

## 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.

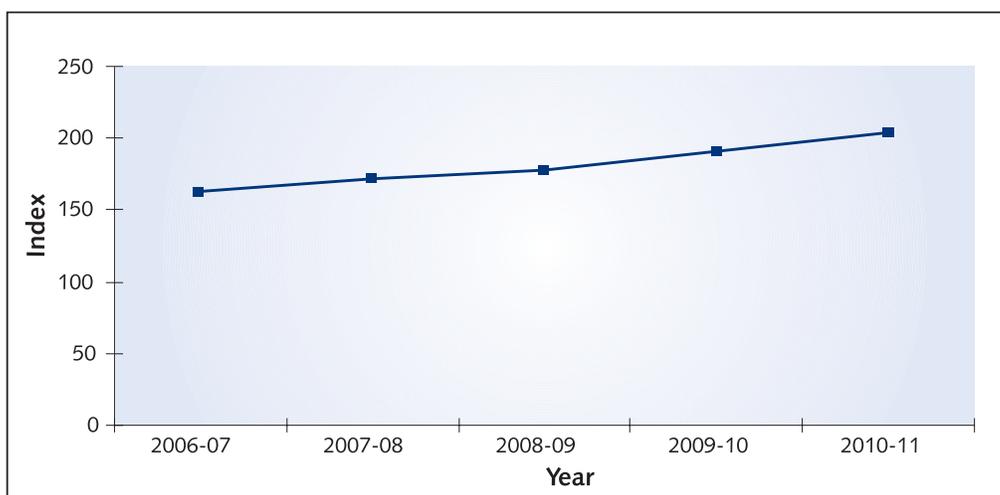
3.2 The country is endowed with huge resources of many metallic and non-metallic minerals. Mining sector is an important segment of the Indian economy. Since independence, there has been a pronounced growth in the mineral production both in terms of quantity and value. India produces as many as 87 minerals, which include 4 fuel, 10 metallic, 47 non-metallic, 3 atomic and 23 minor minerals (including building and other materials).

### Mineral Production

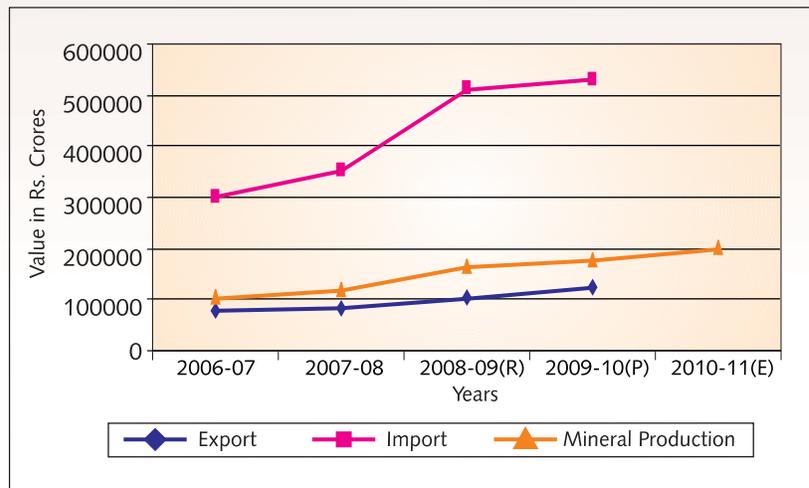
3.3 Based on the overall trend so far the index of mineral production (base 1993-94=100) for the year 2010-11 is estimated to be 208.83 as compared to 193.36 for 2009-10 showing a positive growth of 7.43%. The trend of index of mineral production for the last five years is depicted in **Figure 3.1**.

3.4 The total value of mineral production (excluding atomic minerals) during 2010-11 has been estimated at ₹200609.38 crore, which shows an increase of about 11.83% over that of the previous year. During 2010-11, estimated value for fuel minerals accounts for ₹135243.81 crore or 67.42%, metallic minerals, ₹41828.44 crore or 20.85% of the total value and non-metallic minerals including minor minerals ₹23537.13 crore or 11.73% of the total value. Information on production and value of selected minerals from 2006-07 to 2010-11 is given in **Annexure 3.1**. The details of Export and Import of Minerals during the period

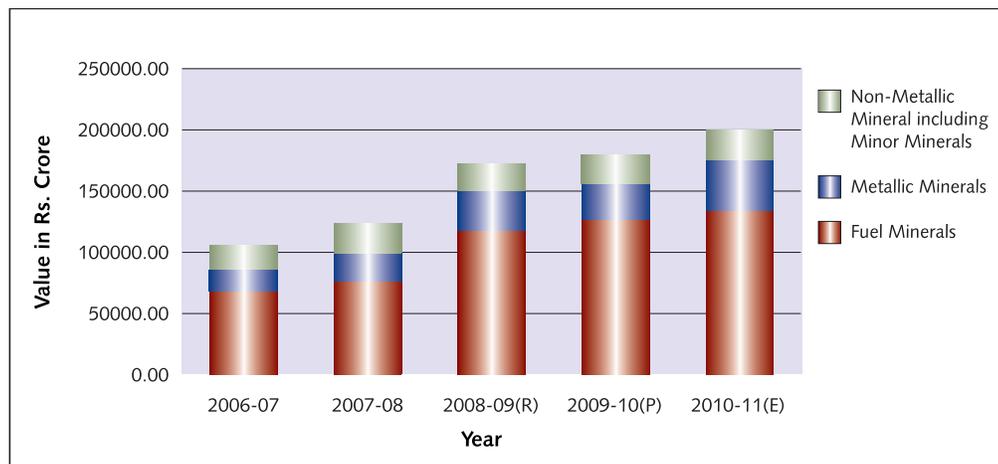
**Figure 3.1**  
Index of mineral production (Base 1993-94=100)



**Figure 3.2**  
Trends in Value of Mineral Production, Exports & Imports



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



2005-06 to 2009-10 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 Office of the Economic Advisor, Ministry of Commerce and Industry has shifted the base year from 1993-94 to 2004-05. The WPI for minerals (base 2004-05=100) stood at 255.5 in December, 2010 and the corresponding index was 200.1 for December, 2009. The minerals included in the wholesale price index are

bauxite, chromite, iron ore, copper ore, zinc conc, manganese ore, barytes, dolomite, fireclay, gypsum, kaolin, limestone, magnesite, phosphorite, graphite and sillamanite. The wholesale price index for metallic minerals was 382.6 in December, 2010 as compared to 232.2 in December, 2009 and that of other minerals was 158 in December, 2010 as compared to 150.7 in December, 2009. The wholesale price index for Coal stood at 163 in December, 2010 as compared to 162.7 in December, 2009. The wholesale price index of mineral oils stood at 160.5 in December, 2010 and it was 138.6 in December, 2009.

