

IRON ORE



# Indian Minerals Yearbook 2018

(Part- III : MINERAL REVIEWS)

57<sup>th</sup> Edition

IRON ORE

(FINAL RELEASE)

GOVERNMENT OF INDIA  
MINISTRY OF MINES  
INDIAN BUREAU OF MINES

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# 16 Iron Ore

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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 ( $\text{Fe}_2\text{O}_3$ ) and magnetite ( $\text{Fe}_3\text{O}_4$ ), India is one of 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 Lumps & 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. 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 that 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%) 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 covered in the Review "Exploration & Development" in Volume-I of Indian Minerals Yearbook titled "General Reviews".

## PRODUCTION & STOCKS

The production of iron ore constituting lumps, fines and concentrates was 200.95 million tonnes in the year 2017-18, showing an increase of about 3%

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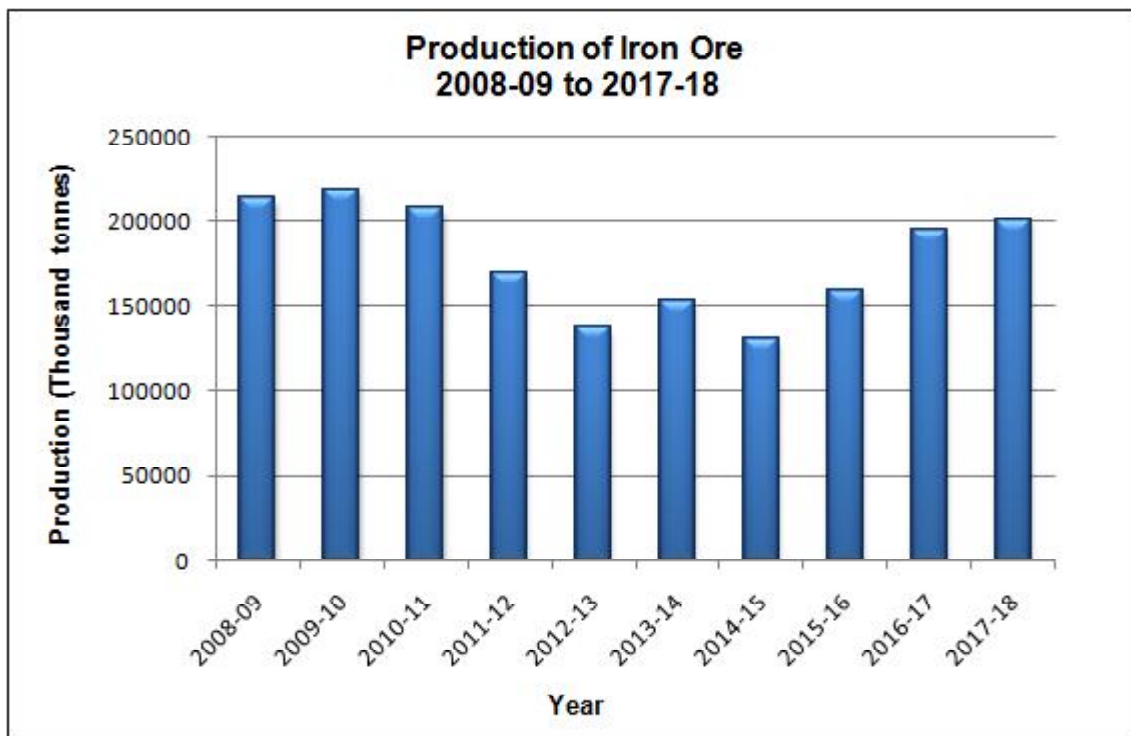
as compared to that in the preceding year. There were 294 reporting mines in 2017-18 as against 318 in the previous year. Among them, 35 mines were in the Public Sector and 259 in Private Sector. Besides, production of iron ore was reported as associated mineral by 9 mines in 2017-18 as against 12 mines in 2016-17. The contribution of Public Sector to the total production was about 35% as against about 36% in the preceding year. The remaining 65% of the production in 2017-18 was from Private Sector. Among 35 iron ore mines in Public Sector, 18 iron ore mines each producing more than one million tonnes annually accounted for about 96.28% of the total output in Public Sector during 2017-18. Out of 259 iron ore mines and 9 associated mines in Private Sector, 28 iron ore mines each producing more than one million tonnes annually accounted for about 79.21% of the total output of Private Sector during the year. Thus, 46 iron ore mines each producing more than one million tonnes of iron ore annually contributed about 85.27% of the total output in 2017-18. The captive mines reported production of 60.40 million tonnes comprising about 30% of total production and non-captive mines reported production of 140.55 million tonnes, i.e., about 70% during 2017-18.

Gradewise analysis of the current year's output reveals that out of total output of 200.95 million tonnes, iron ore lumps constituted 64.99 million tonnes (i.e., about 32.34%), fines constituted 135.62 million tonnes (i.e., about 67.49%) and concentrates constituted 0.35 million tonnes (i.e., about 0.17%).

Among the States, Odisha recorded the highest production of 102.17 million tonnes, i.e., about 50.84% of the country's total production in 2017-18. Chhattisgarh was at the second place with a production of 34.54 million tonnes, i.e., about 17% of the total production followed by Karnataka with a production of 28.72 million tonnes, i.e., about 14.29% and Jharkhand with 21.84 million tonnes, i.e., about 10.87% of the country's production. The remaining 13.66 million tonnes, i.e., 7% production was reported from Andhra Pradesh, Goa, Madhya Pradesh, Maharashtra, Rajasthan and Telangana.

The mine-head closing stocks of iron ore for the year 2017-18 were 151.47 million tonnes as compared to 148.71 million tonnes in 2016-17.

The average daily employment of labour was 44,949 during 2017-18 as against 45,383 in the preceding year (Tables - 3 to 7).



**Table – 1 : Reserves/Resources of Iron Ore (Haematite) as on 1.4.2015  
(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>4053032</b>	<b>449917</b>	<b>918801</b>	<b>5421751</b>	<b>3444103</b>	<b>1573822</b>	<b>1496674</b>	<b>1762741</b>	<b>1798557</b>	<b>4498142</b>	<b>2491176</b>	<b>17065214</b>	<b>22486965</b>
<b>By Grades</b>													
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
Lumps & fines medium grade	440515	73933	84121	598568	134534	56987	101242	994	15969	201152	241259	752136	1350705
Lumps & 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
Lumps & fines & blue dust unclassified grade	12345	1746	1106	15197	-	2241	560	2009	-	-	-	4810	20007

(Contd.)

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(In '000 tonnes)

(Table-1Conclid.)

Grade/State	Reserves						Remaining Resources						Total Resources (A+B)	
	Proved STD111	Probable		Total (A)	Feasibility STD211	Pre-feasibility STD221	Measured STD331	Indicated STD332	Inferred STD333	Reconnaissance STD334	Total (B)			
		STD121	STD122									STD222		
<b>By States</b>														
Andhra Pradesh	17664	273	11832	29768	40595	49589	68425	377	4666	147628	13	311293	341062	
Assam	-	-	-	-	-	-	-	-	8600	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	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	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		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>30352</b>	<b>2311</b>	<b>20037</b>	<b>52699</b>	<b>223388</b>	<b>15494</b>	<b>64091</b>	<b>1513195</b>	<b>1984566</b>	<b>6351286</b>	<b>584436</b>	<b>10736455</b>	<b>10789155</b>
<b>By Grades</b>													
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
<b>By States</b>													
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  
2017-18**

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	Jharkhand Chhattisgarh Odisha	Singhbhum (West) Durg Keonjhar, Sundargarh
Tata Steel Ltd, Bombay House, 24, Homi Mody Street, Fort, Mumbai – 400 001, Maharashtra	Jharkhand Odisha	Singhbhum (West) Keonjhar
Rungta Mines (P) Ltd, 8 A Express Tower, 42 A-Shakespeare Sarani, Kolkata – 700 017, West Bengal	Jharkhand Odisha	Singhbhum (West) Keonjhar
Serajuddin & Co., P-16, Bentink Street, Kolkata-700 069, West Bengal	Odisha	Keonjhar
Vedanta Ltd., Sesa Ghor, EDC complex, Patto, Panaji, Tiswadi-403 001 Goa	Goa Karnataka	North Goa South Goa Chitradurga
Rungta Sons (P) Ltd., 8 A Express Tower, 42 A- Shakespeare Sarani, Kolkata-700 017,West Bengal	Odisha	Sundargarh
Odisha Mining Corporation Ltd, OMC House, Unit-5, P.B. No.34 Distt Khurda, Bhubaneswar-751 001 Odisha	Odisha	Keonjhar Sundargarh
Kamaljeet Singh Ahluwalia, Near MMTC Weigh Bridge P.B.No. 3, Barbil-758 035, Distt Keonjhar, Odisha	Odisha	Keonjhar

Table - 3 (Concl.)

