

# 3 Mineral and Metal Scenario

## National Mineral Scenario

3.1 Minerals are valuable natural resources being finite and non-renewable. They constitute the vital raw materials for many basic industries and are a major resource for development. The history of mineral extraction in India dates back to the days of the Harappan civilization. The wide availability of the minerals in the form of abundant rich reserves made it very conducive for the growth and development of the mining sector in India.

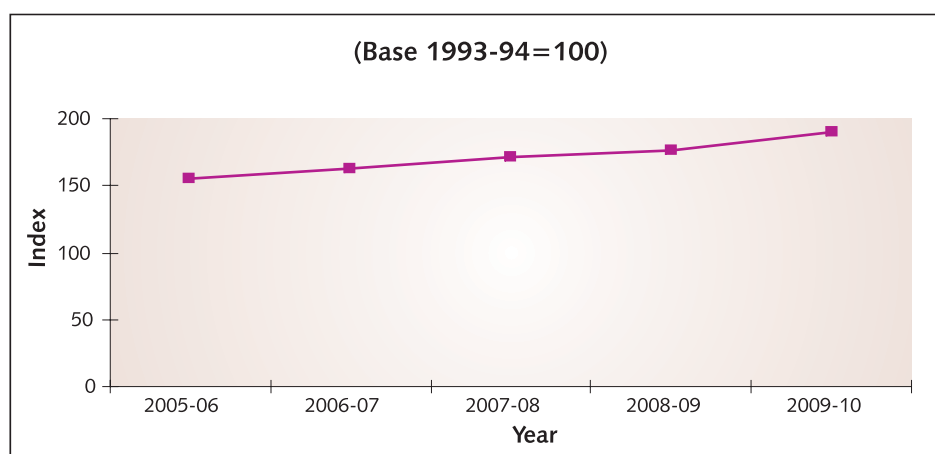
3.2 The country is endowed with huge resources of many metallic and non-metallic minerals. Mining sector is an important segment of the Indian economy. Since independence, there has been a pronounced growth in the mineral production both in terms of quantity and value. India produces as many as 86 minerals, which include 4 fuels, 10 metallic, 46 non-metallic, 3 atomic and 23 minor minerals (including building and other materials).

## Mineral Production

3.3 Based on the overall trend so far the index of mineral production (base 1993-94=100) for the year 2009-10 is estimated to be 189.90 as compared to 175.96 for 2008-09 showing a positive growth of 7.92%. The trend of index of mineral production for the last five years is depicted in **Figure 3.1**.

3.4 The total value of mineral production (excluding atomic minerals) during 2009-10 is estimated at Rs. 1,27,921.42 crores, which shows an increase of about 4.61% over that of the previous year. During 2009-10, provisional value for fuel minerals account for Rs. 79,602.69 crores or 62.23%, metallic minerals, Rs. 27571.16 crores or 21.55% of the total value and non-metallic minerals including minor minerals Rs. 20747.56 crores or 16.22% of the total value. Information on production and value of selected minerals from 2005-06 to 2009-10 is given in **Annexure 3.1**, The details of Export and Import of

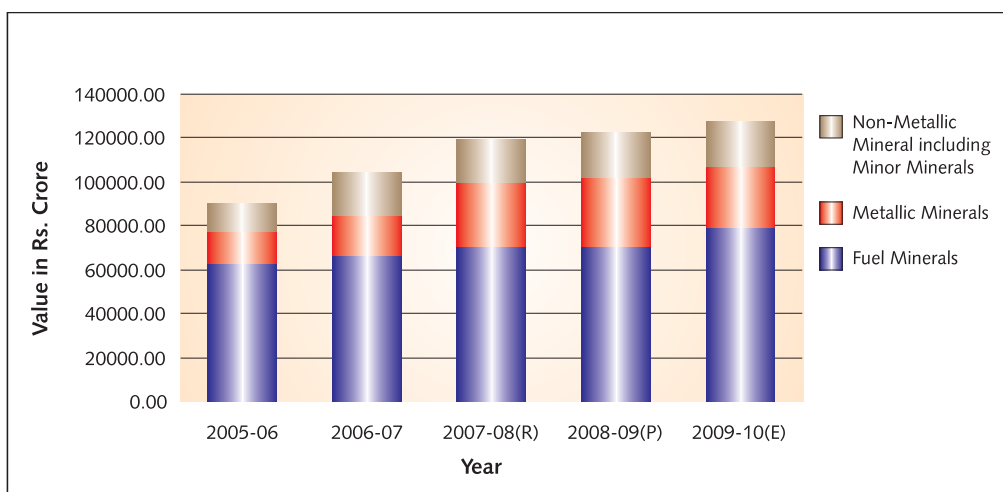
**Figure 3.1**  
Index of Mineral Production



**Figure 3.2**  
Trends in Value of Mineral Production, Export & Import



**Figure 3.3**  
Value of Minerals Production (By Groups)



Minerals during the period 2004-05 to 2008-09 is given in **Annexure 3.2** and **Annexure 3.3**. The trend of value of mineral production for last five years is depicted in **Figure 3.2**. The value of Minerals by groups for the last five years is given in **Figure 3.3**.

**PRICE TREND**

3.5 The wholesale price index for non-fuel minerals (base 1993-94=100) stood at 588.1 in December, 2009 and the corresponding index for December, 2008 was 615.4. The minerals included in the wholesale price index are bauxite, chromite, iron ore, manganese

ore, asbestos, barytes, dolomite, felspar, fireclay, fluorite, gypsum, kaolin, limestone, magnesite, ochre, phosphorite, silica sand, steatite and vermiculite. The wholesale price index for metallic minerals was 879.2 in December, 2009 as compared to 916.7 in December, 2008 and that of other minerals was 128.5 in December, 2009 as compared to 139.6 in December, 2008. The wholesale price index for Coal stood at 251.8 in December, 2009 as compared to 251.8 in December, 2008. The wholesale price index of minerals oils stood at 418.3 in December, 2009 and that in December, 2008 it was 393.6.

### Gross Domestic Product From Mining & Quarrying Sector

3.6 The Gross Domestic Product (GDP) accrued from mining and quarrying sector at 1999-2000 price is estimated by CSO. In 2009-10, the estimates of GDP in April-September of 2009-10, the mining and quarrying sector accounted for about 1.91 % GDP. The contribution of mining and quarrying sector to GDP in 2009-10 (April-September) at Rs. 31,808 crore indicated an increase of 8.7% over that in the preceding period. So far CSO has not published the Advance estimates of 2009-10.

#### Mining

3.7 Indian mining industry is characterized by a large number of small operational mines.

The number of mines which reported mineral production (excluding minor minerals, petroleum (crude), natural gas and atomic minerals) in India was 2729 in 2009-10 as against 2964 in the previous year. Out of 2729 reporting mines, 404 were located in Andhra Pradesh followed by Gujarat (398), Jharkhand (284), Madhya Pradesh (250), Rajasthan (236), Orissa (220), Karnataka (209), Maharashtra (145), Tamil Nadu (138), Chhattisgarh (126) and West Bengal (111). These 11 states together accounted for 92.38 % of total number of mines in the country in 2009-10. The number of reporting mines are given in **Table 3.1**

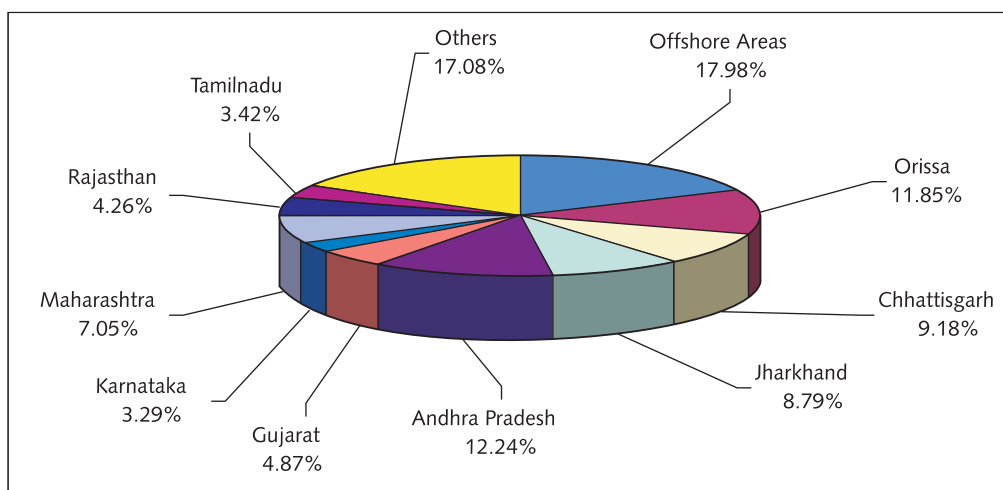
**Table 3.1**  
Number of Reporting Mines

| Sector                   | 2007-08 | 2008-09 | 2009-10 |
|--------------------------|---------|---------|---------|
| All Minerals*            | 2942    | 2964    | 2729    |
| Coal (including Lignite) | 570     | 570     | 570     |
| Metallic Minerals        | 691     | 691     | 636     |
| Non-Metallic Minerals    | 1681    | 1703    | 1523    |

\*Excluding atomic minerals, petroleum (crude), natural gas (utilized) and minor minerals

3.8 During 2009-10, mineral production was reported from 32 States/Union Territories (actual reporting of MCDR & Fuel minerals from 22 states and estimation of minor minerals for all 32 States/Union Territories) of which the bulk of value of mineral production of about 82.92% was confined to 9 States (including offshore areas) only. Offshore areas continued to be in leading position, in terms of value of mineral production in the country and had the share of 17.98% in the national output. Next in order was Andhra Pradesh with a share of 12.24% followed by Orissa (11.85%), Chhattisgarh (9.18%), Jharkhand (8.79%), Maharashtra (7.05%), Gujarat (4.87%), Rajasthan (4.26%), Tamilnadu (3.42%) and Karnataka (3.29%) in the total value of mineral production. Remaining 23 States/Union Territories having individual share of less than 3% together accounted for 17.08% of total value during the year under review. The contribution of States/Regions in the value of mineral production during 2009-10 is pictorially shown in **Figure 3.4**.

**Figure 3.4**  
Share of States in Value of Mineral Production 2009-10 (Estimated)



3.9 State-wise analysis reveals that during 2009-10, the value of mineral production in most of the principal mineral producing States has decreased as compared to that in the previous year. However, some states which have indicated an increase in the value of mineral production are Meghalaya (331.41%), Himachal Pradesh (84.46%), Maharashtra (76.05%), Tamilnadu (53.61%), Arunachal Pradesh (35.29%), Jharkhand (19.47%) and Jammu & Kashmir(11.11%) during the year under review. The all India Reserves and Resources of various minerals as on 01.04.2005 as per UNFC System is given in **Annexure 3.4**.

3.10 During 2008-09, the Public Sector continued to play a dominant role in mineral production accounting for 72% or Rs. 76,651 crores in the total value. Small mines, which were mostly in the private sector, continued to be operated manually either as proprietary or partnership ventures. The minerals which were wholly mined/recovered by the public/joint sector in 2008-09 were Copper ore and concentrate, Diamond, Dunite, Fluorite(graded) & concentrate, Phosphorite/Rock Phosphate, Rock salt, Sand (others), Selenite and Sulphur. By and large, almost the entire production of Lignite, Gold (primary and secondary of indigenous origin) and Gypsum was from Public Sector. In 2008-09, the Public Sector accounted for sizeable 92% production of coal, 86% of petroleum (crude), 76% of Natural gas(utilized), 80% Tin concentrate, 97% of Barytes, 83% of Kyanite, 76% of Silimanite and 60% of Magnesite.