## GROSS DOMESTIC PRODUCT FROM MINING & QUARRYING SECTOR

3.6 The Gross Domestic Product (GDP) accrued from mining and quarrying sector at 2004-05 prices is estimated by Central Statistical Organisation (CSO). The advance estimates of GDP (at 2004-05 prices) for the year 2010-11 in respect of mining and quarrying sector accounted for about 2.26% of GDP. The contribution of mining and quarrying sector to GDP for the year 2010-11 is estimated at ₹110,482 crore which would indicate an increase of 6.2% over that in the previous year. Similarly, the advance estimates of GDP (at current prices) for the year 2010-11 in respect of mining and quarrying sector accounted for about 2.51% of GDP. The contribution of mining and quarrying sector to GDP for the year 2010-11 is estimated at ₹182,278 crore which would indicate an increase of 18.2% over that in the previous year.

### 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 2628 in 2010-11 as against 2999 in the previous year. Out of 2628 reporting mines, 377 were located in Gujarat followed by Andhra Pradesh (372), Jharkhand (288), Madhya Pradesh (251), Rajasthan (215), Karnataka (211), Orissa (159), Tamil Nadu (156), Maharashtra (142), Chhattisgarh (135) and West Bengal (111). These 11 States together accounted for 91.97% of total number of mines in the country in 2010-11. The number of reporting mines are given in **Table 3.1**. Area wise distribution of Mining Leases all over India pertaining to all Minerals excluding fuel atomic and Minor Minerals is given in **Table 3.2** and distribution of Mines by size (Major Mineral only excluding Coal State wise) is given in **Annexure 3.4**.

**Table 3.1**  
**Number of Reporting Mines**

Sector	2008-09	2009-10	2010-11
All Minerals*	3150	2999	2628
Coal (including Lignite)	574	574	574
Metallic Minerals	719	700	608
Non-Metallic Minerals	1857	1725	1446

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

**Table 3.2**  
**Area wise Distribution of Mining Leases\* ( Frequency in Hect.) (as on 31st March, 2009) (All India)**

Frequency Group area in Hects	Number of Mining Leases	Percentage of Total Leases	Area in '000 Hects.	Percentage of Total Area
<b>All Groups</b>	9398	100	493	100
0-10	5345	56	21	4
10-20	948	10	14	3
20-50	1293	14	44	9
50-100	927	10	70	14
100-200	428	5	60	12
200-500	265	3	82	17
Above 500	192	2	202	41

\* Excluding Fuel, Atomic & Minor Minerals

3.8 The Number of Underground Mines in operation Mineral wise (excluding fuel atomic and minor minerals) is given below:-

**Table 3.3**

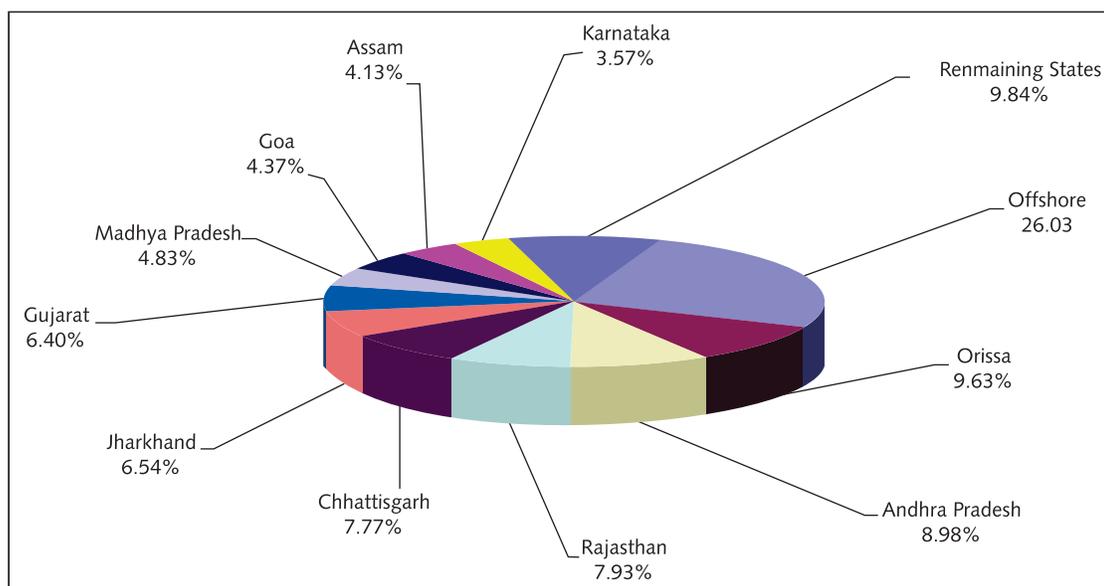
Mineral	Category 'A'	Category 'B'	Total
Apatite	–	1	1
Asbestos	1	2	3
Barytes	–	1	1
Chromite	5	–	5
Copper Ore	3	–	3
Gold	3	1	4
Lead & Zinc	6	–	6
Manganese Ore	8	4	12
Mica	3	25	28
Salt (Rock)	–	1	1
Steatite	2	19	21
<b>Total</b>	<b>31</b>	<b>54</b>	<b>85</b>

3.9 During 2010-11, 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 90.16% was confined to 10 States (including

offshore areas) only. Offshore areas are in leading position, in terms of value of mineral production in the country and had the share of 26.03% in the national output. Next in order was Orissa with a share of 9.63% followed by Andhra Pradesh (8.98%), Rajasthan (7.93%), Chhattisgarh (7.77%), Jharkhand (6.54%), Gujarat (6.40%), Madhya Pradesh (4.83%), Goa (4.37%), Assam (4.13%) and Karnataka (3.57%) in the total value of mineral production. Remaining 22 States and Union Territories having individual share of less than 3% all together accounted for 9.84% of total value during the year under review. The contribution of States/Regions in the value of mineral production during 2010-11 is pictorially shown in **Figure 3.4**.