Name & address of producer	Location of mine	
	State	District
Indrani Patnaik, A/6, Commercial Estate, Civil Township, Rourkela - 769 004 Odisha	Odisha	Keonjhar
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, Distt Keonjhar, Odisha	Odisha	Keonjhar
Jindal Steel & Power Ltd., O.P. Jindal Marg, Delhi Road, Hissar-125 005 Haryana	Odisha	Sundargarh
Aryan Mining & Trading Corp. (P) Ltd., 61, Strand Street, Kolkata-700 006, West Bengal	Odisha	Sundargarh
Essel Mining & Industries Ltd, Industry House, 18 <sup>th</sup> Floor, 10, Camac Street, Kolkata- 700 017 West Bengal	Odisha	Sundargarh
Khatau Narbheram & Co., N.V. Ram Complex, Barbil-758 035, Distt Keonjhar, Odisha	Odisha	Keonjhar
Usha Martin Ltd, Mangal Kalash, 2 A Shakespeare Sarani, Kolkata-700 071, West Bengal	Jharkhand	Singhbhum (West)
Bonai Industrial Co. Ltd. Rungta Office, Main Road, P.O. Barbil-758 035, Distt Keonjhar, Odisha	Odisha	Sundargarh
Mideast Integrated Steels Ltd, Mesco Tower, H-1, Zamrudpur Community Centre, Kailash Colony, New Delhi-110 048	Odisha	Keonjhar
Freegrade & Co. (P) Ltd., 8 A,Express Tower, 42 A- Shakespeare Sarani, Kolkata- 700 017, West Bengal	Odisha	Sundargarh

(Contd.)

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**Table – 4 : Production of Iron Ore\*, 2015-16 to 2017-18  
(By States)**

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

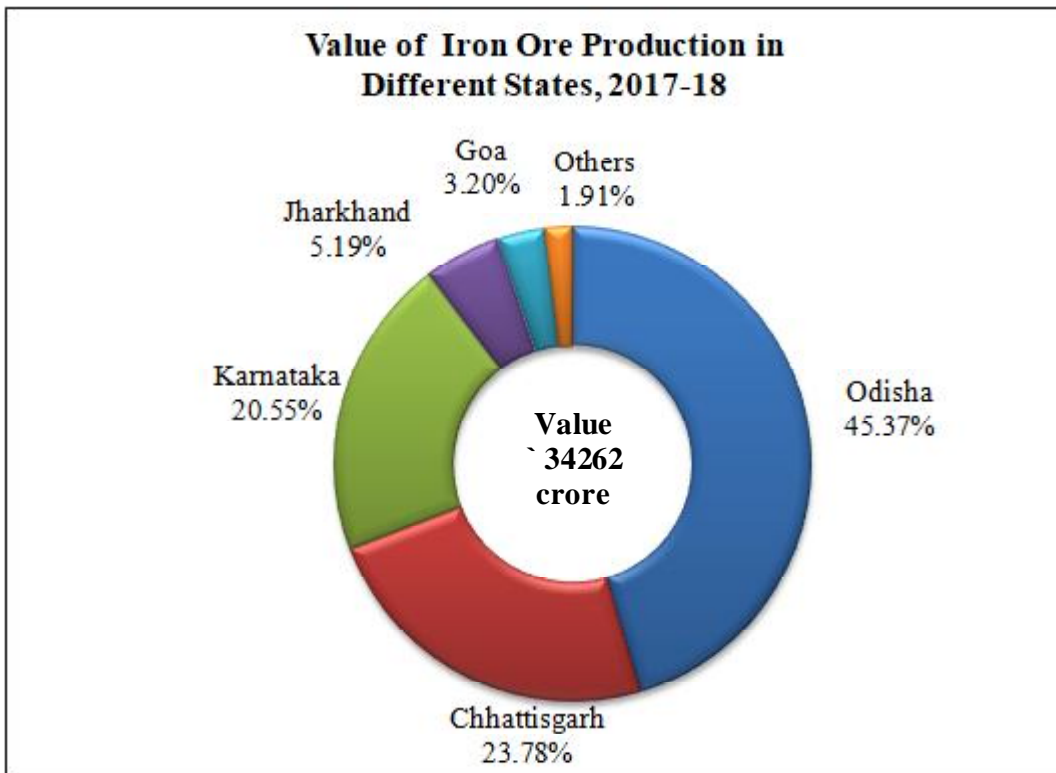
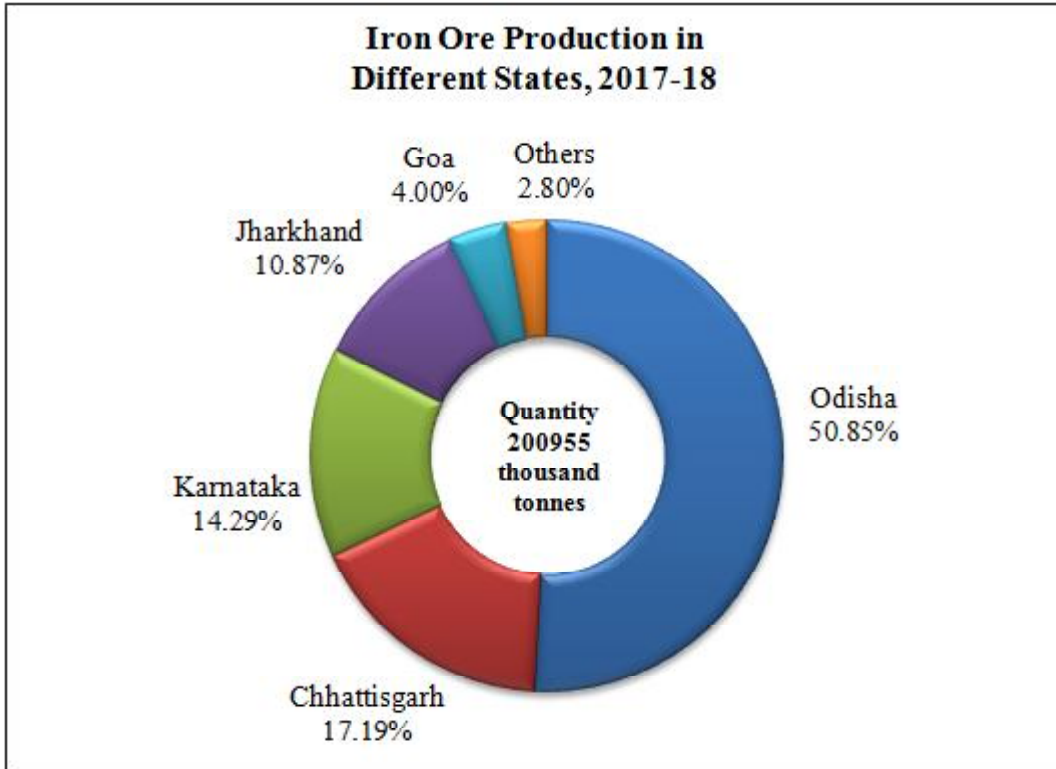
States		2015-16		2016-17		2017-18 (P)	
		Quantity	Value	Quantity	Value	Quantity	Value
<b>India</b>	<b>Total</b>	<b>158108</b>	<b>223206636</b>	<b>194584</b>	<b>252291800</b>	<b>200955</b>	<b>342628915</b>
	Lumps	54610	98878782	65325	102868610	64981	140739268
	Fines	102407	122489117	128100	146288294	135621#	201432592#
	Concentrates	1091	1838737	1159	3134896	353#	457055#
<b>Andhra Pradesh</b>	<b>Total</b>	<b>493</b>	<b>283258</b>	<b>485</b>	<b>264799</b>	<b>680</b>	<b>417688</b>
	Lumps	312	227859	302	204091	407	328172
	Fines	181	55399	183	60708	273	89516
<b>Chhattisgarh</b>	<b>Total</b>	<b>26718</b>	<b>52780037</b>	<b>33285</b>	<b>60676299</b>	<b>34546</b>	<b>81490207</b>
	Lumps	10214	24169097	12094	24402985	12324	32116329
	Fines	16504	28610940	21191	36273314	22222	49373878
<b>Goa</b>	<b>Total</b>	<b>1794</b>	<b>2132157</b>	<b>9170</b>	<b>11555369</b>	<b>8040</b>	<b>10965978</b>
	Lumps	260	377365	2044	2776889	1521	1922149
	Fines	1534	1754792	7075	8712618	6450	8956976
	Concentrates	-	-	51	65862	69	86853
<b>Jharkhand</b>	<b>Total</b>	<b>19198</b>	<b>16494215</b>	<b>21224</b>	<b>14623291</b>	<b>21848</b>	<b>17786135</b>
	Lumps	6154	6032530	5938	4646787	6081	5933166
	Fines	13044	10461685	15286	9976504	15767	11852969
<b>Karnataka</b>	<b>Total</b>	<b>25036</b>	<b>34659850</b>	<b>26483</b>	<b>44516153</b>	<b>28724</b>	<b>70398115</b>
	Lumps	7990	14927975	8890	16622762	9441	25931317
	Fines	17046	19731875	17593	27893391	19283	44466798
<b>Madhya Pradesh</b>	<b>Total</b>	<b>2447</b>	<b>1475651</b>	<b>1771</b>	<b>767339</b>	<b>2679</b>	<b>1265424</b>
	Lumps	268	174566	136	108922	360	203883
	Fines	2179	1301085	1633	655590	2319	1061541
	Concentrates	-	-	2	2827	-	-
<b>Maharashtra</b>	<b>Total</b>	<b>1420</b>	<b>1500657</b>	<b>1321</b>	<b>1152442</b>	<b>940</b>	<b>1201680</b>
	Lumps	198	349230	231	370585	323	634493
	Fines	1222	1151427	1090	781857	617	567187
<b>Odisha</b>	<b>Total</b>	<b>79856</b>	<b>112112226</b>	<b>99617</b>	<b>115628185</b>	<b>102177</b>	<b>155456128</b>
	Lumps	29103	52579559	35568	53693920	34398	73626122
	Fines	50694	59421386	64049	61934265	67495	81459804
	Concentrates	59	111281	-	-	284	370202
<b>Rajasthan</b>	<b>Total</b>	<b>1146</b>	<b>1768585</b>	<b>1228</b>	<b>3107923</b>	<b>1317</b>	<b>3646154</b>
	Lumps	111	40601	122	41669	126	43639
	Fines	3	528	++	47	1191#	3602515#
	Concentrates	1032	1727456	1106	3066207	-	-
<b>Telangana</b>	<b>Total</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>4</b>	<b>1406</b>
	Lumps	-	-	-	-	-	-
	Fines	-	-	-	-	4	1406

