

2.1 CHROMITE

Introduction

Chromite is an important commercial chromium bearing mineral. It is an oxide of chromium and iron ($\text{FeO Cr}_2\text{O}_3$ or $\text{Fe Cr}_2\text{O}_4$). It belongs to the spinel group. In its purest form the chromite ore contains 68% chromium oxide and Cr: Fe ratio is 1.8:1, but in nature such chromite is rare. It occurs as a primary mineral of ultrabasic igneous rocks and is normally associated with peridotite, pyroxenite, dunite and serpentinite. World wide, high alumina chromite, largely from podiform deposits is used in refractory applications while iron rich ores, largely from stratiform deposits are utilised in metallurgical and chemical applications.

Chromite is of critical importance because it imparts unique qualities to the products to which it is added. It is used in the production of stainless steel and high temperature alloys having numerous industrial and defence applications. It is also used in the manufacture of ferro-chrome, charge-chrome, refractories and chemicals.

India is one of the leading producers and exporters of chromite in the world. Chromite deposits of Sukinda and Nausahi ultramafic belt of Odisha constitutes 94% of the country's chromite resources. Here chromite occurs as concentration and disseminations in the ultramafic rocks, in the form of lenses, pockets, thin seams and stringers. Other states contributing to the country's resources of chromite are Manipur, Nagaland, Karnataka, Jharkhand, Maharashtra, Tamil Nadu, Telangana and Andhra Pradesh. In Manipur, chromite is associated with serpentine. In Nagaland, nickeliferous chromite has been located in ultramafic belt. In Karnataka, the ultramafic rocks bearing chromite occur in two belts; viz. Nuggehalli, Arsikhera and Nanjangud in Mysore district. In Maharashtra, it occurs in altered ultramafic rocks. In Andhra Pradesh and Telangana, it occurs in Eastern Ghat group of rocks in Krishna and Khammam districts respectively. In Tamil Nadu, chromite associated with amphibolites bands are found in Sitampundi complex of anorthosites.

Basis of Grade Classification

In the inventory as on 01.04.2020 the resources of chromite have been classified into following grades:

- | | |
|------------------|--|
| 1. Ferro-Chrome | Cr_2O_3 48% (min), Cr:Fe ratio 2.8:1 (min) |
| 2. Charge-Chrome | Cr_2O_3 44% (min), Cr:Fe ratio 1.6:1 (min) |
| 3. Refractory | Cr_2O_3 +40%, FeO 18% (max), SiO_2 12% (max), MgO 15% (max), physical - lumpy |
| 4. Chemical | Cr_2O_3 44% (min), FeO 20% (max), Al_2O_3 14% (max), SiO_2 7% (max), CaO 3% (max), MgO 14% (max) |
| 5. Beneficiable | Cr_2O_3 12% (min) |
| 6. Low | Chemical and physical properties fall below the specifications of the different grades mentioned above. |
| 7. Others | Estimation for such grades through usable/marketable but can not be classified into the above grades. |
| 8. Unclassified | The range of minimum and maximum value of the constituents are such that it does not enable to classify under any grades. |
| 9. Not Known | Such estimation about which information/data is not available/reported to be classified it under any of the grades. |

Basis of categorisation of Resources

As per United Nations Framework Classification (UNFC), total resources are broadly classified into 'reserves' and 'remaining resources' category.

According to norms of this system 'reserves' of chromite ore have been placed under proved (111) and probable categories (121) and (122).

The 'remaining resources' have been placed under feasibility (211), pre-feasibility (221) & (222), measured (331), indicated (332), inferred (333) and reconnaissance (334) categories.

Salient Features of the Inventory

The total resources of chromite in the country as on 01.04.2020 are estimated at 331.69 million tonnes, of

these about 79 million tonnes (24%) fall under reserves category and 253 million tonnes (76%) are remaining resources.

All India scenarios of chromite reserves, remaining resources and total resources as on 01.04.2020 vis-a-vis 01.04.2015 have been given in Tables - 1 and 2. The tables give an idea about the significant changes in terms of increase or decrease of resources as per lease status, grade and states. In Table-3, district-wise reserves/resources as on 01.04.2020 have been given.

Out of the total resources, about 66 million tonnes (20%) have been placed in freehold, 219 million tonnes (66%) in leasehold private and 47 million tonnes (14%) in leasehold public areas.

Out of the total resources, charge-chrome grade constitutes 93.71 million tonnes (28%), beneficiable 80.5 million tonnes (24%), ferro-chrome 57 million tonnes (17%) and refractory 52.34 million tonnes (16%). The resources of low grade chromite is limited which constitutes about 11 million tonnes (3%) of the total resources. Besides, meagre quantity of about 0.04 million tonnes is held by others, Not known and unclassified grade.

An overall decrease of about 12 million tonnes of resources have be recorded in NMI 2020 as compared to previous inventory 2015. Downward revision recorded in beneficiable grade 5 million tonnes, charge chrome 12 million tonnes, unclassified grade 2 million tonnes and upward revision in low grade 7 million tonnes, refractory 4.6 million tonnes recorded in current inventory.

The state of Odisha has been endowed with the largest share of total resources of chromite in the country at 318 million tonnes (96%). These resources have mainly been distributed in three districts, namely Jajpur (287 million tonnes), Keonjhar (27 million tonnes) and Dhenkanal (4.5 million tonne). Manipur has 6.66 million tonnes (2%) resources estimated in Chandel and Ukhrul districts. The balance 2% resources are accounted together by other states namely Andhra Pradesh, Jharkhand, Karnataka, Maharashtra, Nagaland Tamil Nadu and Telangana.

In Odisha, an overall net decrease of 12.44 million tonnes resources has been registered due to downward revision in resources of existing deposits. However, one new deposits with total resources of 2,700 thousand tonnes was reported in NMI as on 01.04.2020. Minor increase in Karnataka (186 thousand tonnes) observed due to upward revision in resources of 2 leasehold deposits and minor decrease in Maharashtra (71 thousand tonnes) observed due to downward revision of resources in one leasehold private deposits.

Of the total resources of chromite, about 91 million tonnes (27%) resources have been estimated under inferred (333) and reconnaissance (334) categories. These resources are based on a very limited and preliminary exploration. A detailed exploration in these areas may improve the confidence level of resources.

In the inventory as on 01.04.2020, a total 96 deposits have been covered. Out of these, 62 deposits are in freehold and 34 deposits in lease hold areas (15 leasehold-private and 19 leasehold-public).

National Mineral Inventory - An Overview

Table - 1 : Reserves/Resources of Chromite as on 01.04.2020 vis-à-vis 01.04.2015
(By Lease Status/Grade)

| Lease status/Grade | Reserves | | | Remaining resources | | | Total resources | | |
|----------------------------|------------------|----------------|------------------|---------------------|----------------|------------------|-----------------|----------------|------------------|
| | 01.04.2020 | 01.04.2015 | Net change | 01.04.2020 | 01.04.2015 | Net change | 01.04.2020 | 01.04.2015 | Net change |
| | (In '000 Tonnes) | | | | | | | | |
| All India : Total | 78,535 | 102,210 | (-23,675) | 253,150 | 241,806 | (+11,343) | 331,685 | 344,016 | (-12,331) |
| Ferro-Chrome | - | 13,842 | (-13,842) | 57,429 | 47,504 | (+9,925) | 57,429 | 61,346 | (-3,917) |
| Refractory | 26,663 | 29,978 | (-3,315) | 25,675 | 17,684 | (+7,991) | 52,338 | 47,662 | (+4,676) |
| Charge Chrome | 31,896 | 25,804 | (+6,092) | 61,815 | 79,905 | (-18,090) | 93,711 | 105,709 | (-11,998) |
| Low | 4,480 | - | (+4,480) | 6,284 | 3,765 | (+2,519) | 10,764 | 3,765 | (+6,999) |
| Beneficiable | 15,113 | 31,557 | (-16,444) | 65,413 | 54,139 | (+11,274) | 80,526 | 85,697 | (-5,171) |
| Others | - | 133 | (-133) | 15 | 740 | (-725) | 15 | 873 | (-858) |
| Unclassified | 384 | 896 | (-512) | 35,793 | 37,343 | (-1,550) | 36,177 | 38,239 | (-2,062) |
| Not Known | - | - | - | 725 | 725 | No change | 725 | 725 | No change |
| Freehold | - | - | - | 65,699 | 65,320 | (+379) | 65,699 | 65,320 | (+379) |
| Ferro Chrome | - | - | - | 180 | 180 | No change | 180 | 180 | No change |
| Refractory | - | - | - | 1,599 | 1,515 | (+84) | 1,599 | 1,515 | (+84) |
| Charge Chrome | - | - | - | 22,948 | 22,732 | (+216) | 22,948 | 22,732 | (+216) |
| Low | - | - | - | 3,473 | 3,473 | No change | 3,473 | 3,473 | No change |
| Beneficiable | - | - | - | 2,938 | 2,859 | (+79) | 2,938 | 2,859 | (+79) |
| Others | - | - | - | 15 | 15 | No change | 15 | 15 | No change |
| Unclassified | - | - | - | 33,822 | 33,822 | No change | 33,822 | 33,822 | No change |
| Not Known | - | - | - | 723 | 723 | No change | 723 | 723 | No change |
| Leasehold (Private) | 53,087 | 82,290 | (-29,203) | 165,672 | 111,670 | 54,002 | 218,760 | 193,960 | (+24,800) |
| Ferro Chrome | - | 8,111 | (-8,111) | 56,355 | 28,291 | 28,064 | 56,355 | 36,402 | (+19,953) |
| Refractory | 21,343 | 26,263 | (-4,920) | 17,368 | 6,024 | 11,343 | 38,711 | 32,287 | (+6,424) |
| Charge Chrome | 23,671 | 23,338 | (+333) | 36,836 | 45,660 | (-8,824) | 60,507 | 68,998 | (-8,491) |
| Beneficiable | 7,690 | 23,683 | (-15,993) | 53,171 | 28,202 | (+24,969) | 60,861 | 51,885 | (+8,976) |
| Unclassified | 384 | 896 | (-512) | 1,942 | 3,492 | (-1,550) | 2,326 | 4,388 | (-2,062) |
| Leasehold (Public) | 25,448 | 19,920 | (+5,528) | 21,779 | 64,816 | (-43,038) | 47,227 | 84,736 | (-37,510) |
| Ferro Chrome | - | 5,731 | (-5,731) | 894 | 19,033 | (-18,139) | 894 | 24,764 | (-23,870) |
| Refractory | 5,320 | 3,715 | (+1,605) | 6,708 | 10,145 | (-3,437) | 12,028 | 13,860 | (-1,832) |
| Charge Chrome | 8,225 | 2,466 | (+5,759) | 2,032 | 11,513 | (-9,481) | 10,257 | 13,979 | (-3,722) |
| Low | 4,480 | - | (+4,480) | 2,811 | 292 | (+2,519) | 7,291 | 292 | (+6,999) |
| Beneficiable | 7,423 | 7,875 | (-452) | 9,303 | 23,078 | (-13,775) | 16,726 | 30,953 | (-14,227) |
| Others | - | 133 | (-133) | - | 725 | (-725) | - | 858 | (-858) |
| Unclassified | - | - | - | 29 | 29 | No change | 29 | 29 | No change |
| Not Known | - | - | - | 2 | 2 | No change | 2 | 2 | No change |