3.11 India's ranking in 2007-08 in world production was 2nd in barytes, chromite and talc/steatite/pyrophyllite 3rd in coal & lignite and bauxite, 4th in iron ore and kyanite/sillimanite, 5th in manganese ore and steel (crude), 7th in zinc and 8th in aluminium. The statistics of indigenous and world production of principal minerals and metals are given in **Annexure 3.5**

#### **Self-Reliance in Minerals & Mineral-Based Products**

3.12 India continued to be wholly or largely self-sufficient in minerals which constitute primary mineral

raw materials to industries, such as, thermal power generation, iron & steel, ferro-alloys, aluminium, cement, various types of refractories, china clay-based ceramics, glass, chemicals like caustic soda, soda ash, calcium carbide, titania white pigment, etc. India is, by and large, self-sufficient in coal (with the exception of very low ash coking coal required by the steel plants) and lignite among mineral fuels, bauxite, chromite, iron, manganese ores, ilmenite and rutile among metallic minerals; and almost all the industrial minerals with the exception of chrysotile asbestos, borax, fluorite, kyanite, potash, rock phosphate and elemental sulphur. Despite high degree of self-sufficiency, some quantities of flaky and amorphous graphite of high fixed carbon, kaolin and ball clay for special applications, very low silica limestone, dead-burnt magnesite and sea water magnesia, battery grade manganese dioxide, etc. were imported to meet the demand for either blending with locally available mineral raw materials and/or for manufacturing special qualities of mineral-based products. To meet the increasing demand of uncut diamonds, emerald and other precious and semi-precious stones by the domestic cutting and polishing industry, India continued to depend on imports of raw uncut stones for their value-added re-exports. The degree of self-sufficiency in respect of various principal minerals and metals / ferro-alloys in 2007-08 is given in **Annexure 3.6**.

#### **PRODUCTION TRENDS**

##### **Metallic Minerals**

3.13 The value of metallic minerals in 2008-09 at Rs.31533.97 crores increased by about 7.49% over the previous year. Among the principal metallic minerals, iron ore contributed Rs.25,151 crores or 79.76%, chromite Rs.2217 crores or 7.03%, lead & zinc (concentrate) Rs. 1082 crores or 3.43%, manganese ore Rs.1730 crores or 5.49%, copper (concentrate) Rs. 393 crores or 1.25%, bauxite Rs. 431 crores or 1.37%, gold Rs. 312 crores or 0.99%, while the remaining was jointly shared by silver and tin concentrates.

The production of iron ore at about 215.43 million

tonnes in 2008-09 registered an increase of 17% over the previous year. About 31% of the total production was shared by Public Sector Companies like SAIL (including IISCO), NMDC, etc. The share of Private Sector was 69% which includes Tata Steel (formerly TISCO) (7%). Almost the entire production of iron ore (95%) accrued from Orissa, Karnataka, Chhattisgarh, Goa and Jharkhand during the year. The remaining 5% production was reported from Andhra Pradesh, Madhya Pradesh, Maharashtra and Rajasthan.

The production of copper concentrate at 138 thousand tonnes in 2008-09 decreased by about 36% as compared to the previous year. Average metal content in copper concentrate was 21.89% Cu. The production of chromite at 3.98 million tonnes in 2008-09 decreased by 18% as compared to the previous year. Orissa reported almost entire output of chromite (99.8%) in the country. A nominal production was reported from Karnataka. Mining of chromite was mostly dominated by private sector producers; viz, Tata Steel (formerly TISCO), IMFAL, Balasore Alloys Ltd., Jindal Strips Private Ltd. and FACOR having their own plants, jointly accounted for 62% of total production during 2008-09. Three Public Sector Companies; viz, Orissa Mining Corporation (OMC), Mysore Mineral Ltd. (MML) and Industrial Development Corp. of Orissa Ltd. (IDCOL) together reported 30% of the total production in 2008-09. The production of manganese ore at 2.8 million tonnes in 2008-09 increased by about 5% compared to that in the previous year. MOIL continued to be the largest producer of manganese ore with a share of 38.36% of the total production in 2008-09 followed by Tata Steel (12.09%), OMC (10.66%), SMIOR (8.69%), and S.R. Ferro Alloys Ltd. (4.98%). Of the total production of manganese ore in 2008-09, Orissa contributed 32%, Maharashtra 24%, Madhya Pradesh 25%, Karnataka 12% and Andhra Pradesh 6%. The remaining 1% was jointly shared by Goa and Jharkhand.

The production of primary gold at 2464 kg (excluding by-product gold recovery from imported concentrates) in 2008-09 registered decrease of about 17% as compared to the previous year. Karnataka was the

leading producer of gold accounting for 99% of the total production. The remaining production was reported from Jharkhand. The production of bauxite at 15.5 million tonnes in 2008-09 decreased by 31% compared to the previous year. The four major companies; namely, NALCO, HINDALCO, BALCO and Bombay Minerals Limited engaged in bauxite mining in the country, jointly contributed 57% of the total production of bauxite in 2008-09. Orissa accounted for 30% of the total output of bauxite during 2008-09 followed by Gujarat (23%), Maharashtra (13%), Chhattisgarh (11%) and Jharkhand (10%).

During 2008-09, the production of lead concentrate at 134 thousand tonnes increased by 7% and that of zinc concentrate at 1226 thousand tonnes showed an increase of 18% over the previous year. Average metal content in lead concentrate was 60.3% Pb and that in zinc concentrate was 53.9% Zn. Rajasthan accounted for the entire production of lead concentrate and zinc concentrate during 2008-09.

### Non-Metallic Minerals

3.14 The value of production of non-metallic minerals at Rs. 3527.62 crores during 2008-09 increased by 2.89% as compared to the previous year. Limestone retained its leading position by contributing 70.92% of the total value of non-metallic minerals in 2008-09. The other non-metallic minerals in the order of importance were phosphorite/rock phosphate (8.55%), kaolin (1.99%), dolomite (3.36%), barytes (2.71%) and talc/ soapstone/ steatite (1.44%), gypsum (2.38%), silica sand (0.15%), garnet (abrasive) (1.29%) and magnesite (0.98%). The remaining 6.23% was from other non-metallic minerals.

The production of limestone at 204 million tonnes in 2008-09 increased by 5% as compared the previous year. Limestone is widely produced in India. As much as 88% of the total output in 2008-09 was contributed by seven principal States; viz, Andhra Pradesh (22%), Rajasthan (18%), Madhya Pradesh (13%), Gujarat (11%), and Tamil Nadu, Chhattisgarh and Karnataka (8% each). The remaining 12% of the total production was shared by other limestone producing States. About

40% of the total production was reported by 15 private sector companies. Some of them are Grasim Industries Ltd.(9%), The Associated Cement Cos. Ltd.(7%), Ultra Tech Cement Ltd. (6%), India Cement Ltd., (5%), Shree Cement Ltd. (4%), Birla Corporation Ltd., Madras Cement Ltd. and Binani (3% each).

The production of phosphorite/rock phosphate at 1759 thousand tonnes decreased by 5% in 2008-09 as compared to previous year. The entire production was from Public Sector. Jhamarkotra mine of Rajasthan State Mines & Minerals Ltd. (RSMML) alone accounted for 88% of the total production in India and the entire production of Rajasthan during 2008-09. Madhya Pradesh contributed the remaining 12% of the production. The production of dolomite at 4469 thousand tonnes in 2008-09 registered 24% decrease as compared to preceding year. Four major companies; viz, SAIL (26%), Rashtriya Ispat Nigam Ltd. (12%), South West Mining Ltd. (9%) and Tata Steel (formerly TISCO) (8%) together accounted for 55% of the dolomite produced in 2008-09. Chhattisgarh (30%), Andhra Pradesh (26%) and Orissa (19%) were the principal producing States of dolomite. The remaining 25% was contributed by six States during the year, namely, Gujarat, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra and Rajasthan.

The production of kaolin in 2008-09 at 2213 thousand tonnes increased by 51% as compared to previous year. Nearly 45% of total output of kaolin in 2008-09 was reported from Gujarat followed by Kerala (32%) and by Rajasthan (10%). Production of gypsum at 3.72 million tonnes in 2008-09 registered an increase of 9% as compared to previous year. By and large, the entire production of gypsum was reported from Rajasthan (99%). The remaining 1% was from Jammu & Kashmir and Gujarat. Two Public Sector Companies; namely, RSMML and Fertilizer Corporation of India Ltd. accounted for almost the entire production. The production of magnesite at 245 thousand tonnes during 2008-09 decreased by 3% as compared to the previous year.

The production of talc/soapstone/ steatite in 2008-09

at 832 thousand tonnes decreased by about 10% over the previous year. Rajasthan, the principal State accounted for 72% of the total production in 2008-09. Five principal producers in Rajasthan; namely, Associated Soapstone Distributing Co. (P) Ltd. (28%), Udaipur Mineral Development Syndicate (P) Ltd. (22%), Parbatia Mines (3%) Nalwaya Mineral Industries Pvt. Ltd. (5%), Katiyar Mining and Industrial Corp. (4%) together accounted for 62% of the total production of talc/ soapstone/ steatite in 2008-09.

### Minor Minerals

3.15 The value of production of minor minerals was estimated at Rs 16694.9 crore in 2008-09. Andhra Pradesh with share of 49% in the value of minor minerals produced in the country occupied the top position. Rajasthan was at second place and had a share of 14.8% in the value of minor minerals. Next in the order were Uttar Pradesh with a share of 13.3%, Bihar 6.5%, Gujarat 3.6%, Kerala 3.5%, Madhya Pradesh 2.6% and Maharashtra 1.9 percent.. The contribution of remaining states and UTs was less than one percent each.

Mineral-wise analysis revealed that Road metals had the largest share of 36.4% to the value of minor minerals followed by Building Stone 20.4%, Brick-earth 14.9%, Ordinary Sand 7.2%, Gravel 5.1%, Marble 3.8%, Quartzite & Sand Stone 3.1 %, Lime Stone 2%, Murrum & Kankar 1.9% each and Ordinary Earth 1.4 percent. The individual share of remaining minerals was less than 1.0% which together contributed 1.7 percent of value of minor minerals. The share of minor minerals in the value of mineral production was estimated at 13.67% for 2007-08 and 2008-09.

### State-wise Mineral Scenario

3.16 During 2008-09, mineral production was reported from 32 States/Union Territories of which the bulk of value of mineral production of about 83.96% was confined to 9 States (including offshore areas) only. Offshore areas continued to be in leading position, in terms of value of mineral production in the country

and had the share of 16.24% in the national output. Next in order was Orissa with a share of 13.29% followed by Andhra Pradesh (12.36%), Chhattisgarh (9.97%), Jharkhand (7.73%), Madhya Pradesh (7.13%), Gujarat (4.77%), Mahara-shtra (4.19%), Karnataka (4.18%) and Rajasthan (4.10%) in the total value of mineral production. Remaining 23 States/ Union Territories having individual share of less than 4% together accounted for 16.04% of total value during the year under review.

3.17 State-wise analysis revealed that during 2008-09, the value of mineral production in most of the principal mineral producing States was on higher side as compared to that in the previous year. State wise increase in the value of mineral production was Meghalaya (47.71%), Goa (22.00%), Chhattisgarh (11.96%), Orissa (11.89%), Madhya Pradesh (3.90%), West Bengal (3.59%) and Tripura (3.35%) during the year under review.