\* Excluding ROM

# Under reference



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**Table -5 (A) : Production of Iron Ore, 2016-17**  
(By Sectors/States/Districts/Grades)

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

Sector/ State/ District	N o. of mines	Lumps										Fines										Total			
		Below 55% Fe		55% - 60% Fe		60% - 62% Fe		62% - 65% Fe		65% - 68% Fe		68% - 70% Fe		70% - 72% Fe		72% - 74% Fe		74% - 76% Fe		76% - 78% Fe		78% - 80% Fe		Total Qty	Total Value
		Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value				
<b>India</b>	<b>318(12)</b>	<b>2068</b>	<b>2058</b>	<b>4466</b>	<b>7939</b>	<b>32070</b>	<b>16724</b>	<b>65325</b>	<b>102868610</b>	<b>6030</b>	<b>15336</b>	<b>8510</b>	<b>17837</b>	<b>58703</b>	<b>21684</b>	<b>128100</b>	<b>146288294</b>	<b>1159</b>	<b>3134896</b>	<b>1159</b>	<b>3134896</b>	<b>194584</b>	<b>252291800</b>		
Public Sector	36	4	160	176	2302	14916	8792	26350	44118829	10	969	2390	11035	20964	8641	44009	58936006	-	-	-	-	70359	103054835		
Private Sector	282(12)	2064	1898	4290	5637	17154	7932	38975	58749781	6020	14367	6120	6802	37739	13043	84091	87352288	1159	3134896	1159	3134896	124225	149236965		
<b>Andhra Pradesh</b>	<b>22(1)</b>	<b>302</b>	-	-	-	-	-	<b>302</b>	<b>204091</b>	<b>183</b>	-	-	-	-	-	<b>183</b>	<b>60708</b>	-	-	-	-	<b>485</b>	<b>264799</b>		
Anantapur	2	55	-	-	-	-	-	55	32824	-	-	-	-	-	-	-	-	-	-	-	-	55	32824		
Cuddapah	5	175	-	-	-	-	-	175	109284	139	-	-	-	-	-	139	43206	-	-	-	-	314	152490		
Krishna	2	-	-	-	-	-	-	-	-	++	-	-	-	-	-	++	22	-	-	-	-	++	22		
Kurnool	11(1)	48	-	-	-	-	-	48	46047	44	-	-	-	-	-	44	17480	-	-	-	-	92	63527		
Nellore	1	24	-	-	-	-	-	24	15936	-	-	-	-	-	-	-	-	-	-	-	-	24	15936		
Prakasam	1*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
<b>Chhattisgarh</b>	<b>17</b>	<b>181</b>	<b>95</b>	<b>16</b>	<b>765</b>	<b>3671</b>	<b>7366</b>	<b>12094</b>	<b>24402985</b>	<b>164</b>	<b>187</b>	<b>277</b>	<b>4336</b>	<b>8772</b>	<b>7455</b>	<b>21191</b>	<b>36273314</b>	-	-	-	-	<b>33285</b>	<b>60676299</b>		
Dantewara	5	-	-	++	20	560	7001	7581	19295980	3	37	239	1022	7124	6360	14785	30827103	-	-	-	-	22366	50123083		
Durg	5	-	-	-	528	3083	350	3961	4532890	-	12	-	3240	1447	425	5124	4379866	-	-	-	-	9085	8912756		
Kanker	4	41	68	12	131	28	15	295	377538	79	121	38	53	201	670	1162	980635	-	-	-	-	1457	1358173		
Narayanpur	1*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Rajnandgaon	2	140	27	4	86	-	-	257	196577	82	17	-	21	++	-	120	85710	-	-	-	-	377	282287		
<b>Goa</b>	<b>82(1)</b>	<b>822</b>	<b>802</b>	<b>292</b>	<b>100</b>	<b>28</b>	-	<b>2044</b>	<b>2776889</b>	<b>2127</b>	<b>3669</b>	<b>845</b>	<b>333</b>	<b>101</b>	-	<b>7075</b>	<b>8712618</b>	<b>51</b>	<b>65862</b>	<b>51</b>	<b>65862</b>	<b>9170</b>	<b>11555369</b>		
North Goa	38	584	373	229	96	28	-	1310	1696807	1062	2390	352	309	101	-	4214	5189094	-	-	-	-	5524	6885901		
South Goa	44(1)	238	429	63	4	-	-	734	1080082	1065	1279	493	24	++	-	2861	3523524	51	65862	51	65862	3646	4669468		
<b>Jharkhand</b>	<b>21</b>	<b>21</b>	<b>35</b>	<b>1025</b>	<b>480</b>	<b>2446</b>	<b>1931</b>	<b>5938</b>	<b>4646787</b>	<b>6</b>	<b>1542</b>	<b>53</b>	<b>1958</b>	<b>5122</b>	<b>6605</b>	<b>15286</b>	<b>9976504</b>	-	-	-	-	<b>21224</b>	<b>14623291</b>		
Singhbhum (West)	21	21	35	1025	480	2446	1931	5938	4646787	6	1542	53	1958	5122	6605	15286	9976504	-	-	-	-	21224	14623291		
<b>Karnataka</b>	<b>63</b>	<b>309</b>	<b>496</b>	<b>609</b>	<b>2272</b>	<b>4883</b>	<b>321</b>	<b>8890</b>	<b>16622762</b>	<b>649</b>	<b>2549</b>	<b>3494</b>	<b>4561</b>	<b>6295</b>	<b>45</b>	<b>17593</b>	<b>27893391</b>	-	-	-	-	<b>26483</b>	<b>44516153</b>		
Bagalkot	3*	139	19	-	-	-	-	158	183503	299	-	-	-	-	-	299	294836	-	-	-	-	457	478339		
Ballari	50	161	345	592	1877	4768	321	8064	15550735	342	1370	2889	4402	5778	45	14826	24849458	-	-	-	-	22890	40400193		
Chitradurga	7	9	132	17	395	115	-	668	888524	8	1179	605	159	517	-	2468	2749097	-	-	-	-	3136	3637621		
Tumakuru	3*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

(Contd.)

IRON ORE

Table - 5 (A) : (Concl.d.)

Sector/ State/ District	No. of mines	Lumps										Fines									
		Below 55% - 58% - 60% - 62% - 65%					Total					Below 55% - 58% - 60% - 62% - 65%					Total				
		55% below 60% - 62% - 65% above					Fe &					55% below 60% - 62% - 65% above					Fe &				
		Fe	Fe	Fe	Fe	Fe	Qty	Value	Fe	Fe	Fe	Fe	Fe	Fe	Fe	Fe	Qty	Value	Qty	Value	Qty
<b>Madhya Pradesh</b>	<b>17(8)</b>	<b>101</b>	<b>5</b>	<b>12</b>	<b>18</b>	-	<b>136</b>	<b>108922</b>	<b>1629</b>	-	<b>4</b>	-	-	-	<b>1633</b>	<b>655590</b>	<b>2</b>	<b>2827</b>	<b>1771</b>	<b>767339</b>	
Chhatarpur	1*	-	5	12	18	-	35	68171	-	-	4	-	-	-	4	6657	-	-	39	74828	
Gwalior	2	-	-	-	-	-	-	-	17	-	-	-	-	-	17	5115	-	-	17	5115	
Jabalpur	13(8)	101	-	-	-	-	101	40751	1612	-	-	-	-	-	1612	643818	2	2827	1715	687396	
Sagar	1*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>Maharashtra</b>	<b>16</b>	<b>51</b>	<b>34</b>	<b>87</b>	<b>45</b>	<b>14</b>	<b>231</b>	<b>370585</b>	<b>845</b>	-	<b>245</b>	-	-	-	<b>1090</b>	<b>781857</b>	-	-	<b>1321</b>	<b>1152442</b>	
Chandrapur	2	-	21	-	-	-	21	49243	25	-	11	-	-	-	36	42622	-	-	57	91865	
Gadchiroli	2	-	++	87	4	14	105	177744	-	-	-	-	-	-	-	-	-	-	105	177744	
Gondia	3	7	-	-	-	-	7	13420	2	-	-	-	-	2	1085	-	-	-	9	14505	
Sindhudurg	8	44	13	-	41	-	98	130178	818	-	234	-	-	1052	738150	-	-	1150	868328		
Kolhapur	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>Odisha</b>	<b>66(2)</b>	<b>159</b>	<b>591</b>	<b>2425</b>	<b>4259</b>	<b>21028</b>	<b>7106</b>	<b>53693920</b>	<b>427</b>	<b>7389</b>	<b>3591</b>	<b>6649</b>	<b>38413</b>	<b>7580</b>	<b>64049</b>	<b>61934265</b>	-	-	<b>99617</b>	<b>115628185</b>	
Keonjhar	37(1)	5	4	930	1461	15909	6942	35869167	335	5037	959	3555	27591	7500	44977	44240944	-	-	70228	80110111	
Mayurbhanj	4	2	201	611	3	4	5	826	1368747	44	441	108	15	2	610	362747	-	-	1436	1731494	
Sundargarh	25(1)	152	386	884	2795	5115	159	9491	16456006	48	1911	2524	3079	10822	78	18462	17330574	-	-	27953	33786580
<b>Rajasthan</b>	<b>14</b>	<b>122</b>	-	-	-	-	<b>122</b>	<b>41669</b>	<b>++</b>	-	-	-	-	-	<b>++</b>	<b>47</b>	<b>1106</b>	<b>3066207</b>	<b>1228</b>	<b>3107923</b>	
Bhilwara	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1106	3066207	1106	3066207	1106	3066207	
Jaipur	5	75	-	-	-	-	75	23229	-	-	-	-	-	-	-	-	-	-	75	23229	
Jhunjhunu	5	4	-	-	-	-	4	4170	++	-	-	-	-	-	++	47	-	-	4	4217	
Sikar	2	43	-	-	-	-	43	14270	-	-	-	-	-	-	-	-	-	-	43	14270	

