.

**Table – 12 : World Reserves of Iron Ore
(By Principal Countries)**

Country	Reserves (In million tonnes)	
	Crude ore	Iron content
World : Total (rounded)	170000	83000
Australia	50000	24000
Brazil	23000	12000
Canada	6000	2300
China	21000	7200
India	8100	5200
Iran	2700	1500
Kazakhstan	2500	900
Russia	25000	14000
South Africa	1200	770
Sweden	3500	2200
Ukraine	6500	2300
USA	2900	760
Other countries	18000	9500

Source: Mineral Commodity Summaries, 2018.

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**Table – 13 : World Production of Iron Ore
(By Principal Countries)**

Country	(In million tonnes)		
	2014	2015	2016
World Total	3386	3300	3305
Australia	740	810	858
Brazil	346	389	424
Canada*	44	47	49
Chile	19	15	15
China	1514	1381	1281
India	129	158	192
Iran	52	43	48
Kazakhstan	52	37	35
Mauritania	13	12	13
Mexico	25	20	20 ^e
Russia	102	101	101
South Africa [@]	81	73	66
Sweden	36	30	32
Ukraine	68	67	67 ^e
USA**	56	46	41 ^e
Venezuela	11	12	11 ^e
Other countries	99	59	51

Source: World Mineral Production, 2012-2016.

Note : Total may not tally as figures are rounded off.

* Including by-product iron ore.

@: Including by-product magnetite.

** Including by-product iron ore and beneficiated and direct shipping ore

FOREIGN TRADE

Exports

Exports of iron ore drastically increased to 30.72 million tonnes in 2016-17 from 5.44 million tonnes in the previous year. In terms of value, the iron ore exports increased to ₹ 10,292 crore in 2016-17 from ₹ 1,264 crore in 2015-16. The exports of iron ore in 2016-17 in terms of volume comprised iron ore fines (60%), iron ore pellets (29%), iron ore lumps (7%), iron ore non-agglomerated concentrate (4%) and negligible quantity of iron ore pyrites. Exports were mainly to China (96%) and Japan (2%) and the remaining 2% of the exports were to Oman, Italy, Iran, Netherlands, Korea, Nepal and Kenya, etc. (Tables- 14 to 19).

Imports

Imports of iron ore substantially decreased to 4.60 million tonnes in 2016-17 from 7.09 million tonnes in the previous year. The imports in 2016-17 comprised iron ore non-agglomerated concentrates (51%), Fines (19%), lumps (22%), iron ore pellets (8%) and negligible quantity of iron ore pyrites, etc. Imports of iron ore were from South Africa (52%), Brazil (38%), Baharain (5%) and Iran (3%) (Tables-20 to 26).

**Table – 14 : Exports of Iron Ore : Total
(By Countries)**

Country	2015-16 (R)		2016-17 (P)	
	Qty (‘000 t)	Value (₹‘000)	Qty (‘000 t)	Value (₹‘000)
All Countries	5441	12639633	30728	102929254
China	5060	10320476	29474	97293983
Oman	++	1799	417	2151559
Japan	++	1383	468	1546315
Italy	-	-	109	711736
Iran	290	2028133	63	418813
Netherlands	++	1265	66	415027
Korea, Rep. of	-	-	75	285680
Nepal	43	73939	37	57652
Kenya	-	-	19	34080
UAE	22	102915	++	5431
Other countries	26	109723	++	8978

**Table – 15: Exports of Iron Ore : Lumps
(By Countries)**

Country	2015-16 (R)		2016-17 (P)	
	Qty (‘000 t)	Value (₹‘000)	Qty (‘000 t)	Value (₹‘000)
All Countries	112	185059	2266	6792560
China	110	178652	2199	6497797
Japan	-	-	67	293697
Nepal	2	6407	++	1066

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

Country	2015-16 (R)		2016-17 (P)	
	Qty (‘000 t)	Value (₹‘000)	Qty (‘000 t)	Value (₹‘000)
All Countries	4635	8763003	18540	47421383
China	4594	8695498	18063	46127910
Japan	-	-	347	914259
Korea, Rep. of	-	-	75	285680
Nepal	41	67408	36	55491
Kenya	-	-	19	33912
UAE	-	-	++	2588
Saudi Arabia	-	-	++	1543
Russia	++	97	-	-

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

Country	2015-16 (R)		2016-17 (P)	
	Qty (‘000 t)	Value (₹‘000)	Qty (‘000 t)	Value (₹‘000)
All Countries	++	7747	++	21060
Japan	++	1383	++	7401
Netherlands	++	1265	++	5464
UAE	++	1008	++	2843
South Africa	-	-	++	1116
Iran	++	1203	++	1059
UK	-	-	++	912
Saudi Arabia	-	-	++	665
Sri Lanka	++	298	++	333
Pakistan	++	115	++	327
Uganda	++	530	++	306
Other countries	++	1945	++	634

**Table – 18: Exports of Iron Ore: Concentrates
Non-Agglomerated
(By Countries)**

Country	2015-16 (R)		2016-17 (P)	
	Qty (‘000 t)	Value (₹‘000)	Qty (‘000 t)	Value (₹‘000)
All Countries	++	8032	1107	2846476
China	-	-	1105	2839135
Oman	++	1799	1	2935
Saudi Arabia	++	1474	++	2565
Nepal	++	124	1	1085
Finland	++	5	++	745
South Africa	++	22	++	4
Canada	++	10	++	3
Australia	-	-	++	2
Austria	++	4	++	1
Japan	-	-	++	1
Other countries	++	4594	-	-