### SCENARIO OF MINERAL RICH STATES

3.18 A review of Mineral rich States of India is given in the subsequent paragraphs.

#### 1. ANDHRA PRADESH

##### Mineral Resources

Andhra Pradesh is the leading producer of chrysotile asbestos, barytes, mica, felspar, vermiculite, quartz, laterite, silica sand, dolomite and limestone. State accounts for 94% barytes, 63% ball clay, 61% corundum, 40% diamond, 39% calcite, 28% mica, 26% garnet, 23% ilmenite, 20% limestone and 15% dolomite resources of the country. State is endowed with the internationally known black, pink, blue and multicoloured varieties of granites. Krishna-Godavari basin areas of the State have emerged as new promising areas for hydrocarbons-specially natural gas. Important minerals occurring in the State are apatite in Visakhapatnam district; asbestos in Cuddapah district; ball clay in West Godavari district; barytes in Anantapur, Cuddapah, Khammam, Krishna, Kurnool, Nellore and Prakasam districts; calcite in Anantapur, Cuddapah, Kurnool and Visakhapatnam districts; china

clay in Adilabad, Anantapur, Chittoor, Cuddapah, East Godavari, West Godavari, Guntur, Kurnool, Mahaboobnagar, Nalgonda, Nellore, Rangareddy, Visakhapatnam and Warangal districts; coal in Adilabad, East and West Godavari, Karimnagar, Khammam and Warangal districts; corundum in Anantapur and Khammam districts; dolomite in Anantapur, Khammam, Kurnool and Warangal districts; felspar in Anantapur, West Godavari, Hyderabad, Khammam, Mahaboob-nagar, Nellore, Rangareddy and Vizianagaram districts; fireclay in Adilabad, Chittoor, Cuddapah, East Godavari, West Godavari, Kurnool, Nalgonda and Srikakulam districts; garnet in East Godavari, Khammam and Nellore districts; granite in Anantapur, Chittoor, Cuddapah, Guntur, Khammam, Medak, Nalgonda, Nellore, Prakasam, Rangareddy, Srikakulam, Viziana-garam and Warangal districts; iron ore (hematite) in Anantapur, Cuddapah, Guntur, Khammam, Krishna, Kurnool and Nellore districts; iron ore (magnetite) in Adilabad, Prakasam and Warangal districts; lead-zinc in Cuddapah, Guntur and Prakasam districts; limestone in Adilabad, Anantapur, Cuddapah, East Godavari, West Godavari, Guntur, Hyderabad, Karimnagar, Krishna, Kurnool, Mahaboobnagar, Nalgonda, Nellore, Rangareddy, Srikakulam, Visakhapatnam and Vizianagaram districts; manganese ore in Adilabad, Srikakulam and Vizianagaram districts; mica in Khammam and Nellore districts; ochre in Cuddapah, West Godavari, Guntur, Kurnool and Visakhapatnam districts; pyrophyllite in Anantapur district; quartz/silica sand in Anantapur, Chittoor, Cuddapah, West Godavari, Guntur, Hyderabad, Khammam, Krishna, Kurnool, Mahaboobnagar, Medak, Nalgonda, Nellore, Prakasam, Rangareddy, Srikakulam, Visakha-patnam, Vizianaagram and Warangal districts; quartzite in Kurnool, Srikakulam, Visakhapatnam and Vizianagram districts; steatite in Anantapur, Chittoor, Cuddapah, Khammam and Kurnool districts and vermiculite in Nellore and Visakhapatnam districts. Petroleum and natural gas deposits of importance are located in the onshore and offshore areas of Krishna-Godavari basin of the State.

Other minerals that occur in the State are bauxite in East Godavari and Visakhapatnam districts; chromite

in Khammam and Krishna districts; copper in Guntur, Khammam, Kurnool and Prakasam districts; diamond in Anantapur, Krishna and Kurnool districts; fuller's earth in Medak and Rangareddy districts; gold in Anantapur, Chittoor and Kurnool districts; graphite in East Godavari, West Godavari, Khammam, Srikakulam, Visakhapatnam and Vizianagaram districts; gypsum in Guntur, Nellore and Prakasam districts; kyanite in Khammam, Nellore and Prakasam districts; magnesite in Cuddapah district; marble in Khammam district; pyrite in Kurnool district; sillimanite in West Godavari district; silver in Guntur district; titanium minerals in East Godavari, Krishna, Nellore, Srikakulam and Visakhapatnam districts; and tungsten in East Godavari district.

### Production

The value of mineral production in Andhra Pradesh at Rs. 15,086 crores in 2008-09 was little higher by about 0.43% as compared to that in the previous year. Almost all important minerals are produced in Andhra Pradesh. The principal minerals produced in the State were coal, natural gas (utilised), limestone, petroleum (crude), barytes, dolomite, felspar, iron ore, manganese ore, silica sand, ball clay, laterite and mica (crude), which together accounted for 45.6% of total value of mineral production in the State during 2008-09. Coal alone contributed 29.49% of the total value of mineral production in the State.

Andhra Pradesh claims the Second position among the States in the country with a contribution of 12.36% to the total value of the mineral production. The share of Andhra Pradesh in the production of principal minerals was barytes 99.63%, mica (crude) 100%, felspar 75.13%, vermiculite 84.87%, quartz 31.76%, laterite 42.21%, silica sand 43.96%, dolomite 26.38%, clay (others) 14.61% and limestone 21.70% in the country.

Among the important minerals produced in the State, output of iron ore increased by 8%, manganese ore by 31% and petroleum (crude) by 3.23%. In the same manner, increase was observed in kaoline 140%, barites 57%, Vermiculite 49%, sand others 38%,

asbestos 18%, limestone 16% and coal 11%. However, the production of Limeshell decreased by 70%, shale by 62%, clay others by 43%, felspar by 28%, , and steatite by 12%. silica sand by 49%, ochre by 11%, quartzite by 60% and dolomite by 16 percent.

The production value of minor minerals was estimated at Rs. 8,189 crores for the year 2008-09. The number of reporting mines in the State was 434 in 2008-09 as compared to 398 in the previous year. The index of mineral production in Andhra Pradesh (base 1993-94=100) was 194.72 in 2008-09 as against 179.57 in the previous year.

## 2. CHHATTISGARH

### Mineral Resources

Chhattisgarh is the sole producer of tin concentrates and is one of the leading producers of coal, dolomite and iron ore. State accounts for about 38% tin ore, 28% diamond, 19% iron ore (hematite), 16% coal and 11% dolomite resources of the country. Important mineral occurrences of the State are bauxite in Bastar, Bilaspur, Dantewada, Jashpur, Kanker, Kawardha (Kabirdham), Korba, Raigarh and Sarguja districts; china clay in Durg and Rajnandgaon districts; coal in Korba, Korba, Raigarh and Sarguja districts; dolomite in Bastar, Bilaspur, Durg, Raigarh and Raipur districts; iron ore (hematite) in Dantewada district, Bailadila deposit in Dantewada district, Chhote Dongar deposit in Kanker district, Rowghat, Chargaon, Metabodeli and Hahaladdi deposits in Rajnandgaon district, Boria Tibbu deposits in Dalli-Rajhara area, Durg district. Bailadila-Rowghat hill ranges in the State are considered to be one of the biggest iron ore fields in India. Limestone occurs in Bastar, Bilaspur, Durg, Janjgir-Champa, Kawardha (Kabirdham), Raigarh, Raipur and Rajnandgaon districts; quartzite in Durg, Raipur, Rajnandgaon and Raigarh districts; and talc/steatite in Durg district. Other minerals occurring in the State are corundum in Dantewada district; diamond and other gemstones in Raipur, Mahasamund and Dhamtari districts; gold in Raipur, Jashpur, Kanker and Mahasamund districts; fire clay in Bilaspur, Raigarh and Rajnandgaon districts; fluorite in Rajnandgaon district;

garnet and marble in Bastar district; emerald and gold in Raipur district; granite in Bastar, Kanker and Raipur districts; quartz/silica sand in Durg, Raigarh, Raipur and Rajnandgaon districts; and tin in Bastar and Dantewada districts.

### Production

The value of mineral production in Chhattisgarh at Rs. 12,173 crores in 2008-09, increased by 11.96% as compared to that in the previous year. The State is ranked third in the country and accounted for 9.97% of the total value of the production. The important minerals produced in the State in 2008-09 were coal iron ore, dolomite and limestone which together accounted for about 99% of the entire value of mineral production in the State. Chhattisgarh was the sole producer of tin concentrate. The State was the leading producer of coal and dolomite and iron ore with a share of 21%, 30% and 14% respectively in the country. During 2008-09, the production of coal increased by 13%, dolomite by 4% and limestone by 8%. There was a decrease in production of Tin concentrate by 5%, kaoline by 100% and Clay(others) by 3%. bauxite by 7%, iron ore by 3%, steatite by 34% and quartzite by 100 percent.

The production value of minor minerals was estimated at Rs. 75 crores for the year 2008-09. The number of reporting mines in Chhattisgarh was 139 in 2008-09 as against 147 in the previous year. The index of mineral production in Chhattisgarh (base 1993-94=100) was 240.27 in 2008-09 as against 218.96 in the previous year.

## 3. GOA

### Mineral Resources

Goa is well known for its iron and manganese ores. Bauxite and laterite are the other minerals produced in the State. Iron and manganese ore belts extend from South-East to North-West of the State. Important iron ore deposits are located in Bicholim, Sanguem and Satari talukas. Manganese ores are associated with iron ores and occur as pockets of various sizes in a form of concretionary pebbles in shales. Important manganese

ore deposits are confined to the Southern and South-Eastern parts of Sanguem taluka. Bauxite occurs in South-Eastern parts of Goa.

### Production

The value of mineral production in Goa at 3,897 crores in 2008-09 increased by 22% as compared to the previous year. About 99.77% of the total value of mineral production in Goa was contributed by iron ore. Production of bauxite and minor minerals was also reported from the State in 2008-09. During the year under review, production of bauxite increased by 298%, iron ore by 8% and manganese ore by 17% over the previous year.

The production value of minor minerals was estimated at Rs. 6 crores for the year 2008-09. There were 76 reporting mines in 2008-09 as against 78 in the previous year. The index of mineral production in Goa (base 1993-94=100) was 232.07 in 2008-09 as against 214.19 in the previous year.

## 4. GUJARAT

### Mineral Resources

Gujarat is the sole producer of agate, chalk, and perlite and is leading producer of fluorite (concentrate), fireclay, silica sand, lignite, laterite, petroleum and natural gas and bauxite in the country. State is the sole holder of country's resources of perlite, 69% of fluorite, 28% of diatomite, 18% of bentonite and 10% of wollastonite.

Important mineral occurrences in the State are agate found in Deccan Trap flows in Bharuch district; bauxite in Amreli, Bhavnagar, Jamnagar, Junagadh, Kheda, Kachchh, Sabarkantha and Valsad districts; ball clay in Banaskantha, Bharuch, Kachchh and Patan districts; bentonite in Amreli, Bhavnagar, Jamnagar, Kachchh and Sabarkantha districts; china clay in Amreli, Banaskantha, Bhavnagar, Jamnagar, Junagadh, Kachchh, Mehsana and Sabarkantha districts; chalk in Porbandar district; diatomite in Bhavnagar district; dolomite in Bhavnagar, Panchmahals and Vadodara districts; fireclay in Bharuch, Kachchh, Mehsana,

Rajkot, Sabarkantha, Surat and Surendranagar districts; fluorite in Vadodara and Bharuch districts; fuller's earth in Bhavnagar and Kachchh districts; gypsum in Bhavnagar, Jamnagar, Junagadh, Kachchh and Surendranagar districts; lignite in Bharuch, Bhavnagar, Kachchh and Surat districts; limestone in Amreli, Banaskantha, Bharuch, Bhavnagar, Jamnagar, Junagadh, Kheda, Kachchh, Panchmahals, Porbandar, Rajkot, Sabarkantha, Surat, Vadodara and Valsad districts; ochre in Banaskantha, Bhavnagar, Kachchh and Patan districts; perlite in Rajkot district; petroleum and natural gas in oil fields of Ankaleshwar, Kalol, Navgam, Balol and Cambay in Cambay onshore and offshore basins; quartz/silica sand in Bharuch, Bhavnagar, Dahod, Kheda, Kachchh, Panchmahals, Rajkot, Sabarkantha, Surat, Surendranagar, Vadodara and Valsad districts; and steatite in Sabarkantha district.