3.10 State-wise analysis revealed that during 2010-11, the value of mineral production in most of the mineral producing States has increased as compared to that in the previous year. The States which showed an increase in the value of mineral production are Rajasthan (122.13%), Goa (48.75%), Himachal Pradesh (33.22%), Karnataka (32.13%), Chhattisgarh (28%), Uttarakhand (19.42%), Bihar (18.97%), Orissa (12.81%), Jharkhand (8.97%) and Tamil Nadu (3.34%). However, some of the principal mineral producing States showed decrease in value of mineral

**Figure 3.4**  
Share of States in Value of Mineral Production 2010-11(Estimated)



production and those include West Bengal (2.87%), Assam (5.73%), Maharashtra (5.32%), and Andhra Pradesh (6.43%). The all India Reserves and Resources of various minerals as on 01.04.2005, as per UNFC System is given in **Annexure 3.5**.

3.11 During 2009-10, the Public Sector continued to play a dominant role in mineral production accounting for 74.48% or ₹1,19,385.86 crore 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 2009-10 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 2009-10, the Public Sector accounted for production of sizeable 91% of coal, 86.05% of petroleum(crude), 76.91% of Natural gas (utilized), 58% Tin concentrate, 99% of Barytes, 84% of Kyanite, 74% of Silimanite and 60% of Magnesite.

3.12 India's ranking in 2009-10 in world production was second in barytes, chromite and talc/steatite/pyrophyllite, third in coal & lignite and bauxite, fourth in iron ore and kyanite/sillimanite, fifth in manganese ore, steel (crude) and zinc, sixth in bauxite, eighth in aluminium and tenth in magnesite.

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

3.13 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 2009-10 is given in **Annexure 3.6** captioned as contribution and rank of India in world production of principal minerals and metals.

### PRODUCTION TRENDS

#### Metallic Minerals

3.14 The value of metallic minerals in 2009-10 at ₹32274.29 crore decreased by about 10.52% over the previous year. Among the principal metallic minerals, iron ore contributed ₹26864.84 crore or 83.24%, zinc concentrate ₹1290.85 crore or 4.0%, manganese ore ₹1269.54 crore or 3.93%, chromite ₹1183.41 crore or 3.67%, bauxite ₹456.36 crore or 1.41%, copper (concentrate) ₹362.54 crore or 1.12%, silver ₹338.84 crore or 1.05% and gold ₹331.39 crore or 1.03%, while the remaining was shared by Lead Concentrates and Tin Concentrates.

The production of iron ore at about 218.64 million tonnes in 2009-10 registered an increase of 2.67% over the previous year. About 27% of the total production was shared by Public Sector Companies like SAIL (including IISCO), NMDC, etc. The share of Private Sector was 63% which includes Tata Steel (formerly TISCO) (8%). Almost the entire production of iron ore (96%) accrued from Orissa, Karnataka, Chhattisgarh, Goa and Jharkhand during the year. The remaining 4% production was reported from Andhra Pradesh, Madhya Pradesh, Maharashtra and Rajasthan.

The production of copper concentrate was at 124 thousand tonnes in 2009-10 which got decreased by about 9.48% as compared to the previous year. Average metal content in copper concentrate was 22.9% Cu. The production of chromite was at 3.41 million tonnes in 2009-10 which got decreased by 16.22% as compared to the previous year. Orissa reported almost entire output of chromite (99%) 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 which have their own plants and jointly accounted for 63% of total production during 2009-10. Three Public Sector Companies; viz, Orissa Mining Corporation (OMC), Mysore Mineral Ltd. (MML) and Industrial Development Corp. of Orissa Ltd. (IDCOL) together reported 18% of the total production in 2009-10. The production of manganese ore at 2.44 million tonnes in 2009-10 decreased by about 12.52% compared to that in the previous year. MOIL continued to be the largest producer of manganese ore with a share of 42% of the total production in 2009-10 followed by Tata Steel (10%), SMIOR (10%), OMC (9%), and R.B.S.S.Durga Prasad & F.N. Das 5%. Of the total production of manganese ore in 2009-10, Orissa contributed 25%, Maharashtra 24%, Madhya Pradesh 25%, Karnataka 13% and Andhra Pradesh 10%. The remaining 2% was jointly shared by Goa, Gujarat, Rajasthan and Jharkhand.

The production of primary gold at 2106 kg (excluding by-product gold recovery from imported concentrates) in 2009-10 registered decrease of about 13.62% 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 13.95 million tonnes in 2009-10 decreased by 9.76% 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 66% of the total production of bauxite in 2009-10. Orissa accounted

for 35% of the total output of bauxite during 2009-10 followed by Gujarat (19%), Maharashtra (14%) Chhattisgarh (12%) and Jharkhand (12%).

During 2009-10, the production of lead concentrate at 136 thousand tonnes increased by 1.74% and that of zinc concentrate at 1277 thousand tonnes showed an increase of 4.33% over the previous year. Average metal content in lead concentrate was 61.82% Pb and that in zinc concentrate was 52.86% Zn. Rajasthan accounted for the entire production of lead concentrate and zinc concentrate during 2009-10.

### Non-Metallic Minerals

3.15 The value of production of non-metallic minerals at ₹4286.94 crores during 2009-10 increased by 5.41% as compared to the previous year. Limestone retained its leading position by contributing 69.66% of the total value of non-metallic minerals in 2009-10. The other non-metallic minerals in the order of importance were phosphorite/rock phosphate (7.28%), barytes (5.48%), dolomite (3.38%), gypsum (2.24%), garnet (abrasive) (1.73%) kaolin (1.63%), talc/soapstone/steatite (1.23%), magnesite (0.99%) and Silica Sand (0.70%). The remaining was from other non-metallic minerals.

The production of limestone which was at 229 million tonnes in 2009-10 increased by 3.33% as compared to that in the previous year. Limestone is widely produced in India. As much as 87% of the total output in 2009-10 was contributed by seven principal States; viz, Andhra Pradesh (22%), Rajasthan (20%), Madhya Pradesh (12%), Gujarat (9%), and Tamil Nadu, Chhattisgarh and Karnataka (8% each). The remaining 13% of the total production was shared by other limestone producing States. About 41% 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. (5%) and Birla Corporation Ltd., Madras Cement Ltd. and Binani (3% each).