figures rounded off.

National Mineral Inventory - An Overview

**Table – 2 : Total Resources of Chromite as on 01.04.2020 vis-à-vis 01.04.2015
(By States)**

(In '000 Tonnes)

| State | Total Resources | | Net Change |
|--------------------------|------------------|------------------|-------------------|
| | As on 01.04.2020 | As on 01.04.2015 | |
| All India : Total | 331,685 | 344,016 | (-) 12,331 |
| Andhra Pradesh | ++ | ++ | No Change |
| Jharkhand | 736 | 736 | No Change |
| Karnataka | 1,817 | 1,631 | (+) 186 |
| Maharashtra | 538 | 609 | (-) 71 |
| Manipur | 6,657 | 6,657 | No Change |
| Nagaland | 3,200 | 3,200 | No Change |
| Odisha | 318,269 | 330,714 | (-) 12,445 |
| Tamil Nadu | 282 | 283 | (-) 1 |
| Telangana | 186 | 186 | No Change |

figures rounded off, ++: Negligible

Table - 3 : District wise Reserves/Resources of Chromite as on 01.04.2020

(In '000 Tonnes)

| State/District | Reserves | Remaining Resources | Total Resources |
|--------------------------|---------------|---------------------|-----------------|
| All India : Total | 78,535 | 253,150 | 331,685 |
| Andhra Pradesh | - | ++ | ++ |
| Krishna | - | ++ | ++ |
| Jharkhand | - | 736 | 736 |
| Singhbhum (East) | - | 736 | 736 |
| Karnataka | 499 | 1,317 | 1,817 |
| Chikmagalur | - | 138 | 138 |
| Hassan | 499 | 1,114 | 1,613 |
| Mysore | - | 66 | 66 |
| Maharashtra | 5 | 533 | 538 |
| Bhandara | 5 | 434 | 439 |
| Chandrapur | - | 11 | 11 |
| Nagpur | - | 56 | 56 |
| Sindhudurg | - | 33 | 33 |
| Manipur | - | 6,657 | 6,657 |
| Chandel | - | 1,178 | 1,178 |
| Ukhrul | - | 5,479 | 5,479 |
| Nagaland | - | 3,200 | 3,200 |
| Tuensang | - | 3,200 | 3,200 |
| Odisha | 78,031 | 240,237 | 318,269 |
| Balasore | - | 3 | 3 |
| Dhenkanal | 845 | 3,679 | 4,523 |
| Jajpur | 68,227 | 218,380 | 286,607 |
| Keonjhar | 8960 | 18,176 | 27,136 |
| Tamil Nadu | - | 282 | 282 |
| Coimbatore | - | 37 | 37 |
| Salem | - | 246 | 246 |
| Telangana | - | 186 | 186 |
| Khammam | - | 186 | 186 |

figures rounded off, ++: Negligible

2.2 IRON ORE (Haematite)

Introduction

Haematite is one of the most important ores for extraction of iron. In India, over 95% of iron ore is consumed in iron & steel industry. Haematite occurs in the form of oxide (Fe_2O_3) which is widely spread at various regions across the country. Haematite deposits are mainly located in Andhra Pradesh, Chhattisgarh, Goa, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra and Odisha. Bara Jamda sector in Jharkhand, Bailadila-Rowghat hill ranges in Chhattisgarh and Bellary-Hospet sector in Karnataka are considered the biggest iron ore fields in India. In India, the iron ore deposits are associated with Banded-Haematite-Quartzite (BHQ)/Banded-Haematite-Jasper (BHJ) formed by sedimentation and residual concentration.

Basis of Grade Classification

In India, occurrences of iron ore are classified as high grade, medium grade and low grade deposits according to the incidence of iron in the ore. Ore is being processed by crushing, screening, washing, etc. before making ready for sintering, pelletisation, blast furnace operation, etc. It is known that even a comparatively lower grade deposit can yield high quality furnace charge after beneficiation and agglomeration. Hence, grade classification has been done according to the naturally occurring state of the ore.

The grade classification adopted in the inventory as on 01.04.2020 is based mainly on four chemical constituents namely Fe, SiO_2 , Al_2O_3 and phosphorous which was in line with the recommendations of the committee constituted for end use grade classification (September, 2004). The Classification is given below:

- | | |
|-----------------------------------|--|
| 1. High Grade (lump & fines) | Fe : (+) 65% SiO_2 : 2% (max) Al_2O_3 : 2% (max) P : 0.1% (max) |
| 2. Medium Grade (lump & fines) | Fe : 62 to 65% SiO_2 : 3% (max) Al_2O_3 : 3% (max.) P : 0.1% (max) |
| 3. Low Grade | Fe : (-) 62% |

- | | |
|-------------------|--|
| (lump & fines) | SiO_2 : 4.5 (max) Al_2O_3 : 4% (max) P : 0.1% (max) |
| 4. Beneficiable | (i) Fe: 45% (min) for ore other than Goa. (ii) Fe: 35% (min) for siliceous ore of Goan origin |
| 5. Black iron ore | Haematite containing 10% manganese. |
| 6. Others | Estimation for such grade though useable/marketable but cannot be classified into above grades. |
| 7. Unclassified | The range of minimum and maximum values of constituents are such that it does not enable to classify under any grades. |
| 8. Not Known | Such estimation about which information/data is not available/reported to be classified it under any of the grades. |

Basis of Categorisation of Resources

As per United Nations Framework Classification (UNFC), total resources are broadly classified into 'reserves' and 'remaining resources' category.

According to the norms of this system, 'reserves' of iron ore (haematite) have been placed under proved (111) and probable (121) & (122) categories. The 'remaining resources' have been placed under feasibility (211), pre-feasibility (221) & (222), measured (331), indicated (332), inferred (333) and reconnaissance (334) categories.

Salient Features of the Inventory

The total resources of iron ore (haematite) in the country as on 01.04.2020 are estimated at 24,058 million tonnes; of these about 6,209 million tonnes (26%) fall under 'reserves' category and the balance about 17,849 million tonnes (74%)

under 'remaining resources' category. Of the total resources, about 8,393 million tonnes (35%) have been estimated in freehold areas while about 8,212 million tonnes (34%) in leasehold private and about 7,453 million tonnes (31%) in leasehold public sector.

All India scenario of iron ore (haematite) reserves, remaining resources and total resources as on 01.04.2020 vis-a-vis 01.04.2015 have been given in Tables -1 and 2. The tables give an idea about the significant changes in terms of increase or decrease of resources as per lease status, grades and state. In Table-3, district-wise reserves/resources as on 01.04.2020 have been given.

In terms of grade, the medium grade (lumps & fines) resources constitute for 9,131 million tonnes (38%), followed by low-grade (Lumps & Fines) 7,566 million tonnes (31%), high grade (Lumps & Fines) 2,937 million tonnes (12%), unclassified lumps, fines, blue dust & black iron grade 1,227 million tonnes (5%), beneficiable grade 1,389 million tonnes (6%) and others & not known grades constitute about 1,808 million tonnes (8%).

About 90% of the country's resources have been reported from four states namely Odisha (39%), Jharkhand (20%), Chhattisgarh (19%) and Karnataka (12%). The balance 10% resources are distributed in Goa (5%), Andhra Pradesh (2%) Madhya Pradesh & Maharashtra, (1% each) and Assam, Bihar, Meghalaya, Rajasthan, Uttar Pradesh & Telangana together contribute 1% .

An increase of about 1,571 million tonnes resources of iron ore (haematite) have been recorded in NMI as on 01.04.2020 as compared to

the earlier inventory as on 01.04.2015.

A total of 70 new deposits i.e. 3 deposits in Andhra Pradesh, 1 deposit in Assam, 5 deposits in Chhattisgarh, 2 deposits in Jharkhand, 16 deposits in Karnataka, 11 deposits in Madhya Pradesh, 23 deposits in Odisha, 1 deposit in Rajasthan, 6 deposits in Telangana and 2 deposits in Uttar Pradesh possessing about 1,685 million tonnes of resources were added during updation of NMI as on 01.04.2020. Out of the 70 new deposits added in NMI 2020, 35 deposits with 640 million tonnes resources were reported in freehold, 34 deposits with 921 million tonnes resources in private leasehold and one deposit with 124 million tonnes resources reported in public leasehold categories.