Other minerals that occur in the State are apatite and rock phosphate in Panchmahals district; calcite in Amreli and Bharuch districts; copper ore in Banaskantha district; granite in Banaskantha, Mehesana and Sabarkantha districts; graphite in Panchmahals district; lead-zinc and marble in Banaskantha and Vadodara districts; manganese ore in Panchmahals and Vadodara districts; vermiculite in Vadodara district; and wollastonite in Banaskantha district.

### Production

The value of mineral production in Gujarat in 2008-09 at Rs.5,824 crores, recorded about 8% decrease as compared to that in the previous year. The State was ranked sixth in the country and accounted for about 4.77% of the total value of mineral production in India during the year. Gujarat was the sole producer of Marl, chalk and fluorite (concentrate) and the leading producer of Kaolin and clay (others) in the country.

The State was also the second largest producer of quartz, lignite, petroleum (crude) and natural gas (utilised) in the country during 2008-09. Production of fluorite (concentrate) increased by 80%, Kaolin by 104%, Steatite by 26% Gypsum by 17%, laterite 10% and Dolomite by 13 percent.. The minerals reporting fall in production during 2008-09 were Natural gas(ut)

10%, fireclay 78%, bauxite by 70%, Agate 96%, ball clay 58%, lignite 14% and ochre 33%. Fall in production was due to less plant requirement, shortage of labour and lack of demand of silica sand due to use of pozydone clay for manufacturing of cement.

The production value of minor minerals was estimated at Rs.606 crores for the year 2008-09 same as of previous year. The number of reporting mines in the State was 427 in 2008-09 as compared to 451 in the previous year. The index of mineral production in Gujarat (base 1993-94=100) was 113.49 in 2008-09 as against 125 in the previous year.

## 5. JHARKHAND

### Mineral Resources

Jharkhand carved out of Bihar in November, 2000 is one of the leading mineral producing States. It is one of the leading producers of coal, kyanite, gold, silver, bauxite and felspar. Uranium ore is being mined and processed by Uranium Corporation of India Ltd. (UCIL) for use as fuel in the country's nuclear power reactors through four underground mines, an opencast mine, two processing plants and a by-product recovery plant, all in East Singhbhum district. Jharkhand accounts for about 35% rock phosphate, 29% coal, 28% iron ore (hematite), 27% apatite, 22% andalusite, 16% copper ore and 10% silver ore resources of the country.

Important minerals occurring in the State are bauxite in Dumka, Gumla, Lohardaga and Palamau districts; china clay in Dumka, Hazaribagh, Lohardaga, East & West Singhbhum, Sahebganj and Ranchi districts; coal in Bokaro, Deoghar, Dhanbad, Giridih, Godda, Hazaribagh, Palamau, Pakur, and Ranchi districts; copper in Hazaribagh and East Singhbhum districts; dolomite in Garhwa and Palamau districts; felspar in Deoghar, Dhanbad, Dumka, Giridih, Hazaribagh, Koderma and Palamau districts; fireclay in Dhanbad, Dumka, Giridih, Godda, Hazaribagh, Palamau, Ranchi and West Singhbhum districts; gold in East Singhbhum district; graphite in Palamau district; iron ore (hematite) in West Singhbhum district; iron ore (magnetite) in Gumla, Hazaribagh, Palamau and East Singhbhum

districts; kyanite in East & West Singhbhum districts; limestone in Bokaro, Dhanbad, Garhwa, Giridih, Hazaribagh, Palamau, Ranchi, East & West Singhbhum districts; manganese ore in East & West Singhbhum districts; mica in Giridih and Koderma districts; ochre in West Singhbhum district; dunitite/ pyroxenite in East Singhbhum district; quartz/silica sand in Deoghar, Dhanbad, Dumka, Giridih, Godda, Hazaribagh, Koderma, Palamau, Ranchi, Sahebganj, East & West Singhbhum districts; and quartzite in East & West Singhbhum districts.

Other minerals that occur in the State are andalusite and rock phosphate in Palamau district; apatite, chromite, cobalt, nickel, gold and silver in East Singhbhum district; asbestos in East & West Singhbhum districts; barytes in Palamau and East Singhbhum districts; bentonite in Pakur and Sahebganj districts; garnet in Hazaribagh district; granite in Deogarh, Dhanbad, Dumka, Giridih, Godda, Gumla, Hazaribagh, Koderma, Lohardaga, Palamau, Ranchi and East Singhbhum districts; sillimanite in Hazaribagh district; talc/steatite in Giridih, Palamau, East & West Singhbhum districts; titanium minerals in Ranchi and East Singhbhum districts; and vermiculite in Giridih and Hazaribagh districts.

### Production

The value of mineral production in Jharkhand during 2008-09 at Rs.9,443 crores slightly decreased by about 2 % over the previous year. The State claiming fourth position in the country accounted for 7.73 % of the total value of mineral production during 2008-09. Jharkhand was the leading producer of kyanite and second leading producer of gold in the country. The State was third leading producer of felspar and graphite during the year. Coal, the principal mineral produced in the State contributed 87.37% of the total value of mineral production in the State. The other principal minerals produced in the State were iron ore, bauxite, dolomite, copper concentrate and manganese ore.

Among the important minerals, production of coal increased by 6.34%, iron ore 2.2%, copper concentrate by 636%, manganese ore by 33%, bauxite by 27%

and quartz by 19% during 2008-09 as compared to the previous year. However, the output of limestone declined by 18%, laterite by 33%, gold by 32% and fireclay by 36% owing to disruptions by naxal outfits and less market demand.

The production value of minor minerals was estimated at Rs. 40 crores. The number of reporting mines in Jharkhand during 2008-09 was 294 as against 293 during previous year. The index of mineral production in Jharkhand (Base1993-94=100) was 130.98 in 2008-09 as compared to 123.69 in the previous year.

## 6. KARNATAKA

### Mineral Resources

Karnataka has the distinction of being the main gold producing State in the country. The State is the sole producer of felsite and leading producer of iron ore, chromite and dunitite. Karnataka hosts country's 78% vanadium ore, 74% iron ore (magnetite), 42% tungsten ore, 38% asbestos, 33% titaniferous magnetite, 30% limestone, 25% granite, 22% manganese ore, 19% corundum, 18% dunitite, 17% gold (primary), 13% kyanite and 11% iron ore (hematite) resources. The important minerals occurring in the State are bauxite in Belgaum, Chickmagalur, Uttar and Dakshin Kannad districts; china clay in Bangalore, Belgaum, Bellary, Bidar, Chickmagalur, Dharwad, Gadag, Hassan, Haveri, Kolar, Uttar and Dakshin Kannad, Shimoga and Tumkur districts; chromite in Hassan district and in two belts viz. Nuggehalli Arsikhera and Nanjangud in Mysore district; dolomite in bagalkot, Belgaum, Bijapur, Chitradurga, Mysore, Uttar Kannad and Tumkur districts; dunitite/pyroxenite in Chickmagalur, Hassan and Mysore districts; felspar in Bangalore, Belgaum, Chitradurga, Hassan and Kolar districts; fireclay in Bangalore, Chitradurga, Dharwad, Hassan, Kolar, Shimoga and Tumkur districts; gold in Chitradurga, Dharwad, Gulbarga, Hassan, Haveri, Kolar, Raichur and Tumkur districts; iron ore (hematite) in Bagalkot, Bellary, Bijapur, Chickmagalur, Chitradurga, Dharwad, Uttar Kannad, Shimoga and Tumkur districts; iron ore (magnetite) in Chickmagalur, Hassan, Uttar and

Dakshin Kannad and Shimoga districts; kyanite in Chickmagalur, Chitradurga, Mandya, Mysore, Shimoga and Dakshin Kannad districts; limestone in Bagalkot, Belgaum, Bellary, Bijapur, Chickmagalur, Chitradurga, Davangere, Gadag, Gulbarga, Hassan, Mysore, Uttar and Dakshin Kannad, Shimoga, Tumkur and Udupi districts; magnesite in Mandya and Mysore districts; manganese ore in Belgaum, Bellary, Chickmagalur, Chitradurga, Davangere, Uttar Kannad, Shimoga and Tumkur districts; ochre in Bellary and Bidar districts; quartz/silica sand in Bagalkot, Bangalore, Belgaum, Bellary, Chickmagalur, Chitradurga, Davangere, Dharwad, Gulbarga, Hassan, Haveri, Kolar, Koppal, Mandya, Mysore, Uttar & Dakshin Kannad, Raichur, Shimoga, Tumkur and Udupi districts; and steatite in Bellary, Chickmagalur, Chitradurga, Hassan, Mandya, Mysore, Raichur and Tumkur districts.

Other minerals that occur in the State are asbestos in Chickmagalur, Hassan, Mandya, Mysore and Shimoga districts; barytes and pyrite in Chitradurga district; calcite in Belgaum, Bijapur and Mysore districts; copper in Chickmagalur, Chitradurga, Gulbarga, Hassan, Uttar Kannad, Raichur and Shimoga districts; corundum in Bangalore, Bellary, Chitradurga, Hassan, Mandya, Mysore and Tumkur districts; fuller's earth in Belgaum and Gulbarga districts; granite in Bagalkot, Bangalore, Bellary, Bijapur, Chamrajanagar, Gulbarga, Hassan, Kolar, Koppal, Uttar Kannad, Raichur and Tumkur districts; graphite in Kolar and Mysore districts; gypsum in Gulbarga district; molybdenum in Kolar and Raichur districts; nickel in Uttar Kannad district; sillimanite in Hassan and Dakshin Kannad districts; silver in Chitradurga and Raichur districts; titanium minerals in Hassan, Uttar Kannad and Shimoga districts; tungsten in Dharwad, Kolar and Raichur districts; vanadium in Hassan, Uttar Kannad and Shimoga districts; and vermiculite in Hassan, Mandya and Mysore districts.

### Production

The value of mineral production in Karnataka during 2008-09 at Rs.5,109 crores decreased by 18 % over the previous year. Iron ore, gold, manganese ore, limestone and dolomite being the important minerals

produced in the State together accounted for about 99% of the total value of mineral production during the year. Karnataka was the sole producer of felsite and the leading producer of gold with a share of 99% and limeshell (57%) of total production in the country. The State was also the second leading producer of iron ore, shale and dunite. Among the important minerals, production of quartz, felsite, shale and fireclay increased by 264%, 92%, 35% and 29% respectively. The production of corundum, quartzite and steatite declined by 100% each where as production of ochre, chromite, dunite and kaolin declined by 85%, 56%, 66% and 37% respectively. Decline in production was also noticed in magnesite 48%, limeshell 41% and clay other by 50 percent.

The production value of minor minerals was estimated at Rs.26 crores for the year 2008-09. The number of reporting mines in Karnataka was 224 in 2008-09 as against 220 in the previous year. The index of mineral production in Karnataka (Base 1993-94=100) was 305.14 in 2008-09 as compared to 326.32 in the previous year.