The production of phosphorite/rock phosphate which was at 1547 thousand tonnes decreased by 14.26% in 2009-10 as compared to the previous year. The entire production was from Public Sector. Jhamarkotra mine of Rajasthan State Mines & Minerals Limited (RSMML). RSMML alone accounted for 88% of the total production in India and the entire production of Rajasthan during 2009-10. Madhya Pradesh contributed the remaining 12% of the production. The production of dolomite at 5182 thousand tonnes in 2009-10 got decreased by 5.85% as compared to the preceding year. Four major companies together accounted for 55% of the dolomite produced in 2009-10. These are SAIL (26%), Rashtriya Ispat Nigam Ltd. (12%), South West Mining Ltd. (9%) and Tata Steel (formerly TISCO) (8%). The principal producing States of dolomite were Andhra Pradesh (30%), Chhattisgarh (23%), and Orissa (18%). The remaining 29% was contributed by Seven States during the year, namely, Gujarat, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Uttarakhand and Rajasthan.

The production of kaolin in 2009-10 was at 2578 thousand tonnes which got increased by 23.73% as compared to that in the previous year. Nearly 50% of total output of kaolin in 2009-10 was reported from Gujarat followed by Kerala (28%) and Rajasthan (13%). Production of gypsum at 3.42 million tonnes in 2009-10 registered a decrease of 11.73% as compared to the 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 which was at 286 thousand tonnes during 2009-10 increased by 13.25% as compared to the previous year.

The production of talc/soapstone/steatite in 2009-10 which was at 835 thousand tonnes got decreased by about 6% over the previous year. Rajasthan, the principal State accounted for 74% of the total production in 2009-10. 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%) and Katiyar Mining and Industrial Corp. (4%) together accounted for 62% of the total production of talc/ soapstone/ steatite in 2009-10.

### Minor Minerals

3.16 The value of production of minor minerals was estimated at ₹ 18734.45 crore in 2009-10. Andhra Pradesh with share of 54% in the value of minor minerals produced in the country occupied the top position. Rajasthan was at second place and had a share of 16.6% in the value of minor minerals. Next in the order was Uttar Pradesh with a share of 12.4%, Kerala 3.9%, Gujarat 3.8%, Madhya Pradesh 2.4%, Maharashtra 1.7% and Chattisgarh 1.2%. 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 37.7% to the value of minor minerals followed by Building Stone 19.6%, Brick-earth 10%, Ordinary Sand 9.4%, Gravel 6.2%, Marble 3.6%, Lime Stone 3.2%, Quartzite & Sand Stone 3.1%, Kankar 2.6% and Murrum 2.3%. The individual share of remaining minerals was less than 1.0% which together contributed 2.1% of value of minor minerals. The share of minor minerals in the value of mineral production was estimated at ₹ 18734.45 crore for 2008-09 and 2009-10.

### State-wise Mineral Scenario

3.17 During 2009-10, mineral production was reported from 32 States/Union Territories of which the bulk of value of mineral production of about 89.16% was confined to 11 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 27.32% in the national output. Next in order was Andhra Pradesh with a share of 10.74% followed by Orissa (9.54%), Gujarat (7.13%), Chhattisgarh (6.79%), Jharkhand (6.71%), Madhya Pradesh (5.41%), Assam (4.90%), Rajasthan (3.99%),

Maharashtra (3.36%) and Goa (3.28%) in the total value of mineral production. Remaining 21 States/ Union Territories having individual share of 3% or less than 3% all together accounted for 10.84% of total value during the year under review.

3.18 State-wise analysis revealed that during 2009-10, the value of mineral production in most of the mineral producing States has got increased as compared to that in the previous year. The States which registered an increase in the value of mineral production are Arunachal Pradesh (34.85%), Jammu & Kashmir (23.51%), Rajasthan (22.43%), Goa (20.88%), Jharkhand (11.34%), Meghalaya (5.28%), Tamilnadu (3.07%), Assam (1.88%) and Andhra Pradesh (1.62%) during the year under review. However, some of the principal mineral producing States revealed decrease in value of mineral production and those include Maharashtra (14.66%), Karnataka (14.22%) and Chattisgarh (7.90%).

### SCENARIO OF MINERAL RICH STATES

3.19 The 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, feldspar, 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; feldspar in Anantapur, West Godavari, Hyderabad, Khammam, Mahaboobnagar, 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, Vizianagaram 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, Visakhapatnam, Vizianagaram and Warangal districts; quartzite in Kurnool, Srikakulam, Visakhapatnam and Vizianagaram 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 ₹19258.15 crore in 2009-10 was higher by about 1.62% 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), iron ore, limestone, petroleum (crude) and barites which together accounted for 47.19% of total value of mineral production in the State during 2009-10. Coal alone contributed 32.73% 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 10.74% to the total value of the mineral production. The share of Andhra Pradesh in the production of principal minerals was barytes 99.71%, mica (crude) 99.84%, feldspar 46.87%, vermiculite 87.53%, quartz 33.19%, laterite 50.43%, silica sand 39.22%, dolomite 29.69%, clay (others) 19.56%, Manganese 10.26% and limestone 21.55% in the country.

Among the important minerals produced in the State, output of manganese ore increased by 35.69% and petroleum (crude) by 5.19%. In the same manner, increase was observed in coal 13.20% barytes 26.92%, clay (others) 30.92%, dolomite 22.91%, ochre 28.92%, Vermiculite 4.84% and sand others 31.77

percent. However, the production of iron ore got decreased by 38.64%, kaoline by 11.81%, asbestos by 26.03%, limestone by 4.81%, Limeshell by 100%, shale by 27.07%, feldspar by 30.98%, steatite by 11.14%, Silica sand by 28.20% and quartzite by 79.50%.

The production value of minor minerals was estimated at ₹10,054.18 crore for the year 2009-10. The number of reporting mines in the State was 444 in 2009-10 as compared to 472 in the previous year. The index of mineral production in Andhra Pradesh (base 1993-94=100) was 215.06 in 2009-10 as against 198.46 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 which was at ₹12,180.34 crore in 2009-10 got decreased by 7.90% as compared to that in the previous year. The State is ranked fifth in the country and has accounted for 6.79% of the total value of the production. The important minerals produced in the State in 2009-10 were coal, iron ore and limestone which together accounted for about 97.49% 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 iron ore with a share of 20.67% and 12.11% respectively in the country. During 2009-10, the production of coal got increased by 7.89%, bauxite by 0.72% and limestone by 4.43 percent. There was a decrease in production of iron ore by 11.74%, dolomite by 8.42% Tin concentrate by 1.28%, Clay (others) by 100%, steatite by 83.19% and quartzite by 100 percent.