++ Negligible \*Only labour reported

IRON ORE

**Table – 5 (B) : Production of Iron Ore, 2017-18 (P)**  
**(By Sectors/States/Districts/Grades)**

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

Sector/ State/ District	No. of mines	Lumps										Fines										Concentrates				Total					
		Below 55% - 55% Fe		58% - 60% Fe		60% - 62% Fe		62% - 65% Fe		65% & above		Total		Below 55% - 55% Fe		58% - 60% Fe		60% - 62% Fe		62% - 65% Fe		65% & above		Total		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	Qty	Value	Qty	Value		
<b>India</b>	<b>294(9)</b>	<b>2166</b>	<b>2535</b>	<b>4786</b>	<b>6766</b>	<b>32136</b>	<b>16592</b>	<b>64981</b>	<b>140739268</b>	<b>7127<sup>m</sup></b>	<b>10807</b>	<b>10574</b>	<b>20621</b>	<b>64095</b>	<b>22397</b>	<b>135621<sup>l</sup></b>	<b>201432592<sup>n</sup></b>	<b>353<sup>r</sup></b>	<b>457055<sup>n</sup></b>	<b>200955</b>	<b>342628915</b>										
Public Sector	35	25	206	383	2065	14995	8977	26651	61655054	123	924	3220	11191	20937	8333	44728	80923331	-	-	-	71379	142578385									
Private Sector	259(9)	2141	2329	4403	4701	17141	7615	38330	79084214	7004#	9883	7354	9430	43158	14064	90893#	120509261#	353	457055	129576	200050530										
<b>Andhra Pradesh</b>	<b>18</b>	<b>401</b>	<b>6</b>	-	-	-	-	<b>407</b>	<b>328172</b>	<b>273</b>	-	-	-	-	-	<b>273</b>	<b>89516</b>	-	-	-	<b>417688</b>										
Anantapur	2	9	-	-	-	-	-	9	5558	-	-	-	-	-	-	-	-	-	-	-	5558										
Cuddapah	2	224	6	-	-	-	-	230	165032	200	-	-	-	-	-	200	56476	-	-	-	221508										
Krishna	1	-	-	-	-	-	-	-	-	++	-	-	-	-	-	++	148	-	-	-	148										
Kurnool	11	160	-	-	-	-	-	160	150582	73	-	-	-	-	-	73	32892	-	-	-	183474										
Nellore	1	8	-	-	-	-	-	8	7000	-	-	-	-	-	-	-	-	-	-	-	7000										
Prakasam	1*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-										
<b>Chhattisgarh</b>	<b>17</b>	<b>310</b>	<b>145</b>	<b>34</b>	<b>752</b>	<b>2866</b>	<b>8217</b>	<b>12324</b>	<b>32116329</b>	<b>394</b>	<b>438</b>	<b>346</b>	<b>3527</b>	<b>8318</b>	<b>9199</b>	<b>22222</b>	<b>49373878</b>	-	-	-	<b>81490207</b>										
Dantewara	6	-	2	3	8	353	7593	7959	27543004	11	59	244	951	7044	7636	15945	42826189	-	-	-	70369193										
Durg	4	20	-	-	404	2434	624	3482	3504096	25	10	-	2241	1209	596	4081	3991846	-	-	-	7495942										
Kanker	4	53	83	28	229	71	-	464	663469	170	307	54	198	56	967	1752	2091545	-	-	-	2755014										
Narayanpur	1*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-										
Rajnandgaon	2	237	60	3	111	8	-	419	405760	188	62	48	137	9	444	464298	-	-	-	870058											
<b>Goa</b>	<b>85(1)</b>	<b>379</b>	<b>799</b>	<b>130</b>	<b>184</b>	<b>29</b>	-	<b>1521</b>	<b>1922149</b>	<b>1474</b>	<b>2545</b>	<b>1393</b>	<b>579</b>	<b>459</b>	<b>6450</b>	<b>8956976</b>	<b>69</b>	<b>86853</b>	<b>8040</b>	<b>10965978</b>											
North Goa	41	231	330	63	128	29	-	781	1033347	636	1366	533	304	420	3259	4642153	-	-	-	5675500											
South Goa	44(1)	148	469	67	56	-	-	740	888802	838	1179	860	275	39	3191	4314823	69	86853	4000	5290478											
<b>Jharkhand</b>	<b>19</b>	<b>25</b>	<b>304</b>	<b>1275</b>	<b>1185</b>	<b>2183</b>	<b>1109</b>	<b>6081</b>	<b>5933166</b>	<b>13</b>	<b>1501</b>	<b>1388</b>	<b>3475</b>	<b>4630</b>	<b>4760</b>	<b>11852969</b>	<b>21848</b>	<b>17786135</b>	<b>21848</b>	<b>17786135</b>											
Singbhum (West)	19	25	304	1275	1185	2183	1109	6081	5933166	13	1501	1388	3475	4630	4760	11852969	-	-	-	17786135											
<b>Karnataka</b>	<b>53</b>	<b>291</b>	<b>725</b>	<b>683</b>	<b>1593</b>	<b>5555</b>	<b>594</b>	<b>9441</b>	<b>25931317</b>	<b>983</b>	<b>1901</b>	<b>4612</b>	<b>4017</b>	<b>7550</b>	<b>220</b>	<b>19283</b>	<b>44466798</b>	<b>28724</b>	<b>70398115</b>	<b>28724</b>	<b>70398115</b>										
Bagalkot	3	115	47	-	-	-	-	162	247187	276	-	-	-	-	276	283357	-	-	-	530544											
Ballari	43	160	357	623	1164	5390	594	8288	23563215	299	1317	3102	3909	7427	220	16274	40251398	-	-	-	63814613										
Chitradurga	6	16	321	60	429	165	-	991	2120915	408	584	1510	108	123	-	2733	3932043	-	-	-	6052958										
Tumakuru	1*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-										

(Contd)

IRON ORE

Table - 5 (B) : (Conclid.)

Sector/ State/ District	No. of mines	Lumps										Fines															
		Below 55% - 58% - 60% - 62% - 65% below below below below below					55% below 60% 62% 65% Fe Fe Fe Fe Fe					Total					65% - 62% - 65% above above above					Total					
		Fe	Fe	Fe	Fe	Fe	Fe	Fe	Fe	Fe	Fe	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value		
<b>Madhya Pradesh</b>	<b>15(5)</b>	<b>320</b>	<b>24</b>	<b>16</b>	<b>++</b>	-	-	-	-	-	<b>2304</b>	<b>203883</b>	<b>360</b>	<b>203883</b>	<b>2319</b>	<b>1061541</b>	-	-	-	-	-	<b>2679</b>	<b>1265424</b>	-	-	-	-
Gwalior	1	-	-	-	-	-	-	-	-	-	19	-	-	-	19	7580	-	-	-	-	-	19	7580	-	-	-	-
Jabalpur	12(5)	306	-	-	-	-	-	-	-	-	2285	149746	306	149746	2298	1051341	-	-	-	-	-	2604	1201087	-	-	-	-
Chhatarpur	1	7	24	16	++	-	-	-	-	-	48695	-	47	48695	2	2620	-	-	-	-	-	49	51315	-	-	-	-
Sagar	1	7	-	-	-	-	-	-	-	-	5442	-	7	5442	-	-	-	-	-	-	-	7	5442	-	-	-	-
<b>Maharashtra</b>	<b>15</b>	<b>71</b>	<b>54</b>	<b>175</b>	<b>23</b>	-	-	-	-	-	<b>293</b>	<b>634493</b>	<b>323</b>	<b>634493</b>	<b>617</b>	<b>567187</b>	-	-	-	-	-	<b>940</b>	<b>1201680</b>	-	-	-	-
Chandrapur	2	-	15	-	-	-	-	-	-	-	19	27452	15	27452	26	25216	-	-	-	-	-	41	52668	-	-	-	-
Gadchiroli	2	-	1	175	1	-	-	-	-	-	397248	-	177	397248	-	-	-	-	-	-	-	177	397248	-	-	-	-
Gondia	3	8	-	-	-	-	-	-	-	-	13505	3	8	13505	3	2100	-	-	-	-	-	11	15605	-	-	-	-
Kolhapur	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sindhudurg	8	63	38	-	22	-	-	-	-	-	271	196288	123	196288	588	539871	-	-	-	-	-	711	736159	-	-	-	-
<b>Odisha</b>	<b>60(2)</b>	<b>244</b>	<b>478</b>	<b>2473</b>	<b>3029</b>	<b>21503</b>	-	-	-	-	<b>198</b>	<b>73626122</b>	<b>34398</b>	<b>73626122</b>	<b>67495</b>	<b>81459804</b>	<b>284</b>	<b>370202</b>	-	-	-	<b>102177</b>	<b>155456128</b>	-	-	-	-
Keonjhar	35(1)	16	-	670	262	16479	-	-	-	-	49	46514311	23626	46514311	47052	56854968	-	-	-	-	-	70678	103369279	-	-	-	-
Mayurbhanj	2	16	38	737	5	40	-	-	-	-	27	2478243	916	2478243	2	245508	-	-	-	-	-	1274	2723751	-	-	-	-
Sundargarh	23(1)	212	440	1066	2762	4984	-	-	-	-	122	24633568	9856	24633568	146	24359328	284	370202	-	-	-	30225	49363098	-	-	-	-
<b>Rajasthan</b>	<b>12</b>	<b>125</b>	-	-	-	-	-	-	-	-	<b>1191#</b>	<b>43639</b>	<b>1</b>	<b>43639</b>	<b>1191#</b>	<b>3602515#</b>	-	-	-	-	-	<b>1317</b>	<b>3646154</b>	-	-	-	-
Bhilwara	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Jaipur	5	76	-	-	-	-	-	-	-	-	77	22211	77	22211	-	-	-	-	-	-	-	77	22211	-	-	-	-
Jhunjhunu	3	2	-	-	-	-	-	-	-	-	949	-	2	949	-	-	-	-	-	-	-	2	949	-	-	-	-
Sikar	2	47	-	-	-	-	-	-	-	-	1191#	20479	47	20479	1191#	3602515#	-	-	-	-	-	1238	3622994	-	-	-	-
<b>Telangana</b>	<b>(1)</b>	-	-	-	-	-	-	-	-	-	<b>4</b>	-	-	-	<b>4</b>	<b>1406</b>	-	-	-	-	-	<b>4</b>	<b>1406</b>	-	-	-	-
Khammam	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Warangal	(1)	-	-	-	-	-	-	-	-	-	4	-	-	-	4	1406	-	-	-	-	-	4	1406	-	-	-	-