Out of the total increase in resources, Odisha reported 1,851 million tonnes and Karnataka 369 million tonnes. Besides, an increase of about 196 million tonnes was reported together from Andhra Pradesh, Assam, Goa, Madhya Pradesh, Maharashtra, Telangana & Uttar Pradesh states. Bihar and Meghalaya states reported no change in resources. Further, depletion of about 845 million tonnes resources was reported from Jharkhand, Chhattisgarh and Rajasthan.

A sizeable quantity of about 7,442 million tonnes (31%) of iron ore (haematite) have been estimated under inferred and reconnaissance categories. If these areas are examined for further detailed exploration, the confidence level of resource position of iron ore (haematite) in the country may improve further.

A total of 1,127 deposits of iron ore (haematite) have been covered in NMI as on 01.04.2020. Out of which, 448 deposits are in freehold areas, 626 deposits are in leasehold private areas and 53 deposits are in leasehold public areas.

Table - 1 : Reserves/Resources of Iron Ore (Haematite) as on 01.04.2020 vis-à-vis 01.04.2015
(By Lease Status/Grade)

| Lease status/Grade | Reserves | | | | Remaining resources | | | | Total resources | | | |
|---|------------------|------------------|-------------------|-------------------|---------------------|---------------------|-------------------|-------------------|---------------------|------------|------------|------------|
| | 01.04.2020 | 01.04.2015 | Net change | 01.04.2020 | 01.04.2015 | Net change | 01.04.2020 | 01.04.2015 | Net change | 01.04.2020 | 01.04.2015 | Net change |
| | (In '000 Tonnes) | | | | | | | | | | | |
| All India : Total | 6,209,034 | 5,421,751 | (+787,283) | 17,848,870 | 17,065,214 | (+783,656) | 24,057,905 | 22,486,965 | (+1,570,940) | | | |
| Lump, high grade | 832,185 | 1,424,375 | (-592,190) | 940,095 | 1,150,092 | (-209,997) | 1,772,279 | 2,574,466 | (-802,187) | | | |
| Lump, medium grade | 1,432,585 | 1,441,151 | (-8,566) | 4,188,788 | 6,167,154 | (-1,978,366) | 5,621,372 | 7,608,306 | (-1,986,934) | | | |
| Lump, low grade | 686,331 | 262,679 | (+423,652) | 2,388,547 | 1,725,796 | (+662,751) | 3,074,877 | 1,988,474 | (+1,086,403) | | | |
| Lump, unclassified grade | 210 | 248 | (-38) | 246,248 | 291,951 | (-45,703) | 246,459 | 292,200 | (-45,741) | | | |
| Fines, high grade | 146,830 | 350,628 | (-203,798) | 67,192 | 214,334 | (-147,142) | 214,022 | 564,962 | (-350,940) | | | |
| Fines, medium grade | 147,829 | 188,862 | (-41,033) | 1,204,201 | 1,485,105 | (-280,904) | 1,352,029 | 1,673,967 | (-321,938) | | | |
| Fines, low grade | 148,301 | 310,263 | (-161,962) | 1,208,318 | 950,157 | (+258,161) | 1,356,619 | 1,260,420 | (+96,199) | | | |
| Fines, unclassified grade | 490 | 982 | (-492) | 115,885 | 156,851 | (-40,966) | 116,375 | 157,833 | (-41,458) | | | |
| Lumps & Fines, high grade | 471,678 | 208,286 | (+263,392) | 478,709 | 438,791 | (+39,918) | 950,387 | 647,077 | (+303,310) | | | |
| Lumps & Fines, medium grade | 1,016,424 | 598,568 | (+417,856) | 1,141,559 | 752,136 | (+389,423) | 2,157,983 | 1,350,705 | (+807,278) | | | |
| Lumps & Fines, low grade | 698,544 | 210,012 | (+488,532) | 2,435,597 | 1,114,567 | (+1,321,030) | 3,134,141 | 1,324,579 | (+1,809,562) | | | |
| Lumps & Fines, unclassified grade | 188,144 | 244,809 | (-56,665) | 153,661 | 354,485 | (-200,824) | 341,805 | 599,293 | (-257,488) | | | |
| Black Iron Ore | - | - | - | 19,106 | 19,106 | No change | 19,106 | 19,106 | No change | | | |
| Lumps, low & medium grade | - | 14,788 | (-14,788) | - | 13,865 | (-13,865) | - | 28,653 | (-28,653) | | | |
| Others | 23,905 | 30,934 | (-7,029) | 53,585 | 38,715 | (+14,870) | 77,490 | 69,649 | (+7,841) | | | |
| Unclassified | 86,138 | 72,331 | (+13,807) | 329,906 | 102,905 | (+227,001) | 416,044 | 175,236 | (+240,808) | | | |
| Not known | 1,569 | 4,434 | (-2,865) | 1,728,782 | 1,705,721 | (+23,061) | 1,730,351 | 1,710,155 | (+20,196) | | | |
| Lumps, Fines & Blue Dust | - | - | - | 1,847 | - | (+1,847) | 1,847 | - | (+1,847) | | | |
| Low grade | - | - | - | - | - | - | - | - | - | | | |
| Lumps, Fines & Blue Dust unclassified grade | 57,351 | 15,197 | (+42,154) | 28,408 | 4,810 | (+23,598) | 85,759 | 20,007 | (+65,752) | | | |
| Beneficial grade | 270,521 | 43,204 | (+227,317) | 1,118,438 | 378,673 | (+739,765) | 1,388,959 | 421,877 | (+967,082) | | | |
| Freehold | - | - | - | 8,392,809 | 7,275,626 | (+1,117,183) | 8,392,809 | 7,275,626 | (+1,117,183) | | | |
| Lump, high grade | - | - | - | 176,488 | 419,966 | (-243,478) | 176,488 | 419,966 | (-243,478) | | | |
| Lump, medium grade | - | - | - | 1,627,796 | 1,399,818 | (+227,978) | 1,627,796 | 1,399,818 | (+227,978) | | | |
| Lump, low grade | - | - | - | 1,417,355 | 1,115,183 | (+302,172) | 1,417,355 | 1,115,183 | (+302,172) | | | |
| Lump, unclassified grade | - | - | - | 240,234 | 241,426 | (-1,192) | 240,234 | 241,426 | (-1,192) | | | |
| Fines, high grade | - | - | - | 65,139 | 65,139 | No change | 65,139 | 65,139 | No change | | | |
| Fines, medium grade | - | - | - | 902,453 | 859,985 | (+42,468) | 902,453 | 859,985 | (+42,468) | | | |
| Fines, low grade | - | - | - | 488,504 | 383,020 | (+105,484) | 488,504 | 383,020 | (+105,484) | | | |
| Fines, unclassified grade | - | - | - | 114,919 | 115,217 | (-298) | 114,919 | 115,217 | (-298) | | | |
| Lumps & Fines, high grade | - | - | - | 118,656 | 160,234 | (-41,578) | 118,656 | 160,234 | (-41,578) | | | |
| Lumps & Fines, medium grade | - | - | - | 377,833 | 315,626 | (+62,207) | 377,833 | 315,626 | (+62,207) | | | |
| Lumps & Fines, low grade | - | - | - | 525,382 | 378,914 | (+146,468) | 525,382 | 378,914 | (+146,468) | | | |
| Lumps & Fines, unclassified grade | - | - | - | 33,126 | 31,429 | (+1,697) | 33,126 | 31,429 | (+1,697) | | | |
| Black Iron Ore | - | - | - | 698 | 698 | No change | 698 | 698 | No change | | | |
| Others | - | - | - | 5,143 | 18 | (+5,125) | 5,143 | 18 | (+5,125) | | | |
| Unclassified | - | - | - | 185,220 | 27,312 | (+157,908) | 185,220 | 27,312 | (+157,908) | | | |
| Not known | - | - | - | 1,725,721 | 1,702,416 | (+23,305) | 1,725,721 | 1,702,416 | (+23,305) | | | |
| Beneficial grade | - | - | - | 388,140 | 59,225 | (+328,915) | 388,140 | 59,225 | (+328,915) | | | |

National Mineral Inventory - An Overview

Table-1 (Concld.)