## 7. MADHYA PRADESH

### Mineral Resources

Madhya Pradesh is the only diamond producing State and is the leading producer of copper concentrate pyrophyllite and diaspore. State hosts country's 68% diaspore, 41% molybdenum ore, 46% pyrophyllite, 32% diamond, 29% copper ore, 17% rock phosphate, 16% each of manganese ore and fireclay and 11% ochre resources. Important mineral occurrences in the State are bauxite in Balaghat, Guna, Jabalpur, Katni, Mandla, Rewa, Satna and Shahdol districts; calcite in Badwani, Jhabua and Khargone districts; china clay in Betul, Chhatarpur, Chhindwara, Gwalior, Hoshangabad, Jabalpur, Khargone, Narsinghpur, Raisen, Satna, Shahdol and Sidhi districts; copper in Balaghat, Betul and Jabalpur districts; coal in Betul, Shahdol and Sidhi districts; diamond in Panna district; diaspore & pyrophyllite in Chhatarpur, Shivpuri and Tikamgarh districts; dolomite in Balaghat, Betul, Chhindwara, Damoh, Dewas, Hoshangabad, Jabalpur,

Jhabua, Katni, Mandla, Narsinghpur, Sagar and Seoni districts; fireclay in Betul, Chhindwara, Jabalpur, Katni, Narsinghpur, Panna, Sagar, Shahdol and Sidhi districts; iron ore (hematite) in Betul, Gwalior, Jabalpur and Katni districts; limestone in Balaghat, Chhindwara, Damoh, Dhar, Hoshangabad, Jabalpur, Jhabua, Khargone, Katni, Mandsaur, Morena, Narsinghpur, Rewa, Sagar, Satna, Sehore, Shahdol and Sidhi districts; manganese ore in Balaghat, Chhindwara and Jhabua districts; ochre in Dhar, Gwalior, Jabalpur, Mandla, Rewa, Satna, Shahdol and Umaria districts; quartz/silica sand in Balaghat, Dewas, Dhar, Jabalpur, Khandwa, Khargone, Morena, Rewa and Shahdol districts; talc/steatite/soapstone in Dhar, Jabalpur, Jhabua, Katni, Narsinghpur and Sagar districts; and vermiculite in Jhabua district.

Other minerals that occur in the State are calcareous shales (used in slate pencil) in Mandsaur district; barytes in Dewas, Dhar, Shivpuri, Sidhi and Tikamgarh districts; felspar in Jabalpur and Shahdol districts; fuller's earth in Mandla district; gold in Jabalpur and Sidhi districts; granite in Betul, Chhatarpur, Chhindwara, Datia, Jhabua, Panna, Seoni and Shivpuri districts; graphite in Betul and Sidhi districts; gypsum in Shahdol district; lead-zinc in Betul district; molybdenum in Balaghat district; potash in Panna district; quartzite in Sehore district; rock phosphate in Chhatarpur, Jhabua and Sagar districts; and sillimanite in Sidhi district.

### Production

The value of mineral production in Madhya Pradesh at Rs.8,705 crores in 2008-09 increased by about 4 % as compared to the previous year. Madhya Pradesh contributed 7.13% to the total value of mineral production and was fifth among States in the country. The State was the sole producer of diamond and slate in the country. The State was the leading producer of pyrophyllite with a share of 81.12%, copper concentrates 41.75% and diaspore 44.4% in the national output of respective minerals. Madhya Pradesh was also the leading producer of clay (others) (19%), shale (20%) and phosphorite (12%). During 2008-09, the production of coal increased by 5%, manganese ore 4%, bauxite 113%, phosphorite 91% and

pyrophyllite 12 percent. However, downward trend in production was shown in limestone 9%, clay (others) 54%, copper concentrates 30%, diamond 9%, iron ore 65%, silica sand 75%, laterite 45% and quartz, steatite 100% each.

The production value of minor minerals was estimated at Rs.440 crores for the year 2008-09. The number of reporting mines in Madhya Pradesh was 282 in 2008-09 as against 312 in the previous year. The index of mineral production in Madhya Pradesh (base 1993-94=100) was 211.02 in 2008-09 as against 202.73 in the previous year.

## 8. MAHARASHTRA

### Mineral Resources

Maharashtra is the sole producer of corundum and is the second largest producer of manganese ore after Orissa. The principal mineral-bearing belts in Maharashtra are Vidarbha area in the East and Konkan area in the West. Important mineral occurrences are bauxite in Kolhapur, Raigad, Ratnagiri, Satara, Sindhudurg and Thane districts; china clay in Amravati, Bhandara, Chandrapur, Nagpur, Sindhudurg and Thane districts; chromite in Bhandara, Chandrapur, Nagpur and Sindhudurg districts; coal in Nagpur, Chandrapur and Yavatmal districts; dolomite in Chandrapur, Nagpur and Yavatmal districts; fireclay in Amravati, Chandrapur, Nagpur and Ratnagiri districts; fluorite and Shale in Chandrapur district; iron ore (hematite) in Chandrapur, Gadchiroli and Sindhudurg districts; iron ore (magnetite) in Gondia district; kyanite in Bhandara and Nagpur districts; laterite in Kolhapur district; limestone in Ahmednagar, Chandrapur, Dhule, Gadchiroli, Nagpur, Nanded, Sangli and Yavatmal districts; manganese ore in Bhandara, Nagpur and Ratnagiri districts; corundum, pyrophyllite and sillimanite in Bhandara district; quartz and silica sand in Bhandara, Gadchiroli, Gondia, Kolhapur, Nagpur, Ratnagiri and Sindhudurg districts and quartzite in Gondia and Nagpur districts.

Other minerals that occur in the State are barytes in Chandrapur and Gadchiroli districts; copper in Bhandara,

Chandrapur, Gadchiroli and Nagpur districts; feldspar in Sindhudurg district; gold in Bhandara and Nagpur districts; granite in Bhandara, Chandrapur, Dhule, Gadchiroli, Nagpur, Nanded, Nasik, Sindhudurg and Thane districts; graphite in Sindhudurg district; lead-zinc in Nagpur district; marble in Bhandara and Nagpur districts; ochre and tungsten in Chandrapur and Nagpur districts; silver and vanadium in Bhandara district; steatite in Bhandara, Ratnagiri and Sindhudurg districts; and titanium minerals in Gondia and Ratnagiri districts.

### Production

The value of mineral production in Maharashtra during 2008-09 at Rs.5,112 crores increased negligibly by 0.35% as compared to that in the previous year. Maharashtra accounted for about 4.19% of the total value of mineral production in the country during the year under review. It was the sole producer of corundum and fluorite (graded) in the country during 2008-09. The State was the largest producer of manganese ore sharing 23.83% of total production of the mineral in the country. Among other important minerals, the State reported higher production during 2008-09 in respect of pyrophyllite (47.%), bauxite (11%) and coal by 6 percent. Fall in production was reported in respect of Corundum(73%), Sand(others), 53 % kyanite 50%, iron ore 44%, silica sand 40%, Dolomite(11%), Shale (21%), Limestone (20%), quartz (37%), fluorite (graded) 36%, sillimanite 26% and manganese ore by 21 percent.

The value of production of minor minerals was estimated at Rs. 317 crores for the year 2008-09. The number of reporting mines was 152 in 2008-2009 as against 163 in the previous year. The index of mineral production in Maharashtra (base 1993-94 = 100) in 2008-09 was 191.18 as against 186.93 in the previous year.

## 9. ORISSA

### Mineral Resources

Orissa is the leading producer of chromite, graphite, bauxite, manganese ore, iron ore, sillimanite, quartzite, pyroxenite and dolomite. The State hosts country's sole resources of ruby and platinum group of metals.

It accounts country's 95% chromite, 92% nickel ore, 69% cobalt ore, 55% bauxite, 51% titaniferous magnetite, 40% limestone, 36% pyrophyllite, 33% iron ore (hematite), 26% sillimanite, 25% each fireclay and garnet, 24% each coal and zircon and 20% vanadium ore resources.

Important minerals that occur in the State are bauxite in Boudh, Bolangir, Kalahandi, Keonjhar, Koraput, Malkangiri and Sundergarh districts; china clay in Bargarh, Boudh, Bolangir, Keonjhar, Mayurbhanj, Sambalpur and Sundergarh districts; chromite in Balasore, Cuttack, Dhenkanal, Jajpur and Keonjhar districts. Chromite deposits of Sukinda and Nuasahi ultramafic belt constitute 95% of the country's chromite resources. Coal occurs in IB river Valley coalfield, Sambalpur district and Talcher coalfield, Dhenkanal district; dolomite in Keonjhar, Koraput, Sambalpur and Sundergarh districts; dunite/pyroxenite in Keonjhar district; fireclay in Angul, Bhubaneswar, Cuttack, Dhenkanal, Jharsuguda, Khurda, Puri, Sambalpur and Sundergarh districts; garnet in Ganjam and Sambalpur districts; graphite in Bargarh, Boudh, Bolangir, Kalahandi, Koraput, Nuapada, Rayagada and Sambalpur districts; iron ore (hematite) in Dhenkanal, Jajpur, Keonjhar, Koraput, Mayurbhanj, Sambalpur and Sundergarh districts; limestone in Bargarh, Kalahandi, Koraput, Malkangiri, Nuapada, Sambalpur and Sundergarh districts; manganese ore in Bolangir, Keonjhar, Koraput, Sambalpur and Sundergarh districts; Pyrophyllite in Keonjhar district; quartz/silica sand in Boudh, Bolangir, Kalahandi, Sambalpur and Sundergarh districts; quartzite in Bolangir, Dhenkanal, Jajpur, Keonjhar, Mayurbhanj, Sambalpur and Sundergarh districts; sillimanite in Ganjam and Sambalpur districts; talc/steatite in Keonjhar, Mayurbhanj and Sambalpur districts; titanium minerals in Dhenkanal, Ganjam, Jajpur and Mayurbhanj districts; and zircon in Ganjam district.

Other minerals that occur in the State are cobalt in Cuttack and Jajpur districts; copper in Mayurbhanj and Sambalpur districts; granite in Angul, Boudh, Bolangir, Cuttack, Deogarh, Dhenkanal, Ganjam, Keonjhar, Khurda, Koraput, Mayurbhanj, Nuapada, Rayagada

and Sambalpur districts; lead in Sargipalli area, Sundergarh district and nickel in Cuttack, Jajpur, Keonjhar and Mayurbhanj districts. Occurrences of ruby and emerald are reported from Bolangir and Kalahandi districts, respectively. Platinum Group of Metals occur in Keonjhar district; silver in Sundergarh district; tin in Koraput and Malkangiri districts; and vanadiferous magnetite occurs in Balasore and Mayurbhanj districts.

### Production

The value of mineral production in Orissa at Rs. 16,233 crores in 2008-09 increased by 12% over the previous year. The State contributed 13.29% of the total value of mineral production and claims first position among the States in the country during the year under review. The important minerals produced in Orissa were coal, bauxite, chromite, iron ore, manganese ore and limestone which together accounted for about 99.1% of the total value of mineral production in 2008-09.

Orissa was the leading producer of iron ore with a share of 34.41%, bauxite 30.44%, chromite 99.89%, dolomite 18.70%, sillimanite 42.21%, pyroxenite 82.46%, manganese ore 32.02%, coal 19.91%, fireclay 18.36% and quartzite 54.43% in the total production of respective mineral in India during the year 2008-09. The State was also the leading producer of graphite with a share of 45% in the total production in the country.

Of the important minerals, production of iron ore increased by 6.08%, coal 9.96%, pyrophyllite 158%, quartz 50%, manganese ore 36%, sillimanite 7%, limestone 3%, garnet (abrasive) 45% and quartzite 3% in 2008-09 as compared to that in the previous year. On the other hand, production of chromite decreased by 18%, graphite 43%, dolomite 55%, talc/soapstone/steatite 98%, silica sand 9%, kaoline 4%, fireclay 9% and pyroxenite 3% during the year under review.

The production value of minor minerals was estimated at Rs.86 crores for the year 2008-09. The number of reporting mines in 2008-09 was 233 as against 227 in the previous year. The index of mineral production in

Orissa (base 1993-94 = 100) was 426.09 in 2008-09 as against 425.85 in the previous year.