++ Negligible, \* Only labour reported, (P): Provisional,  
# Under Reference

IRON ORE

**Table – 6 : Production<sup>®</sup> of Iron Ore, 2016-17 and 2017-18  
(By Frequency Groups)**

Production Group (In tonnes)	No. of mines		Production (In '000 tonnes)		Percentage in total production		Cumulative percentage	
	2016-17	2017-18 (P)	2016-17	2017-18 (P)	2016-17	2017-18 (P)	2016-17	2017-18 (P)
<b>Total</b>	<b>318(12)</b>	<b>249(9)</b>	<b>194584</b>	<b>200955</b>	<b>100.00</b>	<b>100.00</b>	<b>-</b>	<b>-</b>
Up to 50,000	195(10)	155(7)	938	836	0.48	0.42	0.48	0.42
50,001 - 100,000	18(1)	21	1405	1579	0.72	0.79	1.2	1.21
100,001 - 500,000	41(1)	54(2)	11281	14084	5.80	7.01	7	8.22
5,00,001 - 10,00,000	18	18	13775	13089	7.08	6.51	14.08	14.73
1,00,00,001 -1,50,00,000	10	6	12615	7133	6.48	3.55	20.56	18.28
15,00,00,001 - 20,00,00,000	3	6	5222	10308	2.68	5.13	23.24	23.41
20,00,00,001 and above	33	34	149348	153926	76.75	76.60	99.99	100.01

*® Excluding ROM*

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

(In '000 tonnes)

State	Lumps						Fines						Concentrates		Total Lumps, Fines & Concentrates	
	Below 55% Fe	55% below 58% Fe	60% below 60% Fe	62% below 62% Fe	65% below 65% Fe	Total	Below 55% Fe	55% below 58% Fe	60% below 60% Fe	62% below 62% Fe	65% below 65% Fe	Total	65% Fe & above	Total		
																Total
<b>India</b>	<b>7552</b>	<b>2173</b>	<b>1857</b>	<b>1868</b>	<b>5616</b>	<b>2159</b>	<b>21225</b>	<b>27029</b>	<b>49417</b>	<b>5722</b>	<b>22736</b>	<b>19012</b>	<b>3545</b>	<b>127461</b>	<b>30</b>	<b>148716</b>
Andhra Pradesh	650	-	-	-	-	-	650	540	-	-	-	-	-	540	-	1190
Chhattisgarh	5	15	6	14	28	234	302	276	142	46	314	1046	670	2494	-	2796
Goa	364	209	75	3	1	-	652	591	711	144	95	-	-	1541	17	2210
Jharkhand	417	512	128	59	231	271	1618	1783	35307	51	157	1512	483	39293	-	40911
Karnataka	4073	477	382	566	760	92	6350	1408	372	473	773	963	44	4033	-	10383
Madhya Pradesh	689	178	17	18	-	-	902	2818	450	58	-	-	-	3326	++	4228
Maharashtra	87	5	++	1	++	-	93	427	++	++	-	-	-	427	-	520
Odisha	1201	777	1249	1207	4596	1561	10591	19172	12435	4950	21397	15491	2348	75793	-	86384
Rajasthan	66	-	-	-	-	1	67	14	-	-	-	-	-	14	13	94
Telangana	++	++	-	-	-	-	++	-	-	-	-	-	-	-	-	-

++ Negligible

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**Table – 7 (B) : Mine-head Closing Stocks of Iron Ore, 2017-18 (P)**  
(By States/Grades)

(In '000 tonnes)

State	Lumps										Fines										Total 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	60% below 62% Fe	62% below 65% Fe	65% Fe & above	Total				
																			Concentrates Total			
<b>India</b>	<b>7726</b>	<b>2030</b>	<b>1809</b>	<b>1780</b>	<b>6192</b>	<b>2782</b>	<b>22319</b>	<b>24766*</b>	<b>53123</b>	<b>6402</b>	<b>24251</b>	<b>16453</b>	<b>3949</b>	<b>128944#</b>	<b>205</b>	<b>151468</b>						
Andhra Pradesh	661	14	-	++	-	-	675	684	-	-	1	-	-	685	-	1360						
Chhattisgarh	9	4	3	2	462	1201	1681	341	122	4	385	394	1293	2539	-	4220						
Goa	523	299	112	++	1	-	935	1011	647	80	21	99	-	1858	21	2814						
Jharkhand	370	662	169	267	221	131	1820	1565	36101	382	750	1344	439	40581	-	42401						
Karnataka	3841	336	347	465	846	75	5910	1435	407	688	612	1483	28	4653	-	10563						
Madhya Pradesh	927	32	17	17	-	-	993	2941	-	4	-	-	-	2945	++	3938						
Maharashtra	124	20	++	5	++	-	149	502	47	5	-	-	-	554	-	703						
Odisha	1172	663	1161	1024	4662	1374	10056	16211	15799	5239	22482	13133	2189	75053	184	85293						
Rajasthan	99	-	-	-	-	1	100	76#	-	-	-	-	-	76#	-	176						
Telangana	++	-	-	-	-	-	-	-	-	-	-	-	-	-	-	++						

++ Negligible # Under reference

IRON ORE



## **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 Goa 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 the 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 tonnes capacity. For longer distances and barge loading, dumpers/trucks up to 10 tonnes capacity are used. The barges carry the ore to harbours. The ore from the barges is loaded on 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 was closed since December 2005 which 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). The Company has three highly-mechanised iron ore mine complexes. Two are located in Chhattisgarh and one in Karnataka. In the year 2017-18, the Company has achieved success in terms of completion of Kumaraswamy Iron Ore Project and Pellet Plant in Donimalai Complex. Both these projects that were commissioned and Performance Guarantee (PG) tests completed are in operation now.

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.

The lumps and fines of iron ore are marketed after screening and beneficiation. Fines are converted into sinters for use in steel plants while pellets made from concentrates/fines are exported and also are utilised for internal consumption in domestic iron & steel industries.

## 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.

The twenty-four pelletisation plants in the country about which information is available, have a total capacity of 65.13 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 and has produced 4.19 million tonnes of pellet during the FY 2017-18, registering an increase of 6%, as compared to FY 2016-17.

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 I<sup>st</sup> 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 has set up a 1.2 million tpy capacity of pellet plant at Donimalai in Karnataka. Another 2 MTPA pellet plant is in the process of being set up at Nagarnar, Chhattisgarh.

NMDC has taken up an ambitious project of laying Slurry Pipeline from Bailadila to Jagdalpur and further up to Visakhapatnam. The capacity of slurry pipeline is 15 MTPA and this will be associated with facilities like beneficiation Plant at Kirandul & Bacheli, Pellet Plant at Nagarnar and Vizag. The slurry pipeline between Bacheli and Nagarnar is being executed by NMDC and that from Nagarnar to Vizag is envisaged to be executed in SPV or BOO mode.

The statutory clearances for Phase-I from Bacheli to Nagarnar in respect of Ore Processing Plant (OPP), Bacheli and Pellet Plant, Nagarnar have been received. The activities for taking a corridor of land for Right of Use (ROU) for laying the slurry pipeline is in progress. The works for Bailadila to Jagdalpur segment (140 km) have been taken up and site levelling work for 2 MTPA pellet plant at Nagarnar has been completed and for 2 MTPA beneficiation plant at Bacheli is in progress.