The production value of minor minerals was estimated at ₹216.76 crores for the year 2009-10. The number of reporting mines in Chhattisgarh was 145 in 2009-10 as against 165 in the previous year. The index of mineral production in Chhattisgarh (base 1993-94=100) was 253.41 in 2009-10 as against 240.36 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 in 2009-10 got increased by 20.88% as compared to the previous year and was at 5887.49 crores. About 99.90% 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 2009-10. During the year under review, production of iron ore got increased by 26.05% and decreased in bauxite by 93.30% and manganese ore by 51.28% over the previous year.

The production value of minor minerals was estimated at ₹5.73 crores for the year 2009-10. There were 74 reporting mines in 2009-10 as against 77 in the previous year. The index of mineral production in Goa (base 1993-94=100) was 275.62 in 2009-10 as against 219.55 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, Mehsana 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 2009-10 which was at ₹12, 782.52 crore, recorded about 0.05% increase as compared to that in the previous year. The State ranked fourth in the country and accounted for about 7.13% of the total value of mineral production in India during the year. Gujarat was the sole producer of chalk and fluorite (concentrate) and the leading producer of Kaolin, Marl and clay (others) in the country.

The State was also the second largest producer of lignite and petroleum (crude) and sole producer of fluorite (concentrate) in the country during 2009-10. Production of lignite got increased by 4.17%, ball clay (378.08%), fireclay (30.71%), Ochre (132.14%),

Quartz (10.61%), Dolomite (48.04%), Silica Sand (3.99%), Gypsum (638.99%) and Kaolin (31.40%). The minerals reporting fall in production during 2009-10 were Natural gas(ut) 6.18%, laterite 28.84%, Marl (7.68%), bauxite by 25.22%, Chalk by 9.55% and Limestone 1.25%. Fall in production was due to less plant requirement, shortage of labour etc.

The production value of minor minerals was estimated at ₹725.67 crores for the year 2009-10. The number of reporting mines in the State was 433 in 2009-10 as compared to 439 in the previous year. The index of mineral production in Gujarat (base 1993-94=100) was 112.12 in 2009-10 as against 113.27 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 feldspar. 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; feldspar 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; dunite/ 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 2009-10 at ₹12,036.78 crore got increased by about 11.34 % over the previous year. The State claiming Sixth position in the country accounted for 6.71% of the total value of mineral production during 2009-10. 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 88.44% of the total value of mineral production in the State. The other principal minerals produced in the State were iron ore, bauxite, dolomite and copper concentrate.

Among the important minerals, production of coal got

increased by 10.04%, iron ore by 7.87%, copper concentrate by 14.36%, bauxite by 5.34%, Graphite 96.84% and quartz by 67.51% during 2009-10 as compared to the previous year. However, the output of manganese ore got declined by 65.36%, limestone by 1.29%, laterite by 11.36%, gold by 22.22%, Silica Sand by 16.42% and fireclay by 6.56% owing to disruptions by naxal outfits and less market demand.

The production value of minor minerals was estimated at ₹40.14 crores. The number of reporting mines in Jharkhand during 2009-10 was 297 as against 300 during previous year. The index of mineral production in Jharkhand (Base 1993-94=100) was 144.01 in 2009-10 as compared to 131.27 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 dunite. 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% dunite, 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; dunite/ 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 2009-10 at ₹5,416.09 crore got decreased by 14.22%

over the previous year. Iron ore, gold, manganese ore and limestone being the important minerals produced in the State together accounted for about 98.92% 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 99.34%, dunite(65.31%), shale(33.52%) and limeshell (63.82%) of total production in the country. The State was also the second leading producer of iron ore. Among the important minerals, production of Laterite got increased by 46.44%, chromite by 56.91%, Limestone by 13.06%, Dunite by 14.73%, Quartzite by 37.04% and dolomite by 4.57 percent. The production of fireclay got declined by 27.26%, Gold by 12.07%, quartz by 98.43%, shale by 11.99%, Bauxite by 3.53% and Manganese ore by 6.02 percent. Decline in production was also noticed in magnesite 34.83% and limeshell 30.19 percent.

The production value of minor minerals was estimated at ₹30.41 crores for the year 2009-10. The number of reporting mines in Karnataka was 233 in 2009-10 as against 238 in the previous year. The index of mineral production in Karnataka (Base 1993-94=100) was 288.50 in 2009-10 as compared to 311.05 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, Mandasaur, 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 Mandasaur district; barytes in Dewas, Dhar, Shivpuri, Sidhi and Tikamgarh districts; feldspar 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 ₹9,701.87 crore in 2009-10 got increased by about 1.19% as compared to the previous year. Madhya Pradesh contributed 5.41% to the total value of mineral production and was seventh 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 87.05% and copper concentrates 52.15% in the national output of respective minerals. Madhya Pradesh was also the leading producer of clay (others) (23.36%), shale (22.81%), Manganese (25.05%), Diaspore(44.83%)

and phosphorite (11.69%). During 2009-10, the production of coal got increased by 3.85%, Shale 8.05%, Copper concentrate 12.75%, iron ore 161.65% and Diamond 3036.19%. However, downward trend in production was noticed in manganese ore 15.84%, phosphorite 27.81%, Fireclay 29.40%, limestone 6.62%, clay (others) 57.73%, laterite 16.40% and bauxite 1.09%.

The production value of minor minerals was estimated at ₹440.19 crore for the year 2009-10. The number of reporting mines in Madhya Pradesh was 288 in 2009-10 as against 326 in the previous year. The index of mineral production in Madhya Pradesh (base 1993-94=100) was 216.36 in 2009-10 as against 214.87 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 2009-10 at ₹6,025.54 crore got decreased by 0.72% as compared to that in the previous year. Maharashtra accounted for about 3.36% 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 2009-10. The State was the largest producer of manganese ore sharing 24.28% of total production of the mineral in the country. Among other important minerals, the State reported higher production during 2009-10 in respect of Kyanite by 12.84%, fluorite (graded) by 55.29%, Quartzite by 135.39% and coal by 5.94%. Fall in production was reported in respect of pyrophyllite by 30.23%, bauxite by 7.28%, Corundum by 68.57%, Sand (others) by 15.74%, iron ore by 14.97%, silica sand by 16.41%, Dolomite by 15.34%, Shale by 6.94%, Limestone by 14.04%, quartz by 36.46%, sillimanite by 5.37% and manganese ore by 12.96%.