| Lease status/Grade | Reserves | | | Remaining resources | | | Total resources | | |
|-----------------------------------|------------------|------------------|-------------------|---------------------|------------------|---------------------|------------------|------------------|--------------------|
| | 01.04.2020 | 01.04.2015 | Net change | 01.04.2020 | 01.04.2015 | Net change | 01.04.2020 | 01.04.2015 | Net change |
| | | | | | | | | | |
| Leasehold (Private) | 2,515,640 | 2,717,062 | (-201,422) | 5,696,094 | 4,703,102 | (+992,992) | 8,211,733 | 7,420,163 | (+791,5670) |
| Lump, high grade | 93,536 | 502,652 | (-409,116) | 662,563 | 272,374 | (+390,189) | 756,099 | 775,026 | (-18,927) |
| Lump, medium grade | 707,933 | 748,226 | (-40,293) | 1,920,101 | 1,793,020 | (+127,081) | 2,628,033 | 2,541,246 | (+86,787) |
| Lump, low grade | 167,013 | 129,268 | (+37,745) | 513,667 | 360,937 | (+152,730) | 680,680 | 490,205 | (+190,475) |
| Lump, unclassified grade | 210 | 248 | (-38) | 6,014 | 6,045 | (-31) | 6,224 | 6,294 | (-70) |
| Fines, high grade | - | 2,357 | (-2,357) | 2,053 | 2,498 | (-445) | 2,053 | 4,855 | (-2,802) |
| Fines, medium grade | 13,639 | 62,994 | (-49,355) | 26,303 | 132,454 | (-106,151) | 39,942 | 195,448 | (-155,506) |
| Fines, low grade | 77,069 | 200,570 | (-123,501) | 673,929 | 478,315 | (+195,614) | 750,998 | 678,885 | (+72,113) |
| Fines, unclassified grade | 490 | 982 | (-492) | 966 | 1,634 | (-668) | 1,456 | 2,616 | (-1,160) |
| Lumps & Fines, high grade | 190,830 | 177,986 | (+12,844) | 224,703 | 250,880 | (-26,177) | 415,533 | 428,866 | (-13,333) |
| Lumps & Fines, medium grade | 299,113 | 309,771 | (-10,658) | 468,095 | 371,099 | (+96,996) | 767,208 | 680,870 | (+86,338) |
| Lumps & Fines, low grade | 554,160 | 202,892 | 351,268 | 603,393 | 527,852 | (+75,541) | 1,157,553 | 730,744 | (+426,809) |
| Lumps & Fines, unclassified grade | 188,144 | 200,750 | (-12,606) | 120,534 | 180,515 | (-59,981) | 308,678 | 381,265 | (-72,587) |
| Black Iron Ore | - | - | - | 18,407 | 18,407 | No change | 18,407 | 18,407 | No change |
| Lumps low & medium grade | - | 14,788 | (-14,788) | - | 13,865 | (-13,865) | - | 28,653 | (-28,653) |
| Others | 23,905 | 30,934 | (-7,029) | 48,442 | 38,697 | (+9,745) | 72,347 | 69,631 | (+2,716) |
| Unclassified | 86,138 | 72,331 | (+13,807) | 144,686 | 75,593 | (+69,093) | 230,824 | 147,925 | (+82,899) |
| Not known | 1,569 | 4,434 | (-2,865) | 3,061 | 3,305 | (-244) | 4,630 | 7,739 | (-3,109) |
| Lumps, Fines & Blue Dust | 45,608 | 15,197 | (+30,411) | 28,107 | 4,810 | (+23,297) | 73,715 | 20,007 | (+53,708) |
| Unclassified grade | - | - | - | - | - | - | - | - | - |
| Beneficial grade | 66,283 | 40,681 | (+25,602) | 231,069 | 170,801 | (+60,268) | 297,352 | 211,482 | (+85,870) |
| Leasehold (Public) | 3,693,395 | 2,704,689 | (+988,706) | 3,759,967 | 5,086,487 | (-1,326,520) | 7,453,362 | 7,791,176 | (-337,814) |
| Lump, high grade | 738,649 | 921,723 | (-183,074) | 101,044 | 457,752 | (-356,708) | 839,693 | 1,379,475 | (-539,782) |
| Lump, medium grade | 724,652 | 692,925 | (+31,727) | 640,891 | 2,974,316 | (-2,333,425) | 1,365,543 | 3,667,241 | (-2,301,698) |
| Lump, low grade | 519,317 | 133,411 | (+385,906) | 457,524 | 249,675 | (+207,849) | 976,841 | 383,086 | (+593,755) |
| Lump, unclassified grade | - | - | - | - | 44,480 | (-44,480) | - | 44,480 | (-44,480) |
| Fines, high grade | 146,830 | 348,271 | (-201,441) | - | 146,697 | (-146,697) | 146,830 | 494,968 | (-348,138) |
| Fines, medium grade | 134,190 | 125,868 | (+8,322) | 275,445 | 492,666 | (-217,221) | 409,634 | 618,534 | (-208,900) |
| Fines, low grade | 71,232 | 109,693 | (-38,461) | 45,885 | 88,822 | (-42,937) | 117,117 | 198,515 | (-81,398) |
| Fines, unclassified grade | - | - | - | - | 40,000 | (-40,000) | - | 40,000 | (-40,000) |
| Lumps & Fines, high grade | 280,848 | 30,300 | (+250,548) | 135,350 | 27,677 | (+107,673) | 416,198 | 57,977 | (+358,221) |
| Lumps & Fines, medium grade | 717,311 | 288,797 | (+428,514) | 295,630 | 65,412 | (+230,218) | 1,012,941 | 354,209 | (+658,732) |
| Lumps & Fines, low grade | 144,384 | 7,120 | (+137,264) | 1,306,822 | 207,801 | (+1,099,021) | 1,451,206 | 214,921 | (+1,236,285) |
| Lumps & Fines, unclassified | - | 44,059 | (-44,059) | - | 142,541 | (-142,541) | - | 186,600 | (-186,600) |
| Lumps, Fines & Blue Dust | - | - | - | 1847 | - | (+1,847) | 1847 | - | (+1,847) |
| Low grade | - | - | - | - | - | - | - | - | - |
| Lumps, Fines & Blue Dust | 11,743 | - | (+11,743) | 301 | - | (+301) | 12,044 | - | (+12,044) |
| Unclassified grade | - | - | - | - | - | - | - | - | - |
| Beneficial grade | 204,238 | 2,522 | (+201,716) | 499,229 | 148,647 | (+350,582) | 703,467 | 151,169 | (+552,298) |

figures rounded off

Table – 2 : Total Resources of Iron Ore (Haematite) as on 01.04.2020 vis-a-vis 01.04.2015 (By States)

| State | Total Resources | | Net Change |
|--------------------------|-------------------|-------------------|----------------------|
| | (In '000 Tonnes) | | |
| | As on 01.04.2020 | As on 01.04.2015 | |
| All India : Total | 24,057,905 | 22,486,965 | (+) 1,570,940 |
| Andhra Pradesh | 395,616 | 341,062 | (+) 54,554 |
| Assam | 30,890 | 12,600 | (+)18,290 |
| Bihar | 55 | 55 | No Change |
| Chhattisgarh | 4,592,111 | 4,858,124 | (-) 266,013 |
| Goa | 1,197,557 | 1,189,313 | (+) 8,244 |
| Jharkhand | 4,710,146 | 5,286,417 | (-) 576,271 |
| Karnataka | 2,835,992 | 2,466,854 | (+) 369,138 |
| Madhya Pradesh | 356,999 | 329,963 | (+) 27,36 |
| Maharashtra | 301,544 | 294,103 | (+) 7,441 |
| Meghalaya | 225 | 225 | No Change |
| Odisha | 9,409,331 | 7,558,664 | (+) 1,850,667 |
| Rajasthan | 35,480 | 38,404 | (-) 2924 |
| Telangana | 105,627 | 53,181 | (+) 52,446 |
| Uttar Pradesh | 86,330 | 58,000 | (+) 28,330 |

figures rounded off.

Table - 3 : District wise Reserves/Resources of Iron Ore (Haematite) as on 01.04.2020

| State | District | (In '000 Tonnes) | | |
|--------------------------|-----------------------|------------------|---------------------|-------------------|
| | | Reserves | Remaining Resources | Total Resources |
| All India : Total | | 6,209,034 | 17,848,870 | 24,057,905 |
| Andhra Pradesh | | 44,744 | 350,872 | 395,616 |
| | Anantapur | 446 | 202,470 | 202,916 |
| | Cuddapah | 38,772 | 55,050 | 93,822 |
| | Guntur | - | 80,000 | 80,000 |
| | Krishna | - | 343 | 343 |
| | Kurnool | 4,499 | 12,138 | 16,636 |
| | Nellore | 1,028 | 760 | 1,788 |
| | Prakasam(Ongole H.Q.) | - | 112 | 112 |
| Assam | | - | 30,890 | 30,890 |
| | Dhubri | - | 18,290 | 18,290 |
| | Kokrajhar | - | 12,600 | 12,600 |
| Bihar | | - | 55 | 55 |
| | Bhagalpur | - | 55 | 55 |
| Chhattisgarh | | 1,593,732 | 2,998,379 | 4,592,111 |
| | Balod | 66,131 | 19,777 | 85,908 |
| | Bastar | - | 1,439,027 | 1,439,027 |
| | Dantewara | 1,469,149 | 1,154,487 | 2,623,636 |
| | Durg | - | 6,000 | 6,000 |
| | Kabirdham | - | 200,787 | 200,787 |
| | Kanker | 23,027 | 112,945 | 135,973 |
| | Narayanpur | 23,185 | 63,859 | 87,044 |
| | Rajnandgaon | 12,239 | 1,497 | 13,736 |

(Contd.)

National Mineral Inventory - An Overview

Table-3 (Concl.d.)

| State | District | Reserves | Remaining Resources | Total Resources |
|-----------------------|------------------|------------------|---------------------|------------------|
| Goa | | 117,235 | 1,080,322 | 1,197,557 |
| | North Goa | 26,754 | 589,087 | 615,841 |
| | South Goa | 90,482 | 491,235 | 581,716 |
| Jharkhand | | 534,677 | 4,175,469 | 4,710,146 |
| | Singhbhum (West) | 534,677 | 4,175,469 | 4,710,146 |
| Karnataka | | 1,043,212 | 1,792,781 | 2,835,992 |
| | Bagalkot | 19,543 | 15,480 | 35,023 |
| | Bellary | 810,439 | 1,181,640 | 1,992,078 |
| | Chikmagalur | - | 42,665 | 42,665 |
| | Chitradurga | 213,230 | 82,949 | 296,179 |
| | Dawangere | - | 62,400 | 62,400 |
| | Dharwar | - | 12,485 | 12,485 |
| | Gadag | - | 10,202 | 10,202 |
| | Haveri | - | 78,810 | 78,810 |
| | North Kanara | - | 108,323 | 108,323 |
| | Shimoga | - | 20,450 | 20,450 |
| | Tumkur | - | 177,377 | 177,377 |
| Madhya Pradesh | | 54,129 | 302,870 | 356,999 |
| | Betul | - | 10 | 10 |
| | Chhatarpur | 725 | 5,566 | 6,291 |
| | Gwalior | 7,116 | 23,068 | 30,184 |
| | Jabalpur | 45,076 | 167,369 | 212,445 |
| | Katni | 432 | 105,631 | 106,063 |
| | Sagar | 780 | 1,194 | 1,974 |
| | Satna | - | 32 | 32 |
| Maharashtra | | 15,241 | 286,304 | 301,544 |
| | Chandrapur | 958 | 2,253 | 3,210 |
| | Gadchiroli | 10 | 200,123 | 200,133 |
| | Sindhudurg | 14,273 | 83,928 | 98,201 |
| Meghalaya | | - | 225 | 225 |
| | Khasi Hills East | - | 225 | 225 |
| Odisha | | 2,798,749 | 6,610,582 | 9,409,331 |
| | Dhenkanal | - | 1,120 | 1,120 |
| | Jajpur | - | 3,510 | 3,510 |
| | Keonjhar | 1,617,796 | 3,573,322 | 5,191,119 |
| | Mayurbhanj | 16,692 | 52,966 | 69,658 |
| | Nawrangpur | - | 2,650 | 2,650 |
| | Sambalpur | - | 50,000 | 50,000 |
| | Sundargarh | 1,164,261 | 2,927,014 | 4,091,275 |
| Rajasthan | | 7,314 | 28,166 | 35,480 |
| | Alwar | - | 1,415 | 1,415 |
| | Dausa | - | 3,388 | 3,388 |
| | Jaipur | 2,595 | 7,860 | 10,455 |
| | Jhunjhunu | 3,946 | 3,717 | 7,663 |
| | Sikar | 773 | 385 | 1,159 |
| | Udaipur | - | 11,400 | 11,400 |
| Telangana | | - | 105,627 | 105,627 |
| | Khammam | - | 78,387 | 78,387 |
| | Karimnagar | - | 27,240 | 27,240 |
| Uttar Pradesh | | - | 86,330 | 86,330 |
| | Jhansi | - | 20,000 | 20,000 |
| | Lalitpur | - | 38,000 | 38,000 |
| | Sonbhadra | - | 28,330 | 28,330 |