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 is not only aimed at contributing significantly to energy savings in the blast furnace operations but also at cutting the cost of operations. The Eastern region accounts around 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.

### **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-eight sintering plants in the country, about which information is available, have a total capacity of about 71.81 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.

The production for sale of pig iron has increased from 1.6 million tonnes in 1991-92 to 5.73 million tonnes in 2017-18. The Private Sector accounted for 94% of total production of pig iron in the country in 2017-18. 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 million tonnes 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. 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 49.62 million tonnes in 2017-18. Production has increased from 0.9 million tonnes in 1990-91 to 30.51 million tonnes in 2017-18. 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. It is projected that the sponge iron capacity may increase to 114 million tonnes by 2030-31 with around 30% share of gas-based capacities under increased environmental considerations and long-term availability of gas.

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 & 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 ferromanganese (high carbon, medium carbon and low carbon), ferrosilicon, ferrochrome (high carbon and low carbon)/charge-chrome, ferro-molybdenum, ferrovanadium, ferrotungsten, ferro-silicon-magnesium, ferroaluminium, ferro-silicon-zirconium, ferrotitanium, etc. Ferro-alloys in turn are either used in Steel Industries to impart some special qualities or are exported. The details about the Ferro- alloys Industry are provided in the Review on 'Ferro-Alloys'.

## **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 2018, 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, Ferro-alloys, Foundry,

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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.

## CONSUMPTION

In 2017-18, about 154.60 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 pelletisation (90.75%) and Sponge Iron industries (8.69%) were the major consumer of iron ore and accounted together for over 99.44 % of the consumption. Plantwise consumption of iron ore in steel plants about which information available is furnished in Table-10. Industry wise consumption of iron ore from 2015-16 to 2017-18 is provided in detail in Table-11.

**Table – 8 : Installed Capacity & Production of Pellets and Sinters, 2017-18  
(By Plants)**

(In '000 tonnes)

Name & location of plant	Annual installed capacity	Production		Iron ore fines consumed	
		2016-17	2017-18 (P)	2016-17	2017-18 (P)
<b>A) Pellet Plants</b>					
1. Amba River Coke Ltd (A wholly owned subsidiary co. of JSW Steel Ltd ) Raigad, Maharashtra	4000	3968	4186	4296	3864
2. Ardent Steel Ltd, Phulj Keonjhar, Odisha	600	NA	NA	NA	NA
3. Arya Iron and Steel Company (AISCO) Barbil, Odisha	1200	NA	NA	NA	NA
4. BMM Ispat, Karnataka	2400	1303	1119	NA	NA
5. Essar Steel Ltd, Visakhapatnam, Andhra Pradesh	8000	NA	NA	NA	NA
6. Essar Steel Ltd, Paradip Port, Odisha.	6000	NA	NA	NA	NA
7. Godawari Power & Ispat Ltd Siltara, Chhattisgarh	2100	NA	NA	NA	NA
8. KIOCL Ltd, Panambur, Mangaluru, Karnataka	3500	NA	NA	NA	NA
9. Jindal Steel & Power Ltd, Barbil	9000	NA	NA	NA	NA
10. Jindal Saw Ltd., Bhilwara, Rajasthan	1200	1200	1197	1279	1353

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(Table-8 Contd.)

(In '000 tonnes)

Name & location of plant	Annual installed capacity	Production		Iron ore fines consumed	
		2016-17	2017-18 (P)	2016-17	2017-18 (P)
11. JSW Steel Ltd, Vijaynagar Works, Vidyanagar, Toranagally, Ballari, Karnataka	9200	6177	7140	21040	20759
12. Jayaswal Neco Industries Ltd, Siltara, Raipur, Chhattisgarh	1200	770	1123	1242	1603
13. Mandovi Pellets Ltd, Near Borim Bridge, Shiroda, Goa – 403 103	1800	NA	NA	NA	NA
14. Minera Steel & power Private Ltd, Ballari, Karnataka	600	651	598	688	656
15. MSP Steel & Power Ltd, Raigarh, Chhattisgarh	900	NA	NA	NA	NA
16. Orissa Metalics Private Ltd., Paschim Mednapore, West Bengal	1230	791	1174	1279	1813
17. Orissa Manganese & Minerals Limited (OMML), Kandra Saraikela Kharsawan, Jharkhand	1200	NA	NA	NA	NA
18. Rashmi Metaliks Ltd, Shyamraipur, Gokulpur, West Midnapore, West Bengal	900	749	787	1413	1364
19. Rexon Strips Ltd, Kumakela, Lathikata Rourkela, Sundargarh, Odisha	300	NA	NA	NA	NA
20. Sarda Energy and Minerals Ltd, Siltara, Raipur, Chhattisgarh	600	NA	NA	NA	NA
21. Shri Bajarang Power & Ispat Ltd, Borjhara, Tilda & Gondwara, Raipur, Chhattisgarh	1200	NA	NA	NA	NA
22. Tata Steel Limited, Jamshedpur	6000	6293	6604	17054	17345
23. Usha Martin Ltd, Usha Alloy & Steel, Division, Jamshedpur	1200	-	367	1694	2119
24. Xindia Steels Ltd, Kunikere & Hirebaganal Ginigera, Koppal, Karnataka	800	NA	NA	NA	NA

(Contd.)

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(Table-8 Contd.)

(In '000 tonnes)

Name & location of plant	Annual installed capacity	Production		Iron ore fines consumed		
		2016-17	2017-18 (P)	2016-17	2017-18 (P)	
<b>B) Sintering Plant</b>						
1. Bokaro Steel Plant, Jharkhand	6900	NA	NA	NA	NA	
2. Bhilai Steel Plant, Bhilai, Durg, Chhattisgarh.	6334	7037	6505	4922	4424	
3. Bhushan Power & Steel Ltd, Sambalpur, Odisha	1000	NA	NA	NA	NA	
4. Durgapur Steel Plant, West Bengal	3009	3167	3155	2363	2408	
5. Gerdau Steel India Ltd, Tadipatri, Anantpur, A.P.	470	NA	NA	NA	NA	
6. IISCO Steel Plant, SAIL Burnpur, West Bengal	3800	NA	NA	2635	2766	
7. Jayaswal Necco Industries Ltd, Siltara Growth Centre, Raipur-493 221, Chhattisgarh	792	-	-	1242	1603	
8. Jindal Steel & Power Ltd, Raigarh, Chhattisgarh	2300	NA	NA	NA	NA	
9. Jindal Saw Ltd., Mundra, Gujarat	900	662	720	118	114	
10. JSW Steel Ltd Vijayanagar works, Vidyanagar -583 175, Tornagallu, Ballari, Karnataka	12950	13913	13858	21040	20759	
11. JSW Ispat Steel Ltd, Dolvi, Raigad, Maharashtra 402 107	2800	NA	NA	NA	NA	
12. JSW Steel Ltd Salem works , Pottaneri, Salem, Tamil Nadu	1180	1215	1208	581	625	
13. Kalyani Steel Ltd, M/s Hospet Steels Ltd., Ginigera, Koppal, Karnataka	500	NA	NA	NA	NA	
14. Kirloskar Ferrous Industries Ltd, Bevinahalli, Hitnal, Karnataka	500	NA	NA	NA	NA	

(Contd.)

IRON ORE

(Table-8 Concl'd.)

(In '000 tonnes)

Name & location of plant	Annual installed capacity	Production		Iron ore fines consumed	
		2016-17	2017-18 (P)	2016-17	2017-18 (P)
15. KIC Metaliks Ltd, Raturia, Angadpur, Durgapur. West Bengal	336	130	174	239	305
16. Mukund Ltd, M/s Hospet Steel Ltd, Ginigera, Koppal, Karnataka	500	NA	NA	NA	NA
17. Neelachal Ispat Nigam Ltd, Kalinga Nagar, Industrial Complex, Duburi-755 026, Distt Jajpur, Odisha	1711	NA	NA	NA	NA
18. Rashmi Metaliks Ltd, Shyamraipur, Gokulpur, West Midnapore, West Bengal	600	310	233	1413	1364
19. RINL, Visakhapatnam Steel Plant No. -1& 2 , Visakhapatnam, Andhra Pradesh	5256	NA	NA	NA	NA
20. RINL, Visakhapatnam Steel Plant No. -3, Andhra Pradesh	3600	NA	NA	NA	NA
21. Rourkela Steel Plant, Odisha	5300	5270	5306	3117	-
22. SBQ Steel Ltd, Gudur, Nellore, Andhra Pradesh	240	-	-	-	-
23. SLR Metaliks Ltd. Ballari, Karnataka	343	-	-	-	-
24. Sesa Goa Ltd., Vedanta Ltd., North Goa	1000	-	-	1127	1064
25. Sunflag Iron and Steel Co. Ltd, Bhandara, Nagpur, Maharashtra	250	323	365	553	639
26. Tata Steel Ltd, Jamshedpur, Jharkhand	8000	8153	6604	17054	17345
27. Tata Metaliks Ltd, Kharagpur, West Bengal	528	NA	NA	NA	NA
28. Usha Martin Ltd (Usha Alloys and Steel Division), Jamshedpur	715	815	818	1694	2119



IRON ORE

**Table - 9 : 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.	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 <sub>2</sub> )	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	65%	5%	0.05%	0.03%
		10-30 mm	-	-	-	-
		10-150 mm	-	-	-	-