## 10. RAJASTHAN

### Mineral Resources

Rajasthan is the sole producer of jasper, lead & zinc concentrate and wollastonite. Rajasthan was the sole producer of garnet (gem) till 2004-05. Almost entire production of calcite and natural gypsum in the country comes from Rajasthan. State is a major producer of asbestos, copper concentrate, ochre, phosphorite/rock phosphate, silver, steatite, ball clay, fluorite and felspar. The State is also an important producer of marble having various shades. Makrana area is world famous centre for marble mining.

Country's more than 90% resources of wollastonite, lead & zinc ore and potash are located in Rajasthan. State has a main share in the total resources of silver ore (84%), gypsum (81%), bentonite (80%), fuller's earth (74%), diatomite (72%), ochre (71%), marble (63%), felspar (62%), calcite (53%), mica (51%), talc/steatite/ soapstone (50%), asbestos (49%), copper (48%), ball clay (36%), rock phosphate (31%), tungsten (31%), fluorite (26%), granite (23%), gold (primary) (17%) and china clay (14%). Important minerals occurring in the State are asbestos (amphibole) in Ajmer, Bhilwara, Dungarpur, Pali, Rajsamand and Udaipur districts; ball clay in Bikaner, Nagaur and Pali districts; barytes in Alwar, Bharatpur, Bhilwara, Bundi, Chittorgarh, Jalore, Pali, Rajsamand, Sikar and Udaipur districts; calcite in Ajmer, Alwar, Bhilwara, Jaipur, Jhunjhunu, Pali, Sikar, Sirohi and Udaipur districts; china clay in Ajmer, Barmer, Bharatpur, Bhilwara, Bikaner, Bundi, Chittorgarh, Dausa, Jaipur, Jaisalmer, Jhunjhunu, Kota, Nagaur, Pali, Sawai Madhopur and Udaipur districts; and copper in Khetri belt in Jhunjhunu district and Dariba in Alwar district. Deposits of copper are also reported to occur in Ajmer, Bharatpur, Bhilwara, Bundi, Chittorgarh, Dungarpur, Jaipur, Pali, Rajsamand, Sikar, Sirohi and Udaipur districts. Dolomite occur in Ajmer, Alwar, Banswara, Bhilwara, Chittorgarh, Jaipur, Jaisalmer, Jhunjhunu, Jodhpur, Sikar and Udaipur districts; felspar

in Ajmer, Alwar, Bhilwara, Jaipur, Pali, Rajsamand, Sikar and Tonk districts; fireclay in Alwar, Barmer, Bharatpur, Bikaner, Jaisalmer, Jhunjhunu and Sawai Madhopur districts; fluorspar in Ajmer, Dungarpur, Jalore, Jhunjhunu, Sikar, Sirohi and Udaipur districts; garnet in Ajmer, Bhilwara, Jaipur, Jhunjhunu, Sikar and Tonk districts; gypsum in Barmer, Bikaner, Churu, Sri Ganganagar, Hanuman-garh, Jaisalmer, Jalore, Nagaur and Pali districts; iron ore (hematite) in Dausa, Jaipur, Jhunjhunu, Sikar and Udaipur districts; iron ore (magnetite) in Bhilwara, Jhunjhunu and Sikar districts; lead-zinc in Zawar in Udaipur district, Bamnia Kalan, Rajpura-Dariba in Rajsamand and Rampura/Agucha in Bhilwara district. Lead-zinc occurrences are also reported from Ajmer, Chittorgarh, Pali and Sirohi districts. Lignite deposits occur in Barmer, Bikaner, Jaisalmer and Nagaur districts. Flux grade limestone occurs in Jodhpur and Nagaur districts and chemical grade limestone in Jodhpur, Nagaur and Alwar districts. Cement grade deposits of limestone are widespread and occur in Ajmer, Alwar, Banswara, Bhilwara, Bikaner, Bundi, Chittorgarh, Churu, Dungarpur, Jaipur, Jaisalmer, Jhunjhunu, Kota, Nagaur, Pali, Sawai Madhopur, Sikar, Sirohi and Udaipur districts. Magnesite occurs in Ajmer, Dungarpur, Pali and Udaipur districts; marble in Ajmer, Banswara, Bhilwara, Bundi, Chittorgarh, Dungarpur, Jaipur, Nagaur, Sikar, Sirohi and Udaipur districts; mica in Bhilwara district; ochre in Bikaner, Chittorgarh, Jaipur, Sawai Madhopur and Udaipur districts; pyrite in Sikar district; pyrophyllite in Alwar, Jhunjhunu, Rajsamand and Udaipur districts; quartz/silica sand in Ajmer, Alwar, Bharatpur, Bhilwara, Bikaner, Bundi, Dausa, Jaipur, Jaisalmer, Jhunjhunu, Jodhpur, Kota, Pali, Rajsamand, Sawai Madhopur, Sikar, Sirohi, Tonk and Udaipur districts; quartzite in Ajmer, Alwar, Jhunjhunu and Sawai Madhopur districts; rock phosphate in Alwar, Banswara, Jaipur, Jaisalmer and Udaipur districts; talc/steatite/ soapstone in Ajmer, Alwar, Banswara, Bharatpur, Bhilwara, Chittorgarh, Dausa, Dungarpur, Jaipur, Jhunjhunu, Karauli, Pali, Rajsamand, Sawai Madhopur, Sirohi, Tonk and Udaipur districts; vermiculite in Ajmer and Barmer districts; and wollastonite in Ajmer, Dungarpur, Pali, Sirohi and Udaipur districts.

Other important minerals that occur in the State are apatite in Udaipur and Sikar districts; bauxite in Kota district; bentonite in Barmer, Jaisalmer and Jhalawar districts; corundum in Tonk district; diatomite in Barmer and Jaisalmer districts; emerald in Ajmer and Rajsamand districts; fuller's earth in Barmer, Bikaner, Jaisalmer and Jodhpur districts; gold in Banswara and Sirohi districts; granite in Ajmer, Alwar, Banswara, Barmer, Bhilwara, Chittorgarh, Jaipur, Jaisalmer, Jalore, Jhunjhunu, Jodhpur, Pali, Rajsamand, Sawai Madhopur, Sikar, Sirohi, Tonk and Udaipur districts; graphite in Ajmer, Alwar and Banswara districts; kyanite and sillimanite in Udaipur district; manganese ore in Banswara, Bhilwara, Jaipur, and Pali districts; potash in Jaisalmer and Nagaur districts; silver in Ajmer, Bhilwara, Jhunjhunu, Rajsamand and Udaipur districts; tungsten at Degana in Nagaur district. Tungsten deposits are also reported to occur in Jaipur, Pali, Sirohi and Udaipur districts.

### Production

The value of mineral production in Rajasthan during 2008-09 at Rs.5,007 crores increased negligibly by 1.21% as compared to the previous year. Its share to the total value of mineral production in the country in 2008-09 was about 4.10%. The State produces almost all varieties of minerals in the country. Rajasthan was the sole producer of lead concentrate, zinc concentrate, calcite, selenite and wollastonite. Almost the entire production of silver and mineral gypsum, in the country was reported from the State. Besides, Rajasthan was the leading producer of copper concentrate accounting for 49.98%, ochre 95.48%, phosphorite/rock phosphate 88.21%, silver 99.77%, talc/soapstone/steatite 71.99%, ball clay 70.79%, fireclay 28.50%, feldspar 21.42%, mica (w/s) 28.91%, limestone 18%, silica sand 13.67% and quartz 28.05% of the total production in the country. Increase in production was reported in respect of lignite 66.17%, lead concentrate 6.7%, zinc concentrate 18.32%, silver 30.66%, gypsum 9.64%, limestone 19.70%, ball clay 20.85%, quartz 35.70%, mica(w/s) by 75.34%, selenite 261.08%, clay others 349.48% and manganese

465.41% as compared to that in the previous year. No production of laterite and mica(crude) was reported during 2008-09. Production of copper concentrate declined by 48.40%, ochre 36.15%, barites 25.30% natural gas(ut.) 18.43%, phosphorite 10.86%, fireclay 33.43%, felspar 30.54%, dolomite 27.95%, silica sand 27.85%, quartzite 18.18%, wollastonite 12.81%, steatite 5.45% and phosphorite 10.86% during the year under review.

The value of production of minor minerals was estimated at Rs.2,477 crores for the year 2008-09. The number of reporting mines in Rajasthan was 261 in the year 2008-09 as against 241 in previous year. The index of mineral production in Rajasthan (base 1993 - 94 = 100) was 222.66 in 2008-09 as against 208.87 in the previous year.

## 11. TAMILNADU

### Mineral Resources

Tamil Nadu is leading producer of garnet (abrasive), graphite, lignite, magnesite, lime kankar and dunite. State accounts country's 81% lignite, 77% vermiculite, 70% dunite, 63% rutile, 52% molybdenum, 49% garnet, 33% ilmentie and 24% sillimanite resources. Important minerals occurring in the State are bauxite in Dindigul, Namakkal, Nilgiri and Salem districts; dunite/pyroxenite in Salem district; felspar in Coimbatore, Dindigul, Erode, Kanchipuram, Karur, Namakkal, Salem and Tiruchirappalli districts; fireclay in Cuddalore, Kanchipuram, Perambalur, Pudukottai, Sivaganga, Thiruvallur, Tiruchirappalli, Vellore and Villupuram districts; garnet in Chidambaram, Kanyakumari, Thanjavur, Tirunelveli and Kottabomman districts; granite in Dharmapuri, Erode, Kanchipuram, Madurai, N. Arcot & Ambedkar, P. Muthuramalingam, Salem, Thiruvannamalai, Tiruchirappalli, Tirunelveli, Vellore and Villupuram districts; graphite in Madurai, Ramnathapuram, Shivganga and Vellore districts and gypsum in Coimbatore, Perambalur, Ramnathapuram, Tiruchirappalli Tirunelveli, Tuticorin and Virudhanagar districts. Lignite deposits are located in Cuddalore Ariyalur, Thanjavur, Thiruvarur, Nagapattinam and Ramanathapuram districts; limestone in Coimbatore,

Cuddalore, Dindigul, Kanchipuram, Karur, Madurai, Nagapattinam, Namakkal, Perambalur, Salem, Thiruvallur, Tiruchirappalli, Tirunel-veli, Vellore, Villupuram and Virudhunagar districts; magnesite in Coimbatore, Dharmapuri, Karur, Namakkal, Nilgiri, Salem, Tiruchirappalli, Tirunelveli and Vellore districts; quartz/silica sand in Chengai-Anna, Chennai, Coimbatore, Cuddalore, Dharmapuri, Dindigul, Erode, Kanchipuram, Karur, Madurai, Namakkal, Periyar, Perambalur, Salem, Thiruvallur, Thiruvarur, Nagapattinam, Tiruchirappalli, Villupuram, Virudhunagar and Vellore districts; steatite in Coimbatore, Salem, Tiruchirappalli and Vellore districts; titanium minerals in Kanya-kumari, Nagapattinam, Ramanatha-puram, Thiruvallur, Tirunelveli and Tuticorin districts; vermiculite in Dharmapuri, Tiruchirappalli and Vellore districts and zircon in Kanyakumari district.

Other minerals that occur in the State are apatite in Dharmapuri and Vellore districts; barytes in Erode, Madurai, Perambalur, Tirunelveli and Vellore districts; bentonite in Chengai-Anna district; calcite in Salem district; china clay in Cuddalore, Dharmapuri, Kanchipuram, Nilgiri, Sivaganga, Thiruvallur, Thiruvannamalai, Tiruchirappalli and Villupuram districts; chromite in Coimbatore and Salem districts; copper, lead-zinc and silver in Villupuram district; corundum and gold in Dharmapuri district; dolomite in Salem and Tirunelveli districts; emerald in Coimbatore district; iron ore (magnetite) in Dharmapuri, Erode, Nilgiri, Salem, Thiruvannamalai, Tiruchirappalli and Villupuram districts; kyanite in Kanyakumari and Tirunelveli districts; molybdenum in Dharmapuri, Dindigul and Vellore districts; pyrite in Vellore district; sillimanite in Kanyakumari, Karur and Tirunelveli districts; tungsten in Madurai and Dindigul districts; and wollastonite in Dharmapuri and Tirunelveli districts.