**Table – 19 : Exports of Iron Ore: Pellets
(By Countries)**

Country	2015-16 (R)		2016-17 (P)	
	Qty (‘000 t)	Value (₹‘000)	Qty (‘000 t)	Value (₹‘000)
All Countries	694	3675792	8815	45847775
China	356	1446326	8107	41829141
Oman	-	-	416	2148624
Italy	-	-	109	711736
Iran	290	2026930	63	417754
Netherlands	-	-	66	409563
Japan	-	-	54	330957
UAE	22	99499	-	-
Malaysia	21	83767	-	-
Vietnam	5	19270	-	-

**Table – 20: Imports of Iron Ore: Total
(By Countries)**

Country	2015-16 (R)		2016-17 (P)	
	Qty (‘000 t)	Value (₹‘000)	Qty (‘000 t)	Value (₹‘000)
All Countries	7099	31971444	4607	21615219
South Africa	4252	19578175	2383	11066550
Brazil	694	3151415	1729	7960838
Bahrain	105	720561	234	1467056
Iran	++	40	124	508357
Oman	1965	8146494	56	325696
Norway	-	-	72	212198
Australia	67	248124	6	33444
Turkey	2	17109	2	17765
Finland	1	10736	1	9592
China	++	8354	++	5846
Other countries	13	90436	++	7877

**Table – 21: Imports of Iron Ore: Concentrates
Non-Agglomerated
(By Countries)**

Country	2015-16 (R)		2016-17 (P)	
	Qty (‘000 t)	Value (₹‘000)	Qty (‘000 t)	Value (₹‘000)
All Countries	2565	11462874	2352	10404621
Brazil	505	2020499	1202	5456870
South Africa	2060	9439580	964	4169888
Oman	-	-	56	325696
Iran	++	40	58	238494
Norway	-	-	72	212198
Netherlands	++	1274	++	1280
Ethiopia	-	-	++	98
Canada	-	-	++	76
UK	-	-	++	21
Sweden	++	1097	-	-
Other countries	++	384	-	-

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

Country	2015-16 (R)		2016-17 (P)	
	Qty (‘000 t)	Value (₹’000)	Qty (‘000 t)	Value (₹’000)
All Countries	279	1907301	392	2520827
Bahrain	105	720561	234	1467056
Brazil	122	833511	155	1032572
Australia	-	-	3	21199
Oman	52	353229	-	-

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

Country	2015-16 (R)		2016-17 (P)	
	Qty (‘000 t)	Value (₹’000)	Qty (‘000 t)	Value (₹’000)
All Countries	3	46031	3	39467
Turkey	2	17109	2	17765
Finland	1	10736	1	9592
China	++	8354	++	5846
Pakistan	++	2477	++	3598
Italy	++	4598	++	2666
Albania	++	1671	-	-
Australia	++	482	-	-
Austria	++	453	-	-
USA	++	151	-	-

**Table – 24: Imports of Iron Ore : Pyrites Roasted
(By Countries)**

Country	2015-16 (R)		2016-17 (P)	
	Qty (‘000 t)	Value (₹’000)	Qty (‘000 t)	Value (₹’000)
All Countries	++	247	++	208
USA	-	-	++	151
China	++	247	++	57
Other countries	-	-	-	-

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

Country	2015-16 (R)		2016-17 (P)	
	Qty (‘000 t)	Value (₹‘000)	Qty (‘000 t)	Value (₹‘000)
All Countries	1709	8162529	994	4824935
South Africa	1629	7836556	994	4824797
Austria	-	-	++	91
Sweden	-	-	++	47
Australia	67	247642	-	-
Singapore	7	48698	-	-
Saudi Arabia	6	29633	-	-

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

Country	2015-16 (R)		2016-17 (P)	
	Qty (‘000 t)	Value (₹‘000)	Qty (‘000 t)	Value (₹‘000)
All Countries	2543	10392709	866	3825369
South Africa	563	2302039	425	2071865
Brazil	67	297405	372	1471396
Iran	-	-	66	269863
Australia	-	-	3	12245
Oman	1913	7793265	-	-

FUTURE OUTLOOK

India is one of the leading producers of iron ore in the world. Among the consuming industries, Cement Industry is the second major consumer of iron ore after Iron & Steel Industry (including Sponge Iron Industry). In order to conserve iron ore resources of the country for long term domestic value addition, export duty on all varieties of iron ore (except pellets) has been increased from 20% to 30% ad valorem.

The Ministry of Steel under Government of India has recently introduced that new National Steel Policy 2017 and with the roll out of the National Steel Policy 2017 and the DMI&SP policy, it is envisaged that the industry can be steered

with appropriate policy support in creating an environment for promoting domestic steel and thereby ensuring a scenario where production meets the anticipated pace of growth in consumption. Thus, the Indian Steel Sector is all set to achieve its vision thereby setting a global benchmark in terms of quality, standards and technology. It is anticipated that crude steel capacity of 300 million tonnes will be required by 2030-31. However, achieving crude steel capacity up to 300 million tonnes will require extensive mobilisation of natural resources, finances, manpower and infrastructure including land. To address the concerns regarding availability of raw material (iron ore) intensive & deeper exploration

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would have to be promoted for augmentation of resource base. Eco-friendly viable underground mining techniques for optimal utilisation of magnetite ore deposits locked in Western Ghats would also have to be explored in conjunction with mining research institutes. The government has already promulgated the Mines and Minerals (Development and Regulation) Amendment Act, 2015 and therein has laid great emphasis on time bound mine development with increased stress on mineral exploration and sustainable mining operations.

The Act has brought clarity on mine allocation process (through auction) and procedures for mining lease renewal. The Act, further, provides for reservation of any particular mine for a particular end use and put conditions permitting auction among such eligible end users.

The Ministry of Steel in conjunction with Ministry of Mines will facilitate creation of a uniform countrywide sales platform for bringing transparency and predictability in the process of sale of iron ore.