The value of production of minor minerals was estimated at ₹317.31 crores for the year 2009-10. The number of reporting mines was 161 in 2009-10 as against 159 in the previous year. The index of mineral production in Maharashtra (base 1993-94 = 100) in 2009-10 was 199.46 as against 207.84 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 for 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 got decreased by 3.43% in 2009-10 over the previous year and was at ₹17,119.70 crores. The State contributed 9.54% of the total value of mineral production and it is in third 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 99.10% of the total value of mineral production in 2009-10.

Orissa was the leading producer of iron ore with a share of 36.26%, bauxite 34.97%, chromite 99.81%, dolomite 18.20%, sillimanite 46.0%, pyroxenite 82.33%, manganese ore 24.75%, coal 20.0%, fireclay 12.05%, Pyrophyllite 4.92% and quartzite 27.40% in the total production of respective mineral in India during the year 2009-10. The State was also the leading producer of graphite with a share of 26.27% in the total production of the country.

Of the important minerals, production of iron ore got increased by 9.15%, coal 8.14%, quartz 271.33%, sillimanite 1.72%, and Bauxite 3.07% in 2009-10 as compared to that in the previous year. On the other hand, production of chromite got decreased by 16.29%, manganese ore 28.09%, pyrophyllite 23.82%, graphite 33.53%, quartzite 37.59% dolomite 41.58%, limestone 6.85%, talc /soapstone /steatite 100%, silica sand 62.06%, garnet(abrasive)3.26% kaoline 37.50%, fireclay 31.18% and pyroxenite 0.53% during the year under review.

The production value of minor minerals was estimated at ₹85.68 crores for the year 2009-10. The number of reporting mines in 2009-10 was 216 as against 239 in the previous year. The index of mineral production in Orissa (base 1993-94 = 100) was 433.96 in 2009-10 as against 427.74 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, Hanumangarh, 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 2009-10 at ₹7,157.47 crores, got increased by 22.43% as compared to the previous year. Its share to the total value of mineral production in the country in 2009-10 was about 3.99%. The State produces almost all varieties of minerals in the country. Rajasthan was the sole producer of lead concentrate, zinc concentrate, calcite and wollastonite. Almost the entire production of silver, Ochre and mineral gypsum, in the country was reported from the State. Besides, Rajasthan was the leading producer of copper concentrate accounting for 37.36%, ochre 93.22%, phosphorite/rock phosphate 88.31%, silver 99.84%, talc/soapstone/steatite 74.53%, ball clay 68.45%, fireclay 45.35%, felspar 48.98%, mica (w/s) 46.27%, limestone 20.26%, silica sand 14.39% and quartz 29.14% of the total production in the country. Increase in production was reported in respect of lignite 20.72%, Natural Gas(ut.) 10.65%, Manganese ore 6.87% lead

concentrate 1.74%, zinc concentrate 4.33%, silver 31.88%, limestone 19.16%, quartz 22.52%, mica(w/s) by 166.75%, clay others 23.24%, barytes 5.56%, ochre 32.07%, feldspar 8.42%, wollastonite 18.64% and dolomite 15.66% as compared to that in the previous year. Production of copper concentrate declined by 32.14%, gypsum 11.68%, ball clay 12.03%, phosphorite 12.07%, fireclay 2.59%, silica sand 17.56%, quartzite 22.85%, Mica (crude) 92.50%, Iron ore 47.83% and steatite 4.73% during the year under review.

The value of production of minor minerals was estimated at ₹3,114.49 crores for the year 2009-10. The number of reporting mines in Rajasthan was 282 in the year 2009-10 as against 261 in previous year. The index of mineral production in Rajasthan (base 1993 - 94 = 100) was 242.44 in 2009-10 as against 229.31 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 for country's 81% lignite, 77% vermiculite, 70% dunite, 63% rutile, 52% molybdenum, 49% garnet, 33% ilmenite and 24% sillimanite resources. Important minerals occurring in the State are bauxite in Dindigul, Namakkal, Nilgiri and Salem districts; dunite/pyroxenite in Salem district; feldspar 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, Tirunelveli, 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 Kanyakumari, Nagapattinam, Ramanathapuram, 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, Tiruvannamalai, 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 ₹4,088.31 crores in 2009-10 got increased by 3.07% as compared to that in the previous year. The State

contributed 2.28% 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 98.17%, of the value of the minerals produced in the State in 2009-10. The State was the leading producer of garnet (abrasive) 92.42%, graphite (rom) 47.62%, lignite 65.55%, magnesite 77.38%, lime kankar 99.77% and dunite 34.69% in national production of respective minerals. During the year under review, production of lignite got increased by 4.83%, dunite 7.89%, garnet (abrasive) 35.88%, Marl 482.89%, limestone 8.10% and magnesite 17.52 percent. On the other hand, production of sillimanite got decreased by 100%, petroleum (crude) by 9.81%, natural gas (utilised) by 5.15%, vermiculite by 16.61%, silica sand by 48.68%, quartz by 34.33%, lime kankar by 22.75%, graphite(rom) by 14.42%, fireclay by 35.24%, ball clay by 9.66%, bauxite by 98.76% and felspar by 85.35%.

The production value of minor minerals was estimated at ₹59.07 crore for the year 2009-10. The number of reporting mines was 170 in 2009-10 as against 178 in the previous year. The index of mineral production in Tamil Nadu (base 1993 - 94 = 100) was 199.08 in 2009-10 as against 198.34 in the previous year.

## METALS

### Aluminium

Aluminium is the most abundant metal in the earth's crust. It ranks second, next only to 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, non-toxic and impervious (hence used in the food and packaging industries) which is also a superb conductor of electricity. Other valuable properties include high reflectivity and rapid heat dissipation. The metal is malleable and easily worked by the common manufacturing and shaping processes.

1. 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.
2. 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. The global aluminium production which was 377.81 lakh tonnes in 2009 got increased to 419.88 lakh tonnes in 2010, as per CRU Monitor-Aluminium. The Global aluminium production is forecast to increase by about 16.3% i.e. to 488.3 lakh tonnes in 2011. The world aluminium consumption in 2009 and 2010 was 343.49 lakh tonnes and 411.15 lakh tonnes respectively. India produced 13.47 lakh tonnes aluminium in 2008-09 and 15.24 lakh tonnes in 2009-10 which approximately was about 3.5% of world production.
4. India is endowed with rich bauxite reserve of 2300 million tonnes (approx. 6.76% of the world total) and ranks fifth 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 2008-09 to 2010-11 (upto December, 2010) is as shown in **Table 3.4**.

The sales figures of aluminium during the years 2008-09 to 2010-11 (upto December, 2010) are as shown in **Table 3.5**.