### Production

The value of mineral production in Tamil Nadu at Rs.2,841 crores in 2008-09 decreased by 6% as compared to that in the previous year. The State contributed 2.33% in the total value of mineral

production in the country during the year under review. The principal minerals produced in the State were lignite, petroleum (crude), natural gas (utilised), garnet, limestone and magnesite, which together accounted for 97.5%, of the value of the minerals produced in the State in 2008-09. The State was the leading producer of garnet (abrasive) 89.48%, graphite (rom) 45.67%, lignite 65.73%, magnesite 76.67%, lime kankar 99.63% and dunite 60.20% in national production of respective minerals. During the year under review, production of natural gas (utilised) increased by 5.39%, vermiculite 13.88%, limestone 1.11%, ball clay 196.04%, magnesite 2.70% lime kankar 29.28% and graphite(rom) 19.58 percent.

On the other hand, production of sillimanite and steatite decreased by 100%, silica sand 69.01%, quartz 53.62% garnet (abrasive) 25.51%, dunite 31.02%, lignite 1.28%, petroleum (crude) by 11.07%, bauxite 21.49%, and felspar 35.42 percent.

The production value of minor minerals was estimated at Rs.59 crores for the year 2008-09. The number of reporting mines was 150 in 2008-09 as against 167 in the previous year. The index of mineral production in Tamil Nadu (base 1993 - 94 = 100) was 195.87 in 2008-09 as against 197.41 in the previous year.

## METALS SCENARIO

### Aluminium

3.19 Aluminium is the most abundant metal in the earth's crust. It ranks second, next only to Iron (steel), in terms of volumes used due to its versatility, which stems from its excellent and diverse range of physical, chemical and mechanical properties. Aluminium, which is only one-third the weight of steel is highly resistant to most forms of corrosion, is non-magnetic, non-combustible, is non-toxic and impervious (hence used in the food and packaging industries) and is also a superb conductor of electricity. Other valuable

properties include high reflectivity, heat barrier properties and heat conduction. The metal is malleable and easily worked by the common manufacturing and shaping processes.

3.20 Uses of aluminium metal are as follows:-

- (i) In construction- windows, doors, cladding, weather-proofing, light constructions such as conservatories and canopies.
- (ii) In transport- auto, aerospace, rail and marine industries.
- (iii) Packaging- protection, storage and preparation for food and drinks.
- (iv) Electrical uses- overhead conductors and underground power-lines and power cables.
- (v) Water treatment and medicine-antacid to combat gastric upsets, anti-perspirants.
- (vi) Machineries and Equipments.
- (vii) Castings- Domestic Utensils.

3.21 In India the electrical sector is the largest consumer of aluminium. Bulk of the Aluminium usage is in overhead conductors and power cables used in generation, transmission and distribution of electricity. Aluminium is used in switchboards, coil windings, capacitors, and many other applications as well.

3.22 The global aluminium production which was 399.00 lakh tonnes in 2008 fell to 377.81 lakh tonnes in 2009, as per CRU Monitor-Aluminium. The Global aluminium production is forecast to increase by about 2% i.e. to 385.00 lakhs tonnes in 2010. The world aluminium consumption in 2008 and 2009 was 376.68 lakh tonnes and 343.41 lakh tonnes respectively. India produced 12.33 lakh tonnes aluminium in 2007-08 and 13.48 lakh tonnes in 2008-09 which approximately was a little over 3% of world production.

3.23 India is endowed with rich bauxite reserve of 2300 million tonnes (approx. 6.76% of the world total) and ranks 5th in the world bauxite reserve base. The primary aluminium industry in India consists of five producers viz. National Aluminium Company Limited (NALCO), HINDALCO Industries Limited, Bharat Aluminium Company Limited (BALCO), Madras Aluminium Company Limited (MALCO) and Vedanta Aluminium Limited (VAL). VAL started its operations in April, 2008. Out of these Companies, only NALCO is in the Public Sector. The production of aluminium by Primary Aluminium Producers in the years 2007-08 to 2009-10 (upto December, 2009) is as follows:-

(in tonnes)

| Name of the company | Aluminium production |                  |   |
|---------------------|----------------------|------------------|---|
|                     | 2007-08              | 2008-09          | 2009-10<br>(upto December, 2009)<br>Provisional |
| NALCO               | 3,59,213             | 3,61,262         | 3,18,741  |
| HINDALCO            | 4,77,723             | 5,24,133         | 4,17,039  |
| MALCO               | 37,635               | 23,224#          | 0#  |
| BALCO               | 3,58,671             | 3,56,781         | 1,98,869@                                       |
| VAL                 | -                    | 82,785           | 1,80,436  |
| <b>Total</b>        | <b>12,33,242</b>     | <b>13,48,185</b> | <b>11,15,085</b>                                |

#MALCO has closed its smelter since December, 2008.

@ BALCO has closed its old smelter of 1,00,000 tonnes per annum capacity due to its non-viability.

The sales figures of aluminium during the years 2007-08 to 2009-10 (upto December, 2009) are as follows:-

(In tonnes)

|                    | 2007-08          | 2008-09          | 2009-10<br>(upto December, 2009)<br>Provisional |
|--------------------|------------------|------------------|---|
| Domestic sales     | 9,28,544         | 9,52,958         | 8,33,833  |
| Export sales       | 3,03,643         | 3,81,870         | 2,71,291  |
| <b>Total sales</b> | <b>12,32,187</b> | <b>13,34,828</b> | <b>11,05,124</b>                                |

3.24 The price of aluminium fixed by the primary producers is generally aligned to the London Metal

Exchange (LME) prices. In 2009, the world aluminium price averaged around \$ 1665/tonne, which was about 35% below the 2008 average price. The decline in aluminium price in 2009 was the largest annual decline on record, mainly as a result of consumption falling faster than production and stocks increasing to end at over 4.6 million at LME. One of the primary producers in India, viz. M/s MALCO temporarily shut down its aluminium production line in December, 2008, which had a capacity of 40,000 tonnes per annum. BALCO has also closed its old smelter of 1,00,000 tonnes per annum capacity due to its non-viability. It is anticipated that economic recovery along with the combined strong demand coupled with growth in demand in industrialized countries at 2-3 per cent a year would propel aluminium higher this year.

3.25 The financial year wise average LME price per tonne of aluminium is given below:-

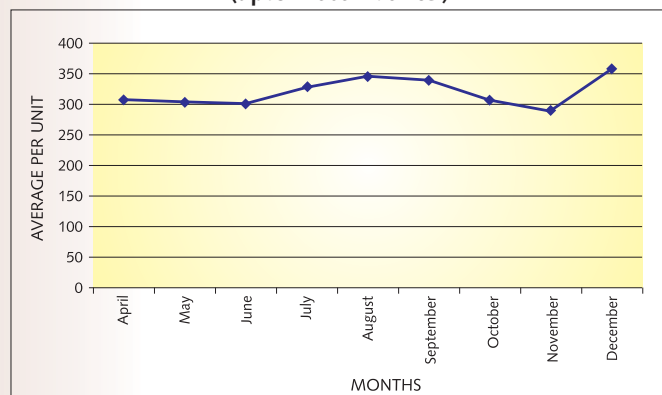
| YEAR                            | Average LME price of aluminium<br>(US\$ per tonne) |
|---------------------------------|--|
| 1995-1996                       | 1724   |
| 1996-1997                       | 1506   |
| 1997-1998                       | 1567   |
| 1998-1999                       | 1291   |
| 1999-2000                       | 1473   |
| 2000-2001                       | 1533   |
| 2001-2002                       | 1395   |
| 2002-2003                       | 1354   |
| 2003-2004                       | 1495   |
| 2004-2005                       | 1778   |
| 2005-2006                       | 2029   |
| 2006-2007                       | 2665   |
| 2007-2008                       | 2624   |
| 2008-2009                       | 2227   |
| 2009-2010<br>(upto December,09) | 1767   |

3.26 Chart/graph showing month to month price movement for Bauxite, Aluminium Metal and Average LME Prices of Aluminium during 2009-10 are given below :

### Bauxite

| MONTH 2009-10 | AVG PRICE RS. PER TONNE |
|---------------|-------------------------|
| APRIL         | 308                     |
| MAY           | 304                     |
| JUNE          | 302                     |
| JULY          | 329                     |
| AUGUST        | 346                     |
| SEPTEMBER     | 340                     |
| OCTOBER       | 307                     |
| NOVEMBER      | 290                     |
| DECEMBER      | 359                     |

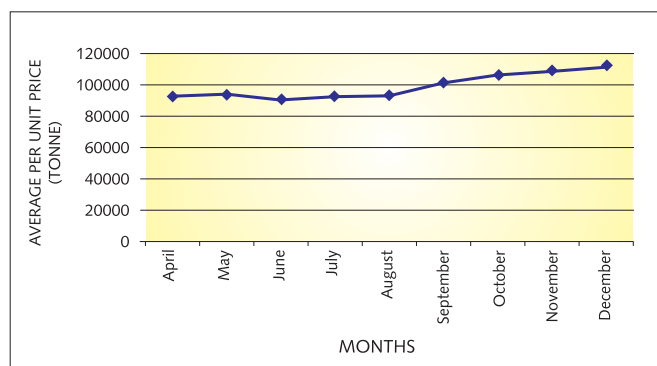
Monthly movement of Bauxite price during 2009-10 (upto December'09)



### ALUMINIUM

| 2009      | AVG PRICE RS. PER TONNE |
|-----------|-------------------------|
| APRIL     | 93320                   |
| MAY       | 94150                   |
| JUNE      | 90910                   |
| JULY      | 93300                   |
| AUGUST    | 93300                   |
| SEPTEMBER | 101530                  |
| OCTOBER   | 106280                  |
| NOVEMBER  | 109140                  |
| DECEMBER  | 112230                  |

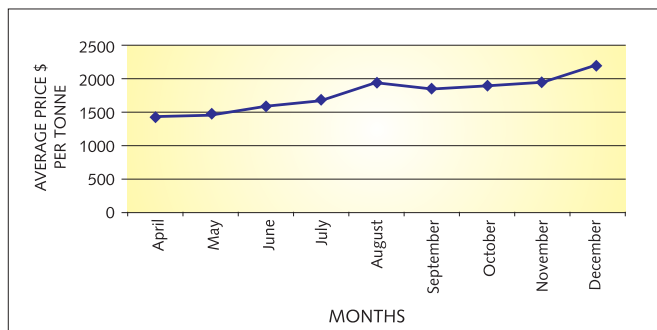
### Domestic prices of Non Ferrous Metals-Aluminium for 2009-10 (upto December'09)



### ALUMINIUM

| 2009      | AVG LME PRICE \$ PER TONNE |
|-----------|----------------------------|
| APRIL     | 1421                       |
| MAY       | 1460                       |
| JUNE      | 1574                       |
| JULY      | 1668                       |
| AUGUST    | 1934                       |
| SEPTEMBER | 1834                       |
| OCTOBER   | 1879                       |
| NOVEMBER  | 1949                       |
| DECEMBER  | 2180                       |

Average prices Aluminium 2009-10 (upto December'09)



### Copper

3.27 Copper is a base metal of strategic importance – an essential component of energy efficient motors and transformers. Its exceptional strength combined with ductility and resistance to creeping and corrosion makes it the preferred and safest conductor. Copper is a critical metal being used in areas such as defence,

space programme, railways, power cables, mint, Telecommunication Cables etc.