figures rounded off

2.3 IRON ORE (Magnetite)

Introduction

Iron ore is the basic raw material in iron & steel industry. Magnetite is one of the principal minerals of iron ore occurring in the form of oxides (Fe_3O_4). The important magnetite deposits are mainly reported from Prakasam (Ongole) district of Andhra Pradesh, South Goa district of Goa, Bababudan, Gargarikal, Kudremukh deposits in Chikmangalur, Hassan, North Kanara, Shimoga districts of Karnataka, Bhilwara district of Rajasthan, Dharmapuri, Salem, Thiruvannamalai districts of Tamil Nadu.

Basis of Grade Classification

The grade classification adopted in the inventory as on 01.04.2020 is in line with the recommendations of the Committee constituted for revision of End use Grade Classification with regard to the Possible Optimum Industrial Use (September, 2004). The classification is as follows:

- | | |
|------------------|--|
| 1. Metallurgical | Average (+) 38% Fe |
| 2. Coal Washery | 64% Fe (min) |
| 3. Foundry | Actual use reported by exploitation agencies. |
| 4. Beneficiable | Fe 15% (min) |
| 5. Unclassified | Minimum & maximum range of values of chemical constituents are too wide to be fitted into any of the above grades. |
| 6. Not Known | The information on chemical constituents is not available or potential/actual use is not reported. |
| 7. Others | Those grades which could not be classified into above grades. |

Basis of Categorisation of Resources

As per United Nations Framework Classification (UNFC), total resources are broadly classified into 'reserves' and 'remaining resources' category.

According to the norms of this system, 'reserves' of iron ore (magnetite) have been placed under proved(111) and probable (121) & (122) categories. The

'remaining resources' have been placed under feasibility (211), pre-feasibility (221) & (222), measured (331), indicated (332), inferred (333) and reconnaissance (334) categories.

Salient Features of the Inventory

The total resources of iron ore (magnetite) in the country as on 01.04.2020 are estimated at 11,228 million tonnes, of these about 203 million tonnes (2%) fall under 'reserve' category and the balance about 11,025 million tonnes (98%) under 'remaining resources' category. About 95% resources are in freehold areas and 5 % resources are in leasehold areas.

All India scenario of iron ore (magnetite) reserves, remaining resources and total resources as on 01.04.2020 vis-a-vis 01.04.2015 have been given in Tables - 1 and 2. The tables give an idea about the significant changes in terms of increase or decrease of resources as per lease status, grades and states. In Table-3 district wise reserves/resources as on 01.04.2020 have been given.

Of the total resources of Iron Ore (Magnetite) in the country, metallurgical grade is about 2,239 million tonnes (20%), coal washery grade 243 million tonnes (2%), unclassified 8,347 million tonnes (74%) and not-known 353 million tonnes(3%). Negligible quantity of resources is under beneficiable, foundary and others grade. Of the total metallurgical grade, about 89% of magnetite has been estimated in 2 states namely Karnataka (65%) and Rajasthan (23%). The balance 11% of metallurgical grade has been reported from Andhra Pradesh, Assam, Bihar, Goa, Jharkhand, Kerala, Maharashtra and Tamil Nadu. The coal washery grade magnetite are very limited and have been reported from Jharkhand & Rajasthan. Further, about 79% resources of not known grade has been reported from Karnataka state alone, and more than 89% resources of unclassified grade are shared by two states viz Andhra Pradesh & Karnataka.

Country's 94% resources of Iron Ore (magnetite) are located in four states namely Karnataka credited with 7,802 million tonnes (69%) followed by Andhra Pradesh 1,472 million tonnes (13%) , Rajasthan 795 million tonnes (7%) and Tamil Nadu 529 million tonnes (5%). Besides, minor resources have been estimated in Assam, Bihar, Chhattisgarh, Goa, Jharkhand, Kerala, Maharashtra, Meghalaya, Nagaland, Odisha & Telangana.

Table - 1 : Reserves/Resources of Iron Ore (Magnetite) as on 01.04.2020 vis-à-vis 01.04.2015
(By Lease Status/Grade)

| Lease status/Grade | Reserves | | | Remaining resources | | | Total resources | | |
|----------------------------|------------------|---------------|-------------------|---------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| | 01.04.2020 | 01.04.2015 | Net change | 01.04.2020 | 01.04.2015 | Net change | 01.04.2020 | 01.04.2015 | Net change |
| | (In '000 Tonnes) | | | | | | | | |
| All India : Total | 202,823 | 52,699 | (+)150,124 | 11,024,791 | 10,736,455 | (+)288,336 | 11,227,614 | 10,789,155 | (+)438,459 |
| Metallurgical | 315 | 11,663 | (-)11,348 | 2,238,244 | 2,185,521 | (+)52,723 | 2,238,559 | 2,197,183 | (+)41,376 |
| Coal Washery | 118,678 | 32,629 | (+)86,049 | 1,24,368 | 65,636 | (+)58,732 | 243,045 | 98,265 | (+)144,780 |
| Foundry | - | - | - | 836 | 836 | No change | 836 | 836 | No change |
| Others | 1,351 | 1,192 | (+)159 | 6,923 | 6,633 | (+)290 | 8,274 | 7,826 | (+)448 |
| Unclassified | 82,479 | 6,606 | (+)75,873 | 8,264,559 | 8,197,449 | (+)67,110 | 8,347,038 | 8,204,056 | (+)142,982 |
| Not Known | - | 609 | (-)609 | 353,064 | 280,379 | (+)72,685 | 353,064 | 280,989 | (+)72,075 |
| Beneficiable | - | - | - | 36,798 | - | (+)36,798 | 36,798 | - | (+)36,798 |
| Freehold | - | - | - | 10,684,581 | 10,142,047 | (+)542,534 | 10,684,581 | 10,142,047 | (+)542,534 |
| Metallurgical | - | - | - | 2,231,637 | 1,877,893 | (+)353,744 | 2,231,637 | 1,877,893 | (+)353,744 |
| Coal Washery | - | - | - | 5,735 | 7,427 | (-)1,692 | 5,735 | 7,427 | (-)1,692 |
| Foundry | - | - | - | 836 | 381 | (+)455 | 836 | 381 | (+)455 |
| Others | - | - | - | 43 | 43 | No change | 43 | 43 | No change |
| Unclassified | - | - | - | 8,129,423 | 7,976,208 | (+)153,215 | 8,129,423 | 7,976,208 | (+)153,215 |
| Not Known | - | - | - | 280,109 | 280,095 | (+)14 | 280,109 | 280,095 | (+)14 |
| Beneficiable | - | - | - | 36,798 | - | (+)36,798 | 36,798 | - | (+)36,798 |
| Leasehold (Private) | 202,190 | 51,878 | (+)150,312 | 268,902 | 178,311 | (+)90,591 | 471,091 | 230,189 | (+)240,902 |
| Metallurgical | - | 11,287 | (-)11,287 | 6,583 | 6,530 | (+)53 | 6,583 | 17,817 | (-)11,234 |
| Coal Washery | 118,678 | 32,629 | (+)86,049 | 118,633 | 58,210 | (+)60,423 | 237,311 | 90,838 | (+)146,473 |
| Foundry | - | - | - | - | 455 | (-)455 | - | 455 | (-)455 |
| Others | 1,351 | 1,192 | (+)159 | 6,880 | 6,590 | (+)290 | 8,231 | 7,783 | (+)448 |
| Unclassified | 82,161 | 6,160 | (+)76,001 | 1,35,028 | 106,241 | (+)28,787 | 217,189 | 112,402 | (+)104,787 |
| Not Known | - | 609 | (-)609 | 1,779 | 284 | (+)1,495 | 1,779 | 894 | (+)885 |
| Leasehold (Public) | 633 | 822 | (-)189 | 71,309 | 416,097 | (-)344,788 | 71,942 | 416,919 | (-)344,977 |
| Metallurgical | 315 | 376 | (-)61 | 24 | 301,097 | (-)301,073 | 339 | 301,473 | (-)301,134 |
| Unclassified | 318 | 446 | (-)128 | 109 | 115,000 | (-)114,891 | 427 | 115,446 | (-)115,019 |
| Not Known | - | - | - | 71,176 | - | (+)71,176 | 71,176 | - | (+)71,176 |

figures rounded off.