- The price of aluminium fixed by the primary producers is generally aligned to the London Metal Exchange (LME) prices. In FY 2009-10, the world aluminium price averaged around \$1666/tonne, which was about 16% below the FY 2008-09 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. Global aluminium capacity is estimated at 50.30 million tonnes in 2010, while production is 41.9 million tonnes. This indicates a capacity utilization of around 80% in 2010 compared to 75% in 2009. 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. Supporting the prices was the vast amount of Aluminium metal tied up under cheap rent and financing deals where metal holders would make profits if the prices rise faster than storage costs. In FY 2010-11, the average aluminium price upto Dec., 2010 has been \$ 2176/tonne which is around 17% higher than that of FY 2009-10. It is expected that LME price of aluminium will remain

**Table 3.4**  
**Production of Aluminium**

(in tonnes)

Name of the company	Aluminium production		
	2008-09	2009-10	2010-11 (upto December, 2010) Provisional**
NALCO	3,61,262	4,31,488	3,32,195
HINDALCO	5,23,453	5,55,404	3,99,253
MALCO	23,224#	–	–
BALCO@	3,56,781	2,68,425	1,92,383
VAL	82,031	2,69,083	2,76,013
<b>Total</b>	<b>13,46,751</b>	<b>15,24,751</b>	<b>11,99,844</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.

\*\* Compiled on the basis of information provided by primary aluminium producers to the Ministry.

**Table 3.5**  
**Sales figures of Aluminium**

(In tonnes)

Items	2008-09	2009-10	2010-11 (upto December, 2010) Provisional
Domestic sales	9,52,958	11,58,964	9,51,829
Export sales	3,81,870	3,72,801	2,24,657
<b>Total sales</b>	<b>13,34,828</b>	<b>15,31,765</b>	<b>11,76,486</b>

between \$ 2400 to \$ 2600/ tonne in the remaining months of FY 2010-11. Aluminium still remains as the prime candidate for a bearish bet and the unwinding of financing deals could be the key in this respect. Analysts forecast prices to average between \$2,350/tonne and \$2,500/tonne in 2011 as a large stock overhang and a declining share of metal tied up in financing deals are expected to restrict further price surges.

## COPPER INDUSTRY IN INDIA

Copper is a malleable and ductile metallic element that is an excellent conductor of heat and electricity as well as corrosion resistant and antimicrobial. It is found in sulfide deposits (as chalcopyrite, bornite, chalcocite, covellite), carbonate deposits (as azurite and malachite), and silicate deposits (as chrysocolla and diopside) it is also formed as pure "native" copper. Archaeological evidence demonstrates that copper was one of the first metals used by humans and was used at least 10,000 years ago for items such as coins and ornaments in western Asia. Regardless of competition from substitutes like iron, aluminum, plastic & fibre, copper's chemical, physical and aesthetic properties make it a material of choice in a wide range of domestic, industrial and high technology applications. Copper is a critical metal being used in areas such as defence, space programme, railways, power cables, mint, Telecommunication Cables, etc.

Copper is a very important element and the oldest known commodity in the world that directly affects the world's economy. Copper consumption in a country is an indicator of its level of economic development. Per capita consumption of copper in India is in the order of 0.50 Kg as compared to 10 Kg in developed nations.

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. Indian

Copper ores have low grade and large scale mechanization in the underground mines is rendered difficult 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.

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 coming 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.

The details of production of major players in copper industry during 2010-11 (upto December, 2010) are given in **Table 3.6**.

## PRICE OF COPPER

Customs duty on imported copper had been reduced in phases from 35% in 2002-03 to 5% at present leading to a steep reduction in price, which, in turn, affected the profitability of domestic copper manufacturer.

Table 3.6

(In tonnes)

Sl. No	Commodity	Unit of Prodn.	No. of Factories	Installed Capacity	Production during 2010-11 (upto Dec,2010)
1	2	3	4	5	6
1	Cathode				
	a) HCL	tonnes	2	49,500	11,484
	b) Sterlite Industries (I) Ltd.	tonnes	1	4,00,000	2,23,825
	c) Hindalco Ind. Ltd. (Unit: Birla Copper)	tonnes	1	5,00,000	2,50,637
	<b>Total:</b>			<b>9,49,500</b>	<b>4,85,946</b>

The domestic price of copper is linked to London Metal Exchange (LME) price. The LME Cash Settlement Price (CSP) is the basis on which prices of copper products are declared by domestic producer. The copper industry was adversely affected due to drastic fall in LME price in the year 2008-09 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 operation of Khetri smelter from December, 2008 on economic considerations. The Khetri smelter continues to be under temporary shutdown on the basis of economic considerations. During the present year, there has been an improvement in the price situation. Till December'10, the LME average price of copper for the year 2010-11 has improved to US\$ 7636 from the yearly average LME price of US\$ 5864 in 2008-09 and US\$ 6101 in 2009-10.

Along with improvement in the LME copper price, the industrial situation has also improved in general indicating a hopeful position for the copper industry.

The year wise average LME price per tonne of copper is shown in the following Table 3.7.

Table 3.7

YEAR	Average LME price of Copper (US \$ per ton)
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
2009-2010	6101
2010-2011 (upto Dec., 2010)	7636

### TRENDS IN COPPER CONSUMPTION

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.

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. HCL has access to over two-thirds of the copper ore

reserves in India. IMC-SRGC has reviewed and classified HCL's mineral reserves and resources in accordance with the Australian Joint Ore Reserves Committee (JORC)'s Code. As per the assessment, HCL has estimated reserves of approx. 411.53 million tonnes of copper ore, with an average of 1.05% copper content as on 01.04.2010.

As per the data of Indian Copper Development Centre (ICDC), during 2008-09 and 2009-10, total domestic refined copper usage was approximately 538,000 tonnes and 550,000 tonnes respectively, whereas, total world refined copper usage was 18,056,000 tonnes in 2008 and 18,189,000 tonnes (provisional) in 2009. Though the current global economic crisis has significantly reduced world refined copper usage levels. International Copper Study Group (ICSG) expects world apparent refined usage in 2010 to increase by about 3.8% from that in 2009. However, the production and consumption of refined copper in 2010-11 would depend on the growth of the economy and LME price.

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 sector. 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.

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 in 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.