3.28 At present, the demand for copper minerals for primary copper production is met through two sources i.e. Copper ore mined from indigenous mines and imported concentrates. The indigenous mining activity among the primary copper producers is limited to only Hindustan Copper Limited (HCL). The other primary copper producers in the private sector import the required mineral in the form of concentrate. HCL also imports some quantity of copper concentrates for its Smelter Plants to supplement the shortfall in indigenous production. Indian Copper ores are of low grade and large scale mechanization in the underground mines has caused difficulty in extraction due to the geometry of the ore body (narrow width and a flatter inclination). Manufacture of primary copper based on indigenous ores is characterized by high energy consumption because of low scale of operations and minimal automation.

3.29 Till 1997, the only producer of primary refined copper was Hindustan Copper Limited (HCL), a public sector enterprise under the Ministry of Mines. The installed capacity for refined copper production at its two integrated copper plants was around 47,500 tonne

per year, which used to meet approximately 25-30% of India's requirement for refined copper. The balance demand was met through imports. However, the scenario has changed drastically after emergence of the other two primary producers of Copper in private sector namely M/s Hindalco Ind. Ltd. (Unit: Birla Copper) and M/s. Sterlite Industries (I) Ltd. Their present annual capacities are 5,00,000 MT and 4,00,000 MT of refined copper respectively. The plants of M/s Hindalco Ind. Ltd. (Unit: Birla Copper) and M/s Sterlite Industries (I) Ltd. are based on imported copper concentrate. Besides, another private player viz. M/s Jagadia Copper Ltd. (formerly SWIL Ltd.) has started operating its 50,000 tonnes plant based on secondary route. Continuous Cast Rod (CCR) plants of M/s TDT and M/s Finolex are based on imported cathode. The capacity for production of primary copper in India has risen from a mere 47,500 tonnes per year till 1997 to 9,99,500 tonnes at present which also includes 50,000 tonnes from secondary route by M/s. Jagadia Copper Ltd., with the result that India is now a net exporter of refined copper.

3.30 The details of production of major players in copper industry during 2009-10 (upto December, 2009) are given below:-

(In tonnes)

| Sl. No | Commodity                                     | Unit of Prodn. | No. of Factories | Installed Capacity | Production during 2009-10 (upto Dec.,2009) |
|--------|---|----------------|------------------|--------------------|--|
| 1      | 2   | 3              | 4                | 5                  | 6  |
| 1      | Cathode                                       |                |                  |                    |  |
|        | a) HCL  | tonnes         | 2                | 49,500             | 10,646                                     |
|        | b) Sterlite Industries (I) Ltd.               | tonnes         | 1                | 4,00,000           | 2,54,670                                   |
|        | c) Hindalco Ind. Ltd.<br>(Unit: Birla Copper) | tonnes         | 1                | 5,00,000           | 2,58,626                                   |
|        | <b>Total:</b>                                 |                |                  | <b>9,49,500</b>    | <b>5,23,942</b>                            |

### Price of Copper

3.31 The domestic price of copper is linked to London Metal Exchange (LME) price. The price of Copper declined sharply till 1998-99. Thereafter it was

fluctuating between US \$ 1450 & 1800 per tonne. Since 2003-04, the LME price is rising steadily and has reached historical levels. Recently, The London Metal Exchange (LME) price of copper which was hovering in the ranges from US \$ 7,000 to US \$ 8,600 per tonne

during the months of April'2008 to September'2008 had a drastic fall during October, 2008 and the price reached a level of US\$ 3071 during December, 2008. The average LME price during 2008-09 was US\$ 5864 as against US\$ 7584 during 2007-08. The copper industry was adversely affected due to the drop in LME price along with the economic slowdown in general. Along with the drop in LME copper price, TCRC (treatment and refining charges) were also unfavourable. This situation affected Indian copper producers in general. HCL which was importing part of its copper concentrate requirement for running Khetri smelter was forced to stop operations of Khetri smelter on economic considerations from December, 2008. The Khetri smelter continues to be under temporary shutdown during 2009-10 also. During the present year there has been an improvement in the price situation. Till December,2009 the LME average for the year 2009-10 has improved to US\$ 5724. Along with improvement in the LME copper price, the industrial situation has also improved in general indicating a hopeful position for the copper industry.

3.32 The year wise average LME price per tonne of copper is shown in the following table:

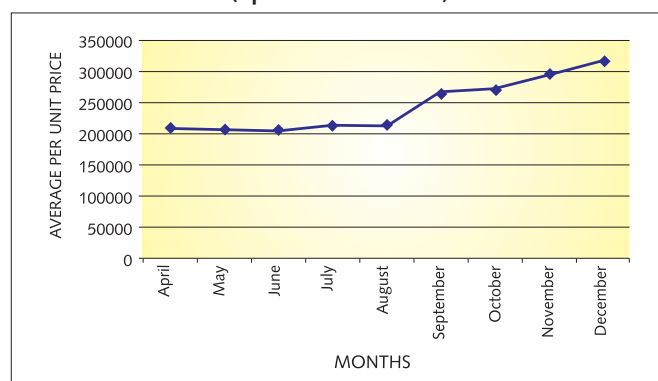
| YEAR                          | Average LME price of Copper (US \$ per ton) |
|-------------------------------|---|
| 1995-96                       | 2844  |
| 1996-97                       | 2257  |
| 1997-98                       | 2096  |
| 1998-99                       | 1581  |
| 1999-2000                     | 1670  |
| 2000-2001                     | 1806  |
| 2001-2002                     | 1527  |
| 2002-2003                     | 1586  |
| 2003-2004                     | 2046  |
| 2004-2005                     | 3000  |
| 2005-2006                     | 4097  |
| 2006-2007                     | 6970  |
| 2007-2008                     | 7584  |
| 2008-2009                     | 5864  |
| 2009-10 (upto December, 2009) | 5724  |

3.33 Chart/graph showing month to month price movement for CopperMetal and Average LME Prices of Copper are given below:-

**COPPER 2009-10**

| MONTH     | AVG PRICE Per Tonne |
|-----------|---------------------|
| APRIL     | 210000              |
| MAY       | 206750              |
| JUNE      | 206230              |
| JULY      | 214040              |
| AUGUST    | 214040              |
| SEPTEMBER | 266260              |
| OCTOBER   | 271720              |
| NOVEMBER  | 297290              |
| DECEMBER  | 317730              |

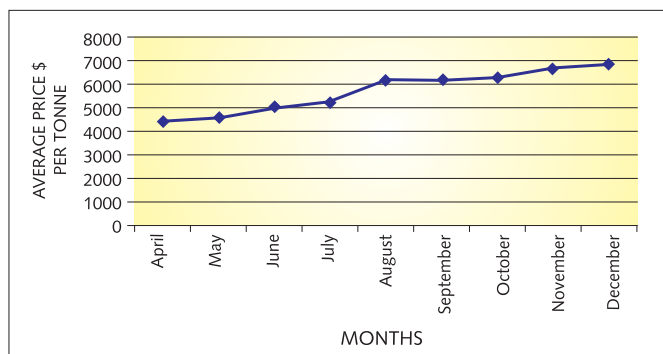
Monthwise average domestic price of Copper 2009-10 (upto December'09)



**COPPER 2009-10**

| MONTH     | AVG LME PRICE \$ PER TONNE |
|-----------|----------------------------|
| APRIL     | 4407                       |
| MAY       | 4569                       |
| JUNE      | 5014                       |
| JULY      | 5216                       |
| AUGUST    | 6165                       |
| SEPTEMBER | 6196                       |
| OCTOBER   | 6288                       |
| NOVEMBER  | 6676                       |
| DECEMBER  | 6892                       |

Average LME Price of Copper 2009-10 (upto December'09)



### Trends in Copper Consumption

3.34 Copper consumption in a country is an indicator of its level of economic development. Per capita consumption in India is in the order of 0.50 Kg as compared to 10 Kg in developed nations.

3.35 The known mineral resources for copper within the country are few with low grades of copper with the average metal content being in the region of a mere 1% and the precious metal content being very low. The estimated copper reserves in the country are approx. 369.4 million tonnes of ore containing 4.4 million tonnes of copper metal.

3.36 As per the estimate of Indian Copper Development Centre (ICDC), during 2008-09, consumption of refined copper in the country was approximately 5,35,000 MT. During 2009-10, production of refined copper is expected to be 7,03,000 MT. The refined copper consumption growth during 2009-10 would be around 6-7%. However, the production and consumption of refined copper in 2009-10 would depend on the growth of the economy and LME price.

3.37 Electrical, Electronics and Telecommunications sectors account for nearly 52% of copper usage in India. The demand again is primarily from the telecom, power and infrastructural sectors. There has been substantial reduction in demand of copper in telecom sector with increased application of Fibre optic cables and fast penetration of wireless communication through cell phones, Wireless in Local Loop and DTH Telecasting.

3.38 In the household wiring sector, despite many advantages of using copper conductors, aluminum

conductors are widely used. The trend, however, has started reversing and increased usage of copper in this sector is perceptible. But unfortunately, in place of cables and wirings made from high grade electrolytic tough pitch copper, applications are mostly of cables and wirings made from "Scrap recycled" (Commercial copper) resulting to substantial electrical energy loss to the country without counting indirect losses and other costs due to failure of these wirings. Usage of copper in building construction, as prevalent in Western World, is slowly making inroads into the country, mainly in metro cities and industrial projects.

### Lead and Zinc.

3.39 As per the data made available by the Indian Bureau of Mines (IBM), the production of zinc is more than its consumption in the country. However, there appears to be shortage of lead in the country as its production is less than its consumption. The production of primary lead metal was 60 thousand tonnes and that of primary zinc metal was 579 thousand tonnes in 2008-09. As against this the apparent consumption of lead was 257 thousand tonnes and that of zinc was 464 thousand tonnes in 2008-09. The exact details of demand and supply of lead and zinc are not maintained. Lead and Zinc are freely importable as per the import policy of the Government. Data relating to import of lead and zinc (metals & alloys) provided by the IBM for the years 2006-07, 07-08 and 08-09 and the data regarding apparent consumption and production of lead and zinc for the years 2006-07, 2007-08 and 2008-09 available with the IBM is as under :

### Apparent consumption of Lead (2006-07 to 2008-09) (Quantity in Tonnes)

| Item                               | 2006-07 | 2007-08<br>(Provisional) | 2008-09<br>(Provisional) |
|------------------------------------|---------|--------------------------|--------------------------|
| Total production<br>Lead (primary) | 44627   | 58246                    | 60323                    |
| Total imports*                     | 184021  | 154292                   | 209455                   |
| Total exports*                     | 15535   | 19806                    | 12566                    |
| Apparent<br>consumption            | 213113  | 192732                   | 257212                   |

\* Lead and alloys & scrap

(Apparent Consumption = Production + Imports – Exports)

### Apparent consumption of Zinc (2006-07 to 2008-09) (Quantity in Tonnes)

| Item                           | 2006-07 | 2007-08<br>(Provisional) | 2008-09<br>(Provisional) |
|--------------------------------|---------|--------------------------|--------------------------|
| Total production zinc (ingots) | 380945  | 457075                   | 579091                   |
| Total imports**                | 179034  | 106214                   | 94694                    |
| Total exports**                | 189249  | 81536                    | 209434                   |
| Apparent consumption           | 370730  | 481753                   | 464351                   |

\*\* zinc and alloys & scrap

(Apparent Consumption = Production + Imports – Exports)

### Other Metals/ Ores

3.40 Chart/ graph showing month to month price movement for Gold, Manganese Ore, Iron Ore, Chromite, and Average LME prices and domestic prices of Lead/ Zinc Nickel and Tin have been enclosed at **Annexure 3.7**.



Plantation on waste dumps after terracing at Codli Iron Ore Mine