**Table – 10 : Consumption and Specifications of Iron Ore, 2016-17 and 2017-18  
(By Steel Plants)**

(In '000 tonnes)

Steel plant	Iron ore consumption				Specifications
	2016-17		2017-18 (P)		
	Lumps	Fines	Lumps	Fines	
Bokaro Steel Plant, Bokaro, Jharkhand	1945	3227	2487	4058	Lumps: Fe-63.40%, SiO <sub>2</sub> :2.25%, Al <sub>2</sub> O <sub>3</sub> 2.39%, Size: 10-40 mm Fines: Fe - 62.24%, SiO <sub>2</sub> - 3.36%, Al <sub>2</sub> O <sub>3</sub> - 3.45%
Durgapur Steel Plant, Durgapur, West Bengal	1431	2363	1363	2408	Lumps : Fe - 62.48%, Al <sub>2</sub> O <sub>3</sub> - 2.42%, Size: 10-50 mm Fines: Fe - 62.8%, SiO <sub>2</sub> - 2.28%, Size : -10 mm
IISCO Steel Plant, Burnpur, West Bengal	689	2545	710	2766	Lumps: Fe - 62.86%, SiO <sub>2</sub> - 2.56%, Al <sub>2</sub> O <sub>3</sub> - 2.56% (max.), Size: 10-40 mm
Bhilai Steel Plant, Chhattisgarh	2969	4922	2414	4424	
Rourkela Steel Plant SAIL, Rourkela, Odisha	1835	3117	2460	5306	-

(Contd.)

## IRON ORE

(Table-10 Concl.)

(In '000 tonnes)

Steel plant	Iron ore consumption				Specifications
	2016-17		2017-18 (P)		
	Lumps	Fines	Lumps	Fines	
Tata Metaliks Ltd Medinipur, Kharagpur West Bengal	220398	260	315		-
Tata Steel Limited, Jamshedpur	3365	17054	3205	17345	
JSW Steel Ltd. Ballary, Karnataka	5831	15444	4375	18210	
Mukund Ltd, M/s Hospet Steel Ltd, Giniger, Koppal, Karnataka	346	154	345	182	-
JSW Steel Ltd Salem works, Raigad, Maharashtra	1003	2861	1003	4156	-
Kalyani Steel Ltd, M/s Hospet Steels Ltd., Giniger, Koppal, Karnataka	318	1090	247	1029	-

## TRADE POLICY

To encourage beneficiation and pelletisation of iron ore fines in the country, basic custom 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. 17<sup>th</sup> March 2012. To ensure easy availability of raw material in domestic market at reasonable prices, export duty on iron ore is @ 30% for both lumps and fines varieties of 58% Fe content and above. The export duty is @ 0% for both lumps and fines varieties of iron ore less than

58% Fe content. The export duty on iron ore pellets is NIL. Export duty on iron ore originated from NMDC is @ 10% when exported by MMTC Ltd under LTA to Japan and South Korea.

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	

## IRON ORE

HS Code	Item	Export Policy	Nature of restrictions
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<sup>@</sup> 2015-16 to 2017-18  
(By Industries)**

Industry	(In tonnes)		
	2015-16	2016-17 (R)	2017-18 (P)
<b>All Industries</b>	<b>126774300</b>	<b>150216000</b>	<b>154597800</b>
Alloy steel	39800	35500	7800
Cement	1254100	868900	778100
Ferro-alloys	78800	70700	64000
Iron & steel (including pelletisation)	96778900	135474700	140300200
Sponge iron	28592000(e)	13730300	13440200
Others (electrode, foundry, oil well drilling, paint, chemical, coal washery** & refractory)	30700	35900	7500

*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.*

## WORLD REVIEW

The world reserves of crude iron ore are estimated to be around 170 billion tonnes. In terms of iron content, the iron ore reserves are estimated to be around 84 billion tonnes. The world reserves of crude iron ore and iron content by principal countries are furnished in Table - 12.

In 2017, the world production of iron ore was 3,332 million tonnes as against 3,317 million tonnes in the previous year. China (37%), Australia (27%), Brazil (13%), India (6%) and

Russia (3%) were the principal producers. These five countries accounted for about 86% of the world production of iron ore. The world production of iron ore is provided in Table-13.

To give a generalised view of the development in various countries, country-wise description sourced from the latest available publication of Minerals Yearbook 'USGS' 2015 is furnished below.

### Australia

Production of iron ore in Australia at 817 Mt, on a usable-ore basis, in 2015, was 5.5% higher

than 774 Mt produced in 2014. On a year-on-year basis, iron ore production in Australia increased by 42 Mt in 2015, 91 Mt in 2014, 127 Mt in 2013 and 68 Mt in 2012. The three leading miners in Australia—BHP Billiton Ltd, Fortescue Metals Group Ltd, and Rio Tinto Group—were among the four leading iron ore producers in the world and accounted for the vast majority of iron ore produced in Australia.

BHP Billiton's iron ore production in Australia in the fiscal year (FY) 2015, which ended June 30, increased to 218 Mt from 159 Mt in FY 2014, mostly owing to the ramping up of the Jumblebar Mine in Western Australia. Production was expected to increase to 233 Mt in FY 2016 as operations were optimised and expansion projects were completed in preparation for a potential doubling of capacity to 290 Mt/yr. Fortescue's production in FY 2015 increased to 165 Mt from 140 Mt produced in FY 2014 and was expected to continue at 165 Mt/yr through FY 2016. Rio Tinto's share of production at its operations in Australia in 2015 increased to 253 Mt from 225 Mt in 2014. The Company's Port of Pilbara and rail infrastructure project was completed in mid-2015, along with the ramping up of multiple mines across the Pilbara region and the commissioning of the Yandicoogina project.

### **Brazil**

Production of iron ore in Brazil at 397 Mt in 2015 was 3% higher than 385 Mt produced in 2014. Vale S.A., the leading iron ore producer in Brazil, increased production in 2015 to 346 Mt, from 332 Mt in 2014. The Company sold 276 Mt of fines and 46 Mt of pellets, an increase from 256 Mt of fines and 44 Mt of pellets in 2014. Anglo American plc increased production in 2015 to 9.2 Mt (wet basis) as the operation continued to be ramped up through mid-2016.

In early November, the Fundão Dam burst at the Samarco Mine in Minas Gerais State, resulting in casualties and flooding of the surrounding villages and areas. The dam's failure released approximately 60 million cubic meters of water and mine waste from the site's tailings ponds into the surrounding area and eventually in to the Rio Doce estuary and the southern Atlantic Ocean.

Concerns regarding the environmental impact of the dam failure and loss of life prompted the Environment Minister of Brazil to file a lawsuit against the operators and to demand that the owners establish a \$5.2 billion fund to pay for environmental recovery and victim compensation. The 30.5-Mt/yr pellet facility was a joint venture between BHP Billiton Ltd and Vale S.A.

### **China**

Production in China, on a usable-ore basis, decreased in 2015 to 375 Mt from 410 Mt in 2014. The China Iron and Steel Association indicated that the Government of China had attempted to resolve overcapacity by reducing steel production capacity by 77.8 Mt since 2011. Steel mills in China remained the leading consumers of iron ore in the world.

### **Canada**

Production of iron ore in Canada increased slightly in 2015 to 45.9 Mt from 44.2 Mt produced in 2014. The Bloom Lake Group and its several affiliates managing operations at Cliffs' Bloom Lake Mine in Quebec Province began restructuring proceedings under the Government of Canada's Companies' Creditors Arrangement Act. Operations at the mine were suspended in late 2014. Cliffs was considering equity investors and sale options, which would terminate all the Company's operations in Canada. Champion Iron Ltd indicated it was considering purchasing the mine along with its rail assets.

U.S. Steel's transition plan with U.S. Steel Canada, as part of the latter's restructuring under Canada's Companies' Creditors Arrangement Act, was approved by the Ontario Superior Court of Justice. The agreement's approval was integral to separating the two companies.

### **Guinea**

ArcelorMittal terminated an agreement to purchase shares in the Mount Nimba iron ore project in Guinea. The original agreement was contingent on receiving permission from the Government of Guinea to ship iron ore into Liberia. That permission was not received by the established deadline.

IRON ORE

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

(In million tonnes)

Country	Reserves	
	Crude ore	Iron content
<b>World : Total (rounded off)</b>	<b>170000</b>	<b>84000</b>
Australia <sup>(a)</sup>	50000	24000
Brazil	32000	17000
Canada	6000	2300
China	20000	6900
India*	5400	3200
Iran	2700	1500
Kazakhstan	2500	900
Russia	25000	14000
South Africa	1200	770
Sweden	1300	600
Ukraine <sup>(b)</sup>	6500	2300
United States	2900	760
Other countries	18000	9500

*Source: Mineral Commodity Summaries, 2019.*

(a) : For Australia Joint Ore Reserves Committee compliant reserves were about 24 billion tonnes for crude ore and 10 billion tonnes for iron content.

(b): For Ukraine, reserves consist of the A+B categories of the Soviet reserves classification system.

\* As per UNFC system as on 1.4.2015, India's reserves/resources of Iron ore (Haematite) and Iron ore (Magnetite) were estimated at 22,487 million tonnes and 10,789 million tonnes respectively.