3.19 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. During the year 2010-11 (upto June, 2010), the production of primary lead was 14144 thousand tonnes and that of zinc metal was 172739 thousand tonnes. As against this, the apparent consumption of lead was 79106 thousand tonnes and that of zinc was 158002 thousand tonnes in 2010-11 (upto June, 2010). The exact details of demand and supply of lead and zinc are not maintained as Lead and Zinc are freely importable as per the import policy of the Government. Data relating to export/import of lead and zinc and the data regarding apparent consumption/production of lead and zinc for the years 2007-08, 2008-09, 2009-10 (provisional) and 2010-11 (provisional) (upto June, 2010) is shown at **Table 3.8 and Table 3.9.**

### Rare Earth Elements

#### Global Scenario

Rare earths are relatively abundant in the Earth's crust, but discovered minable concentrations are less common than most other ores. U.S. and world resources are contained primarily in bastnasite and monazite. Bastnäsite deposits in China and the United States constitute the largest percentage of the world's rare earth economic resources, while monazite deposits in Australia, Brazil, China, India, Malaysia, South Africa, Sri Lanka, Thailand, and the United States constitute the second largest segment. Apatite, cheralite, eudialyte, loparite, phosphorites, secondary monazite, spent uranium solutions, and xenotime make up most of the remaining resources. Undiscovered resources are thought to be very large.

China holds the leading position among producers of rare earths followed by Brazil, Malaysia and India. Rare earths are also produced in Russia, Kazakhstan, Kyrgyzstan and Thailand.

**Table 3.8**  
**Production Imports / Exports and Apparent consumption of Lead ( 2007-08 to 2009-10)**

(Quantity in Tonnes)

Item	2007-08	2008-09	2009-2010 (Provisional)	2010-11 (Up to June.2010) (Provisional)
Total production Lead (primary)	58246	60323	64319	14144
Total imports*	154292	209455	253275	75413
Total exports*	19806	12566	53779	10451
Apparent consumption	192732	257212	263815	79106

\* Lead and alloys & scrap (Apparent Consumption = Production + Imports - Exports)

**Table 3.9**  
**Production Imports / Exports and Apparent consumption of Zinc ( 2007-08 to 2009-10)**

(Quantity in Tonnes)

Item	2007-08	2008-09	2009-2010 (Provisional)	2010-11 (Up to June.2010) (Provisional)
Total production zinc (ingots)	457075	579091	613964	172739
Total imports**	106214	94694	153920	34871
Total exports**	81536	209434	175767	49608
Apparent consumption	481753	464351	592117	158002

\*\* zinc and alloys & scrap (Apparent Consumption = Production + Imports - Exports)

**Table 3.10**  
**World Mine Production and Reserves**

(in Tonnes)

Country	2008	2009	Reserves*
China	120,000	120,000	36,000,000
India**	2,700	2,700	3,100,000
Brazil	650	650	48,000
Malaysia	380	380	30,000
United States	–	–	13,000,000
Australia	–	–	5,400,000
CIS	–	–	19,000,000
Other Countries	NA	NA	22,000,000
<b>Total</b>	<b>1,24,000</b>	<b>1,24,000</b>	<b>99,000,000</b>

Source: Mineral Commodity Summaries, 2010

\*Reserves data for Australia, China, and India were updated based on data from the respective countries.

Though Mineral Commodity Summaries 2010 still shows the Indian production as 2700 tonnes and reserves as 3.1 Million tonnes as per Department of

Atomic Energy, Mumbai, the production of rare earth in India in 2008 was only 35 tonnes while estimated reserves had got increased to 10.21 million tonne.

### INDIAN SCEANIRO

In India, monazite and thorium are the principal source of rare earths elements. Monazite is a prescribed substance as per the notification under the Atomic Energy Act, 1962. AMD has been carrying out its resource evaluation for over five decades. It occurs in association with other heavy minerals, such as ilmenite, rutile, zircon, etc. in concentrations of 0.4 - 4.3% of total heavies in the beach and inland placer deposits of the country. The resource estimates of monazite in the beach and inland placer deposits have got enhanced from 7.90 million tonnes in 2002 to 10.21 million tonnes.

Indian Rare Earth Limited (IREL), a Government of India Undertaking and Kerala Minerals and Metals Limited (KMML), a Kerala State Government Undertaking, are

actively engaged in mining and processing of beach sand minerals from placer deposits. IREL produced 35 tonnes of rare earths viz, RE fluoride, cerium oxide and cerium hydrate from conversion of rare earths chloride, in 2007-08 against 1,800 tpy installed capacity. Production value of rare earths during the year 2005-06, 2006-07 and 2007-08 is at **Table 3.11**.

**Table 3.11**  
**Production and Value of Rare Earths\***

Year	Quantity (tonne)**	Value* (lakh)
2005-06	93	157
2006-07	45	48
2007-08	35	65

\* Produced by IREL.

\*\* Mainly Rare Earths fluoride, cerium oxide & cerium hydrate from conversion of Rare Earths chloride.

Source: Department of Atomic Energy, Mumbai.

India consumed about 200 tonnes of rare earth products in 2004. The country imports all its current requirements from China and mostly uses rare earths is referred as consumer goods industries, petroleum refineries and car industry. As per Department of Atomic Energy, India consumed 222 tonnes of rare earth in the year 2007-08.

Indian Rare Earths, producer of REE which halted output in 2004 in the face of cheaper competition from China, is now stepping back into the picture with investment of ₹140 crore in a 5,000-tonne capacity plant and it hopes to start production by 2012.

To give boost to increasing domestic output, the Government is open to private players forming JVs with

State-run companies for extraction and processing of rare earths minerals. Private players could form a "JV with PSU companies", with private players holding a "minority stake" in the JV.

### Future Outlook

Though China is having only 37% reserves of rare earths, it produces around 97% of world's supply of rare earth. Concerns have mounted about the supply of rare earths as its predominant supplier China has announced its regulation on export and crack down on smuggling. On September 1, 2009, China announced plans to reduce its export quota to 35,000 tonnes per year during 2010-2015, ostensibly to conserve scarce resources and protect the environment. It was reported that China will "further reduce quotas for rare earth exports by 30 percent from next year to protect the precious metals from over-exploitation".

As a result of the increased demand and tightening restrictions on exports of the metals from China, searches for alternative sources in Australia, Brazil, Canada, South Africa, and the United States are ongoing.

Another recently developed source of rare earths is electronic waste and other wastes that have significant rare earth components. New advances in recycling technology have made extraction of rare earths from these materials more feasible, and recycling plants are currently operating in Japan. It is estimated that 300,000 tons of rare earths is stored in unused electronics waste.