All India resources of iron ore (magnetite) have been increased by about 438 million tonnes(4%) as compared to previous inventory as on 01.04.2015. The overall increase in resources was mainly due to addition of 8 new freehold and one leasehold private deposits with 160 million tonnes resources and re-assessment of resources in existing deposits. In Andhra Pradesh, an increase of 80 million tonnes was reported due to addition of a new freehold deposit and upward revision of resources in leasehold public deposit.

In Bihar, an increase of about 47 million tonne was recorded due to addition of a new freehold deposit and re-estimation in 2 freehold deposits. Resources of Chattisgarh increased by 95 million tonnes due to addition of a new leasehold private deposit and upward revision of resources in a leasehold private deposit. In Maharashtra, resources increased by 0.9 million tonnes due to addition of a new freehold deposits and upward revision in resources of a existing deposit. The Rajasthan state reported an increase of 178 million tonnes due to addition of two new freehold deposits and upward revision in resources of existing leasehold

deposits. About 22 million tonnes increase in resources of Tamil Nadu was reported due to addition of a new freehold deposit. About 16 million tonne resources increased in Telangana due to addition of 2 new freehold deposits. A negligible increase in resources quantity was reported in Odisha state due to upward revision of resources of a leasehold private deposit. Resources has not been changed in Assam, Goa Jharkhand, Kerala, Nagaland and Meghalaya.

Of the total resources of iron ore (magnetite), about 6,383 million tonnes (57%) have been estimated under inferred category and 696 million tonnes (6%) under reconnaissance category. These resources are based on a very limited and preliminary exploration and require further exploration to enhance the confidence level of resource position of iron ore (magnetite) in the country.

A total of 159 deposits of Iron ore (magnetite) have been covered in the NMI as on 01.04.2020. Out of which, 123 deposits in freehold, 32 deposits in leasehold private and 04 deposits are in leasehold public areas.

Table – 2 : Total Resources of Iron Ore (Magnetite) as on 01.04.2020 vis-à-vis 01.04.2015 (By States)

| State | Total Resources | | Net Change |
|--------------------------|-------------------|-------------------|--------------------|
| | | | |
| | As on 01.04.2020 | As on 01.04.2015 | |
| All India : Total | 11,227,614 | 10,789,155 | (+) 438,459 |
| Andhra Pradesh | 1,472,383 | 1,392,098 | (+) 80,285 |
| Assam | 15,380 | 15,380 | No Change |
| Bihar | 49,439 | 2,659 | (+) 46,780 |
| Chhattisgarh | 105,921 | 11,225 | (+) 94,696 |
| Goa | 266,336 | 266,336 | No Change |
| Jharkhand | 10,667 | 10,667 | No Change |
| Karnataka | 7,802,171 | 7,802,190 | (-) 19 |
| Kerala | 83,435 | 83,435 | No Change |
| Maharashtra | 1,788 | 885 | (+) 903 |
| Meghalaya | 3,380 | 3,380 | No Change |
| Nagaland | 5,280 | 5,280 | No Change |
| Odisha | 242 | 152 | (+) 90 |
| Rajasthan | 794,926 | 616,916 | (+) 178,010 |
| Tamil Nadu | 528,901 | 507,037 | (+) 21,864 |
| Telangana | 87,366 | 71,514 | (+) 15,852 |

figures rounded off.

Table - 3 : District wise Reserves/Resources of Iron Ore (Magnetite) as on 01.04.2020

(In '000 Tonnes)

| State | District | Reserves | Remaining Resources | Total Resources |
|--------------------------|-----------------------|----------------|---------------------|-------------------|
| All India : Total | | 202,823 | 11,024,791 | 11,227,614 |
| Andhra Pradesh | | - | 1,472,383 | 1,472,383 |
| | Chittoor | - | 9,180 | 9,180 |
| | Prakasam (Ongole H.Q) | - | 1,463,203 | 1,463,203 |
| Assam | | - | 15,380 | 15,380 |
| | Dhubri | - | 4,240 | 4,240 |
| | Goalpara | - | 8,900 | 8,900 |
| | Kokrajhar | - | 2,240 | 2,240 |
| Bihar | | - | 49,439 | 49,439 |
| | Gaya | - | 589 | 589 |
| | Jahanabad | - | 450 | 450 |
| | Jamui | - | 48,400 | 48,400 |
| Chhattisgarh | | 75,876 | 30,045 | 105,921 |
| | Kanker | 21,181 | 3,150 | 24,331 |
| | Rajnandgaon | 54,695 | 26,895 | 81,590 |
| Goa | | 4,990 | 261,345 | 266,336 |
| | North Goa | 3,251 | 2,330 | 5,581 |
| | South Goa | 1,739 | 259,015 | 260,755 |
| Jharkhand | | - | 10,667 | 10,667 |
| | Gumla | - | 147 | 147 |
| | Hazaribagh | - | 32 | 32 |
| | Latehar | - | 672 | 672 |
| | Palamau | - | 6,185 | 6,185 |
| | Singhbhum (East) | - | 3,630 | 3,630 |
| Karnataka | | 318 | 7,801,853 | 7,802,171 |
| | Chikmagalur | - | 6,055,299 | 6,055,299 |
| | Hassan | 318 | 574,189 | 574,507 |
| | North Kanara | - | 152,064 | 152,064 |
| | Shimoga | - | 1,012,951 | 1,012,951 |
| | South Kanara | - | 7,350 | 7,350 |
| Kerala | | - | 83,435 | 83,435 |
| | Kozhikode | - | 79,225 | 79,225 |
| | Malappuram | - | 4,210 | 4,210 |
| Maharashtra | | 578 | 1,210 | 1,788 |
| | Chandrapur | - | 500 | 500 |
| | Gondia | 578 | 710 | 1,288 |
| Meghalaya | | - | 3,380 | 3,380 |
| | Garo Hills (East) | - | 3,380 | 3,380 |
| Nagaland | | - | 5,280 | 5,280 |
| | Kiphire | - | 5,280 | 5,280 |
| Odisha | | - | 242 | 242 |
| | Keonjhar | - | 43 | 43 |
| | Mayurbhanj | - | 199 | 199 |
| Rajasthan | | 121,060 | 673,866 | 794,926 |
| | Bhilwara | 118,678 | 667,031 | 785,709 |
| | Jhunjhunu | 2,017 | 2,559 | 4,576 |
| | Sikar | 365 | 4,276 | 4,642 |
| Tamil Nadu | | - | 528,901 | 528,901 |
| | Dharmapuri | - | 109,700 | 109,700 |
| | Erode | - | 6,055 | 6,055 |
| | Namakkal | - | 25,161 | 25,161 |
| | Nilgiris | - | 7,517 | 7,517 |
| | Salem | - | 253,668 | 253,668 |
| | Thiruvannamala | - | 126,000 | 126,000 |
| | Tiruchirapalli | - | 50 | 50 |
| | Villupuram | - | 750 | 750 |
| Telangana | | - | 87,366 | 87,366 |
| | Adilabad | - | 31,500 | 31,500 |
| | Karimnagar | - | 14,650 | 14,650 |
| | Mahbubnagar | - | 1,202 | 1,202 |
| | Warangal | - | 40,014 | 40,014 |

figures rounded off

2.4 MANGANESE ORE

Introduction

Manganese ore is an indispensable raw material in the manufacture of steel where it is used in the form of ferro-manganese and also as a direct feed to the blast furnace. The important non-metallurgical uses of manganese ore are in the manufacture of dry battery and chemicals. In agriculture, it is used as a micro-nutrient for the plants. Manganese is also used in the manufacture of drier for paints and varnishes. It has important application in ceramic and glass industry as colouring agent. Manganese is also known for its decolorising properties. Chief manganese ore of commercial importance are (i) Pyrolusite (MnO_2 , Mn 63.2%); (ii) Psilomalane (manganese oxide, containing water and varying amount of oxides of Ba, K and Na as impurities; Mn commonly 45-60%) (iii) Manganite ($Mn_2O_3 \cdot H_2O$, Mn 62.4%); and (iv) Braunitz ($3Mn_2O_3$, Mn SiO_3 , Mn about 62% and SiO_2 about 10%).

The important manganese ore deposits in India mainly occur as bedded sedimentary (metamorphosed) deposits associated with Gondite series (Archean) in Madhya Pradesh (Balaghat, Chhindwara, Jabalpur Jhabua and Katni districts), Maharashtra (Bhandara and Nagpur districts), Gujarat (Panchmahal and Chhota Udaipur districts), Odisha (Sundargarh district) and with Kodurite series (Archean) (Koraput district), Andhra Pradesh (Srikakulam and Vizianagaram districts) and Telangana (Adilabad district). Manganese ore also occurs in the form of lateritoid deposits. These ores contain appreciable quantities of iron and vary from manganese ore to iron ores through every gradation. Such deposits occur in Jharkhand (Singhbhum West district), Karnataka (Belgaon, Bellary, Dawangere, Gadag, North Kanara, Tumkur, Chitradurga and Shimoga districts), Odisha (Keonjhar district), Rajasthan (Banswara and Jaipur districts) and West Bengal (Midnapur district). Goa also has important deposits of manganese ore.

Basis of Grade Classification

In the inventory as on 01.04.2020 resources of manganese ore have been classified into the following grades:

- | | |
|-------------------------------|---|
| 1. Battery/ Chemical grade | MnO_2 : 72 % (min) Cu, Pb, Cr & Ni : in traces |
| 2. Blast Furnace (BF) | Mn : 25 to below 35% P : 0.2% (max) |

Al_2O_3 : 7.5% (max)
 SiO_2 : 13% (max)

- | | |
|--|--|
| 3. Ferro Manganese | Mn : 38% (min) P : 0.2% (max) Mn : Fe ratio 2.5 : 1 (min), 7:1 (max) |
| 4. Medium Grade | Mn : 35 to 37% |
| 5. Mixed Grade | |
| 6. Ferro-Manganese & Medium Mixed Grade | |
| 7. Medium & B.F. Mixed grade | |
| 8. Ferro -Manganese, Medium & B.F. Mixed grade. | |
| 9. Ferro-manganese & B.F Mixed Grade | |
| 10. Low | Mn (+) 18% to (-) 25% |
| 11. Beneficiable | Mn : 10% (min.) |
| 12. Others | Estimation for marketable grades which could not be classified into above grades. |
| 13. Unclassified | The range of maximum and minimum value of chemical constituents is too wide to fit into any of the above grades. |
| 14. Not known | The information on chemical constituents are not available or potential/ actual use is not reported. |

Basis of Categorisation of Resources

As per United Nations Framework Classification (UNFC), total resources are broadly classified into 'reserves' and 'remaining resources' category.