## FOREIGN TRADE

### Exports

Exports of iron ore decreased to 24.38 million tonnes in 2017-18 from 30.73 million tonnes in the previous year. In terms of value, the iron ore exports decreased to ` 9,490 crore in 2017-18 from ` 10,293 crore in 2016-17. The exports of iron ore in 2017-18 in terms of volume comprised iron ore fines (54%), iron ore pellets (38%), iron ore lumps (6%), iron ore non-agglomerated concentrate (2%) and negligible quantity of iron ore pyrites. Exports were mainly to China (76%), Japan (12%), Rep. of Korea (5%), Oman (2%) and the remaining 5% of the exports was to Indonesia, Vietnam, Malaysia, Singapore, Korea Dem. Rep., UK etc. (Tables- 14 to 19).

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

(In million tonnes)

Country	2015	2016	2017 (P)
<b>World : Total (rounded off)</b>	<b>3308</b>	<b>3317</b>	<b>3332</b>
Australia	810	858	885
Brazil	389	424	436
Canada*	47	49	49
Chile	15	15	15
China	1381	1281	1229
India <sup>(i)***</sup>	158	195	201
Iran <sup>(j)</sup>	51	65	74
Kazakhstan	37	36	39
Mauritania	12	13	12
Mexico	20	18	18
Mongolia	6	5	8
Peru	7	8	9
Russia	101	101	95
Sierra Leone	5	7	7 <sup>e</sup>
South Africa <sup>@</sup>	73	66	75
Sweden	30	32	32
Turkey	8	7	10
Ukraine	67	63	61
USA**	46	42	46 <sup>e</sup>
Venezuela	12	7	5
Vietnam	3	3	5
Other countries	29	23	22

*Source: World Mineral Production, 2013-2017, BGS.*

*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

(i) Year ended 31<sup>st</sup> March following that stated.

(j) Year ended 20<sup>th</sup> March following that stated.

\*\*\* India's production of iron ore in 2015-16, 2016-17 and 2017-18 was 158.11 million tonnes, 194.58 million tonnes and 200.96 million tonnes respectively

### Imports

Imports of iron ore increased to 8.71 million tonnes in 2017-18 from 4.61 million tonnes in the previous year. The imports in 2017-18 comprised iron ore Fines (44%), non-agglomerated concentrates (25%), lumps (24%), iron ore pellets (7%) and negligible quantity of iron ore pyrites. Imports of iron ore were from Australia (33%), South Africa (31%), Brazil (25%), Bahrain (6%), Oman (3%) and Iran & Russia (1% each) (Tables-20 to 25).

IRON ORE

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

Country	2016-17		2017-18	
	Qty (‘000 t)	Value (` ‘000)	Qty (‘000 t)	Value (` ‘000)
<b>All Countries</b>	<b>30728</b>	<b>102929254</b>	<b>24380</b>	<b>94901382</b>
China	29474	97293983	18602	70391181
Japan	468	1546315	2891	12242234
Korea, Rep. of	75	285680	1125	5809245
Oman	417	2151559	388	2277724
Vietnam	-	-	259	1255169
Indonesia	-	-	273	718618
Malaysia	-	-	218	616088
Singapore	-	-	165	603049
Korea, Dem. P. Rep.	-	-	76	302007
UK	++	912	60	288464
Other countries	294	1650805	323	397603

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

Country	2016-17		2017-18	
	Qty (‘000 t)	Value (` ‘000)	Qty (‘000 t)	Value (` ‘000)
<b>All Countries</b>	<b>18540</b>	<b>47421383</b>	<b>13100</b>	<b>32582233</b>
China	18063	46127910	9889	21333765
Japan	347	914259	2055	7495395
Korea, Dem. P. Rep.	75	285680	595	2523488
Indonesia	-	-	221	371060
Korea, Dem.P.Rep.	-	-	76	302007
Singapore	-	-	40	227895
Malaysia	-	-	86	144553
Kenya	19	33912	45	71966
Vietnam	-	-	53	58197
Nepal	36	55491	40	53907
Other countries	++	4131	-	-

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

Country	2016-17		2017-18	
	Qty (‘000 t)	Value (` ‘000)	Qty (‘000 t)	Value (` ‘000)
<b>All Countries</b>	<b>2266</b>	<b>6792560</b>	<b>1516</b>	<b>4402466</b>
China	2199	6497797	962	2140693
Japan	67	293697	440	2136449
Malaysia	-	-	79	104739
Singapore	-	-	33	17807
Nepal	++	1066	2	2485
Philippines	-	-	++	284
Finland	-	-	++	9

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

Country	2016-17		2017-18	
	Qty (‘000 t)	Value (` ‘000)	Qty (‘000 t)	Value (` ‘000)
<b>All Countries</b>	<b>++</b>	<b>21060</b>	<b>++</b>	<b>25395</b>
Japan	++	7401	++	6575
Netherlands	++	5464	++	6291
UAE	++	2843	++	2634
Bangladesh	-	-	++	1890
Saudi Arabia	++	665	++	1647
Italy	-	-	++	1209
Jordan	-	-	++	783
Uganda	++	306	++	588
Sri Lanka	++	333	++	537
Slovenia	-	-	++	445
Other countries	++	4048	++	2796

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

Country	2016-17		2017-18	
	Qty (‘000 t)	Value (` ‘000)	Qty (‘000 t)	Value (` ‘000)
<b>All Countries</b>	<b>1107</b>	<b>2846476</b>	<b>453</b>	<b>924666</b>
China	1105	2839135	205	562796
Japan	++	1	65	351120
Nepal	1	1085	183	10668
Malaysia	-	-	++	21
Finland	++	745	++	17
Norway	-	-	++	16
USA	-	-	++	11
Germany	-	-	++	10
Spain	-	-	++	3
Maldives	-	-	++	2
Other countries	1	5510	++	2

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

Country	2016-17		2017-18	
	Qty (‘000 t)	Value (` ‘000)	Qty (‘000 t)	Value (` ‘000)
<b>All Countries</b>	<b>4607</b>	<b>21615219</b>	<b>8706</b>	<b>42293972</b>
South Africa	2383	11066550	2744	15411266
Brazil	1729	7960838	2178	12246656
Australia	6	33444	2866	7279074
Bahrain	234	1467056	526	5058760
Oman	56	325696	290	1613832
Russia	-	-	45	375609
Iran	124	508357	52	241360
Turkey	2	17765	4	36624
Sweden	++	47	++	8231
China	++	5846	++	6539
Other countries	73	229620	1	16021

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

Country	2016-17		2017-18	
	Qty (‘000 t)	Value (` ‘000)	Qty (‘000 t)	Value (` ‘000)
<b>All Countries</b>	<b>8815</b>	<b>45847775</b>	<b>9311</b>	<b>56966622</b>
China	8107	41829141	7546	46353495
Korea, Rep. of	-	-	530	3285757
Oman	416	2148624	388	2277724
Japan	54	330957	331	2252695
Vietnam	-	-	206	1196972
Malaysia	-	-	53	366699
Singapore	-	-	92	357347
Indonesia	-	-	52	347558
UK	-	-	60	288050
UAE	-	-	53	240325
Other countries	238	1539053	-	-

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

Country	2016-17		2017-18	
	Qty (‘000 t)	Value (` ‘000)	Qty (‘000 t)	Value (` ‘000)
<b>All Countries</b>	<b>2352</b>	<b>10404621</b>	<b>2210</b>	<b>12707090</b>
Brazil	1202	5456870	1658	9667096
Oman	56	325696	290	1613832
South Africa	964	4169888	147	856588
Australia	-	-	63	315634
Iran	58	238494	52	241360
Sweden	-	-	++	8198
Netherlands	++	1280	++	3098
France	-	-	++	812
Germany	-	-	++	379
USA	-	-	++	34
Other countries	72	212393	++	59

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

Country	2016-17		2017-18	
	Qty (‘000 t)	Value (` ‘000)	Qty (‘000 t)	Value (` ‘000)
<b>All Countries</b>	<b>392</b>	<b>2520827</b>	<b>571</b>	<b>5434369</b>
Bahrain	234	1467056	526	5058760
Russia	-	-	45	375609
Australia	3	21199	-	-
Brazil	155	1032572	-	-

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

Country	2016-17		2017-18	
	Qty (‘000 t)	Value (` ‘000)	Qty (‘000 t)	Value (` ‘000)
<b>All Countries</b>	<b>3</b>	<b>39467</b>	<b>5</b>	<b>54670</b>
Turkey	2	17765	4	36624
China	++	5846	++	6539
Pakistan	++	3598	1	5842
Italy	++	2666	++	4867
Turkmenistan	-	-	++	697
USA	-	-	++	101
Finland	1	9592	-	-

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

Country	2016-17		2017-18	
	Qty (‘000 t)	Value (` ‘000)	Qty (‘000 t)	Value (` ‘000)
<b>All Countries</b>	<b>994</b>	<b>4824935</b>	<b>2123</b>	<b>12138902</b>
South Africa	994	4824797	2123	12138685
Germany	-	-	++	63
Australia	-	-	++	52
Austria	++	91	++	39
Sweden	++	47	++	33
Canada	-	-	++	30



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

Country	2016-17		2017-18	
	Qty (‘000 t)	Value (` ‘000)	Qty (‘000 t)	Value (` ‘000)
<b>All Countries</b>	<b>866</b>	<b>3825369</b>	<b>3797</b>	<b>11958941</b>
Australia	3	12245	2803	6963388
Brazil	372	1471396	520	2579560
South Africa	425	2071865	474	2415993
Iran	66	269863	-	-

## 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 the 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 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.