According to the norms of this system, 'reserves'

of manganese ore have been placed under proved (111) and probable (121) & (122) categories. The 'remaining resources' have been placed under feasibility (211), pre-feasibility (221) & (222), measured (331), indicated (332), inferred (333) and reconnaissance (334) categories.

Salient Features of the Inventory

The total resources of manganese ore in the country as on 01.04.2020 are estimated at about 504 million tonnes; of these total resources, 75 million tonnes (15%) falls under 'reserve' category and balance 429 million tonnes (85%) are under 'remaining resource' category.

Out of the total resources, about 166.86 million tonnes (33%) have been placed in freehold, 197.92 million tonnes (39%) in leasehold private and 138.84 million tonnes (28%) in leasehold public areas.

All India scenario of manganese ore reserves, remaining resources and total resources as on 01.04.2020 vis-a-vis 01.04.2015 have been given in Tables - 1 and 2. The tables give an idea about the significant changes in terms of increase or decrease of resources as per lease status, grade and states. In Table-3, district-wise reserves/ resources as on 01.04.2020 have been given.

In the total resources, BF grade constitutes 148.44 million tonnes (29%); Ferro manganese, medium and BF mixed grade 84.21 million tonnes (17%); Medium grade 34.43 million tonnes (7%); Medium and BF mixed grade 51.08 million tonnes (10%); Ferro-manganese 42.07 million tonnes (8%); Low grade (-25% Mn) 30.76 million tonnes (6%); Ferro-manganese and BF mixed 21.24 million tonnes (4%) and Mixed grade 25.37 million tonnes (5%) and beneficiable 29.33 million tonnes (6%). About 36.54 million tonnes (7%) resources are placed under unclassified, not known and others grade, due to paucity of data for classifying these resources into any specific end use grade. A meagre quantity of 0.2 million tonnes is placed under Battery/chemical grade.

A comparison of grade wise resources as on 01.04.2020 vis-a-vis 01.04.2015 shows that there is an increase in resources in almost all grades except medium, unclassified and ferromanganese & BF grade.

The state of Odisha has been endowed with the

largest share of total resources of manganese ore in the country at 172 million tonnes (34%). These resources have mainly been distributed in 3 districts, namely Keonjhar (116 million tonnes), Sundergarh (52 million tonnes) and Bolangir (2 million tonnes).

Karnataka has about 124 million tonnes (25%) resources estimated in nine districts, major being Chitradurga (31 million tonnes), North Kanara (29 million tonnes), Bellary (23 million tonnes), Tumkur (30 million tonnes), Shimoga (4 million tonnes) and Belgaum district (3 million tonnes).

In Madhya Pradesh about 60 million tonnes (12%) of resources are estimated mainly in Balaghat (47 million tonnes), Jabalpur (10 million tonnes) and Chhindwara (2 million tonnes) districts.

Maharashtra has 59 million tonnes (12%) resources estimated in Nagpur (36 million tonnes) and Bhandara (23 million tonnes) districts.

In Goa about 35 million tonnes (7%) of resources are estimated in South Goa (27 million tonnes) and North Goa (8 million tonnes) districts.

The balance 10% resources are accounted together by other states namely Andhra Pradesh, Gujarat, Jharkhand, Rajasthan, Telangana and West Bengal.

An overall increase of about 7.75 million tonnes resources has been recorded in the inventory as on 01.04.2020 as compared to earlier inventory as on 01.04.2015.

The total resources of Odisha state has been decreased by about 45 million tonnes in inventory as on 01.04.2020 as compared to previous inventory 2015. It is noticed that the decreased in resources was mainly due to downward revision in resources of leasehold private deposits despite addition of five new deposits with 11 million tonnes resources (three leasehold private and two freehold deposits).

In the state of Goa, a minor increase of 0.08 million tonnes of resources is reported from South Goa district due to re-estimation of resources in two private leasehold deposits.

In Karnataka, an addition of about 12.91 million tonnes of resources is recorded in inventory 2020; of which, about 6.29 million tonnes increase was due to addition of four new freehold deposits.

National Mineral Inventory - An Overview

Table - 1 : Reserves/Resources of Manganese Ore as on 01.04.2020 vis-à-vis 01.04.2015
(By Lease Status/Grade)

| Lease status/Grade | Reserves | | Remaining resources | | Total resources | | (In '000 Tonnes) |
|--------------------------|---------------|---------------|---------------------|----------------|-----------------|----------------|------------------|
| | 01.04.2020 | 01.04.2015 | 01.04.2020 | 01.04.2015 | 01.04.2020 | 01.04.2015 | |
| | Net change | | Net change | | Net change | | |
| All India : Total | 75,041 | 93,475 | 428,583 | 402,399 | 503,624 | 495,874 | (+7,750) |
| Battery/Chemical | - | - | 167 | 167 | 167 | 167 | No change |
| Ferro-Manganese | 16,816 | 11,237 | 25,251 | 25,282 | 42,067 | 36,520 | (+5,547) |
| Medium | 3,850 | 3,274 | 30,581 | 49,409 | 34,430 | 52,683 | (-18,253) |
| BF | 9,892 | 11,235 | 138,545 | 129,662 | 148,437 | 140,897 | (+7,540) |
| Mixed | 1,517 | 1,512 | 23,848 | 19,518 | 25,365 | 21,030 | (+4,335) |
| Medium & BF Mixed | 6,207 | 9,800 | 44,877 | 37,957 | 51,084 | 47,757 | (+3,327) |
| Ferro Manganese, | | | | | | | |
| Medium & BF mixed | 24,512 | 37,844 | 59,696 | 41,878 | 84,208 | 79,723 | (+4,485) |
| Ferro Manganese & BF | 2,039 | 2,618 | 19,197 | 23,280 | 21,236 | 25,898 | (-4,662) |
| Low (-) 25 % Mn | 2,271 | 1,905 | 28,485 | 27,386 | 30,756 | 29,291 | (+1,465) |
| Others | 4,167 | 8,798 | 14,772 | 8,780 | 18,939 | 17,578 | (+1,361) |
| Unclassified | 1,265 | 1,370 | 14,160 | 22,115 | 15,425 | 23,484 | (-8,059) |
| Not Known | - | 95 | 2,178 | 1,400 | 2,178 | 1,495 | (+683) |
| Beneficiable | 2,506 | 3,786 | 26,826 | 15,565 | 29,332 | 19,351 | (+9,981) |
| Freehold : Total | - | - | 166,861 | 121,697 | 166,861 | 121,697 | (+45,164) |
| Battery/Chemical | - | - | 142 | 142 | 142 | 142 | No Change |
| Ferro-Manganese | - | - | 12,538 | 9,654 | 12,538 | 9,654 | (+2,884) |
| Medium | - | - | 15,335 | 12,735 | 15,335 | 12,735 | (+2,600) |
| BF | - | - | 68,997 | 57,848 | 68,997 | 57,848 | (+11,149) |
| Mixed | - | - | 17,733 | 9,285 | 17,733 | 9,285 | (+8,448) |
| Medium & BF Mixed | - | - | 13,277 | 13,277 | 13,277 | 13,277 | No Change |
| Ferro Manganese, | | | | | | | |
| Medium & BF mixed | - | - | 3,408 | 3,408 | 3,408 | 3,408 | No Change |
| Ferro Manganese & BF | - | - | 3,667 | 3,614 | 3,667 | 3,614 | (+53) |
| Low (-) 25 % Mn | - | - | 6,325 | 5,280 | 6,325 | 5,280 | (+1,045) |
| Others | - | - | 859 | 560 | 859 | 560 | (+299) |
| Beneficiable | - | - | 16,524 | - | 16,524 | - | (+16,524) |

(Contd.)

National Mineral Inventory - An Overview

Table-1 (Concld.)

| Lease status/Grade | Reserves | | | Remaining resources | | | Total resources | | |
|----------------------------|---------------|---------------|------------------|---------------------|----------------|-------------------|-----------------|----------------|-------------------|
| | 01.04.2020 | 01.04.2015 | Net change | 01.04.2020 | 01.04.2015 | Net change | 01.04.2020 | 01.04.2015 | Net change |
| | | | | | | | | | |
| Unclassified | - | - | - | 6,131 | 4,607 | (+)1,524 | 6,131 | 4,607 | (+)1,524 |
| Not Known | - | - | - | 1,927 | 1,288 | (+)639 | 1,927 | 1,288 | (+)639 |
| Leasehold (Private) | 41,251 | 59,760 | (-)18,509 | 156,673 | 200,443 | (-)43,770 | 197,924 | 260,203 | (-)62,279 |
| Battery/Chemical | - | - | - | 8 | 8 | No change | 8 | 8 | No change |
| Ferro-Manganese | 16,102 | 10,478 | (+)5,624 | 11,307 | 14,928 | (-)3,621 | 27,409 | 25,405 | (+)2,004 |
| Medium | 3,850 | 3,274 | (+)576 | 14,670 | 36,139 | (-)21,469 | 18,519 | 39,414 | (-)20,895 |
| BF | 7,881 | 10,187 | (-)2,306 | 50,943 | 53,275 | (-)2,332 | 58,824 | 63,461 | (-)4,637 |
| Mixed | 1,517 | 1,512 | (+)5 | 6,115 | 9,958 | (-)3,843 | 7,633 | 11,470 | (-)3,837 |
| Medium & BF Mixed | 3,168 | 2,986 | (+)182 | 15,796 | 15,582 | (+)214 | 18,964 | 18,568 | (+)396 |
| Ferro Manganese, | | | | | | | | | |
| Medium & BF mixed | - | 15,641 | (-)15,641 | 11,106 | 10,442 | (+)664 | 11,106 | 26,083 | (-)14,977 |
| Ferro Manganese & BF | 2,039 | 2,618 | (-)579 | 15,530 | 19,666 | (-)4,136 | 17,569 | 22,284 | (-)4,715 |
| Low (-) 25 % Mn | 1,234 | 1,154 | (+)80 | 7,953 | 8,100 | (-)147 | 9,187 | 9,254 | -67 |
| Others | 4,167 | 8,798 | (-)4,631 | 13,899 | 8,206 | (+)5,693 | 18,066 | 17,005 | (+)1,061 |
| Unclassified | 1,265 | 1,370 | (-)105 | 6,204 | 15,682 | (-)9,478 | 7,469 | 17,052 | (-)9,583 |
| Not Known | - | 95 | (-)95 | 242 | 102 | (+)140 | 242 | 198 | (+)44 |
| Beneficiable | 28 | 1,648 | (-)1,620 | 2,899 | 8,354 | (-)5,455 | 2,927 | 10,002 | (-)7,075 |
| Leasehold (Public) | 33,790 | 33,715 | (+)75 | 105,049 | 80,259 | (+)24,790 | 138,839 | 113,974 | (+)24,865 |
| Battery/Chemical | - | - | - | 17 | 17 | No change | 17 | 17 | No change |
| Ferro-Manganese | 714 | 760 | (-)46 | 1,406 | 701 | (+)705 | 2,120 | 1,461 | (+)659 |
| Medium | - | - | - | 576 | 535 | (+)41 | 576 | 535 | (+)41 |
| BF | 2,011 | 1,049 | (+)962 | 18,605 | 18,539 | (+)66 | 20,616 | 19,588 | (+)1,028 |
| Mixed | - | - | - | - | 275 | (-)275 | - | 275 | (-)275 |
| Medium & BF Mixed | 3,039 | 6,814 | (-)3,775 | 15,804 | 9,098 | (+)6,706 | 18,843 | 15,912 | (+)2,931 |
| Ferro Manganese, | | | | | | | | | |
| Medium & BF mixed | 24,512 | 22,203 | (+)2,309 | 45,182 | 28,028 | (+)17,154 | 69,694 | 50,232 | (+)19,462 |
| Low (-) 25 % Mn | 1,037 | 751 | (+)286 | 14,207 | 14,006 | (+)201 | 15,244 | 14,757 | (+)487 |
| Others | - | - | - | 14 | 14 | No change | 14 | 14 | No change |
| Unclassified | - | - | - | 1,825 | 1,825 | No change | 1,825 | 1,825 | No change |
| Not Known | - | - | - | 10 | 10 | No change | 10 | 10 | No change |
| Beneficiable | 2,478 | 2,138 | (+)340 | 7,403 | 7,211 | (+)192 | 9,881 | 9,349 | (+)532 |

figures rounded off.

In Maharashtra, a net increase of about 22 million tonnes resources have been recorded which includes 1.62 million tonnes due to addition of two new freehold, three new leasehold private and one new leasehold public deposits. The rest of the increase in resources was mainly recorded in leasehold private deposits.

In Madhya Pradesh, a net increase of about 2 million tonnes resources have been recorded. About 3 million tonnes increased due to addition of four new (one freehold & three leasehold private) deposits and 6 million tonnes increased due to re-estimation of resources in sixteen leasehold private and two leasehold public deposits. Nearly 7 million tonnes of resources decreased due to re-estimation of resources in leasehold private and public deposits.

In Telangana, a net increase of about 3 million tonnes has been recorded due to addition of four new (one freehold & 3 leasehold private) deposits and re-estimation in 3 leasehold private deposits.

In Andhra Pradesh, a net increase of about 12.20 million tonnes resources have been recorded. Which includes 7.94 million tonnes due to addition of fifteen new (one freehold & fourteen leasehold private) deposits. The rest of the increase was accounted by upward revision of resources in existing leasehold deposits (both private and public).

In Rajasthan, about 3.37 million tonnes of resources decreased due to re-estimation in resources of one leasehold private deposit.

In Jharkhand, a net increase of about 3.12 million

tonnes resources have been recorded which includes 0.08 million tonnes of resources due to addition of one new freehold deposit. An increase of 4.60 million tonnes resources recorded due to re-estimation of resources in two freehold deposits and one each deposit in private & public sector. However, nearly 1.56 million tonnes decreased due to re-estimation of resources in one deposit each in freehold, private and public sector.

Manganese resources are also reported from the states of Gujarat and West Bengal, where it shows no significant change in resources as compared to earlier inventory of 2015.

Total 39 new deposits were added during the five year span of National Mineral Inventory i.e. from 01-04-2015 to 01-04-2020, which include 26 leasehold private, 12 freehold and 1 leasehold public deposits. This has resulted in a cumulative addition of about 25 million tonnes of resources in current inventory.

A sizeable quantity of the total resources of manganese ore constituting about 130 million tonnes (26%), has been estimated under inferred and reconnaissance categories. These resources are based on a very limited and preliminary exploration. A detailed exploration in these areas may improve the confidence level of resources.

A total of 731 deposits have been covered in the inventory as on 01.04.2020. Out of this, 333 deposits are in freehold and 398 deposits in leasehold (364 leasehold - private and 34 leasehold - public).

Table – 2 : Total Resources of Manganese Ore as on 01.04.2020 vis-à-vis 01.04.2015 (By States)

| State | Total Resources | | Net Change |
|--------------------------|------------------|------------------|------------------|
| | | | |
| | As on 01.04.2020 | As on 01.04.2015 | |
| All India : Total | 503,624 | 495,874 | (+) 7,750 |
| Andhra Pradesh | 29,844 | 17,645 | (+) 12,199 |
| Goa | 34,501 | 34,416 | (+) 85 |
| Gujarat | 2,875 | 2,888 | (-) 13 |
| Jharkhand | 14,749 | 11,629 | (+) 3,120 |
| Karnataka | 123,972 | 111,064 | (+) 12,908 |
| Madhya Pradesh | 60,057 | 57,713 | (+) 2,344 |
| Maharashtra | 59,036 | 36,619 | (+) 22,417 |
| Odisha | 171,528 | 216,403 | (-) 44,875 |
| Rajasthan | 2,359 | 5,727 | (-) 3,368 |
| Telangana | 4,503 | 1,568 | (+) 2,935 |
| West Bengal | 200 | 200 | No Change |

figures rounded off.

Table -3 : District-wise Reserves/Resources of Manganese Ore as on 01.04.2020

(In '000 Tonnes)

| State Name | District Name | Reserves | Remaining Resources | Total Resources |
|--------------------------|------------------|---------------|---------------------|-----------------|
| All India : Total | | 75,042 | 428,583 | 503,624 |
| Andhra Pradesh | | 8,088 | 21,756 | 29,844 |
| | Srikakulam | - | 100 | 100 |
| | Vizianagaram | 8,088 | 21,656 | 29,744 |
| Goa | | 65 | 34,436 | 34,501 |
| | North Goa | - | 7,695 | 7,695 |
| | South Goa | 65 | 26,741 | 26,806 |
| Gujarat | | 695 | 2,180 | 2,875 |
| | Panchmahals | - | 2,180 | 2,180 |
| | Chhota Udaipur | 695 | - | 695 |
| Jharkhand | | 1,059 | 13,691 | 14,749 |
| | Singhbhum (West) | 1,059 | 13,691 | 14,749 |
| Karnataka | | 15,464 | 108,508 | 123,972 |
| | Belgaum | - | 3,433 | 3,433 |
| | Bellary | 13,871 | 9,056 | 22,927 |
| | Chikmagalur | - | 130 | 130 |
| | Chitradurga | 250 | 31,056 | 31,307 |
| | Dawangere | 1,257 | 1,242 | 2,499 |
| | Gadag | - | 25 | 25 |
| | North Kanara | - | 29,307 | 29,307 |
| | Shimoga | - | 4,065 | 4,065 |
| | Tumkur | 86 | 30,192 | 30,279 |
| Madhya Pradesh | | 19,558 | 40,499 | 60,057 |
| | Balaghat | 14,992 | 32,297 | 47,288 |
| | Chhindwara | 1,366 | 620 | 1,985 |
| | Jabalpur | 2,790 | 6,939 | 9,729 |
| | Jhabua | 410 | 353 | 763 |
| | Katni | - | 291 | 291 |
| Maharashtra | | 17,733 | 41,303 | 59,036 |
| | Bhandara | 7,152 | 16,200 | 23,352 |
| | Nagpur | 10,582 | 25,103 | 35,685 |
| Odisha | | 11,470 | 160,058 | 171,528 |
| | Bolangir | - | 2,009 | 2,009 |
| | Keonjhar | 9,658 | 106,083 | 115,741 |
| | Koraput | - | 1,248 | 1,248 |
| | Mayurbhanj | - | 57 | 57 |
| | Rayagada | - | 322 | 322 |
| | Sambalpur | - | 120 | 120 |
| | Sundargarh | 1,812 | 50,219 | 52,030 |
| Rajasthan | | 568 | 1,790 | 2,359 |
| | Banswara | 568 | 1,280 | 1,849 |
| | Udaipur | - | 510 | 510 |
| Telangana | | 342 | 4,162 | 4,503 |
| | Adilabad | 342 | 4,162 | 4,503 |
| West Bengal | | - | 200 | 200 |
| | Midnapur | - | 200 | 200 |

figures rounded off.