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MINERAL SCENARIO OF THE STATES OF INDIA

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Mineral Scenario of the States of India

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Contents

Contents

Preface

India's vast Mineral abundance and the exploitative methods of these resources are themselves a testimony of existence of ancient mines and culture of mining practices. Mineral health and Economic health of a country are directly proportional and have been in complementariness since ages. As being endowed with rich deposits of variegated minerals, India has a niche position among countries and commands an enviable status in the world. However, lack of technical know-hows and scientific & systematic mining practice have curbed the growth of mining & mineral industries in the sector, which in many ways than one, eclipsed the growth potential of the country. The realization of planned economy, sustainable mineral development and introduction of technology and investments, post independence, have let the country turn the corner, which now by way of a clear road map to the future is heading towards the path of self- reliance and has put the country in an elevated trajectory of economic growth.

India's Geographical vastness, Geological richness and Mineralogical diverseness have scattered its valuable mineral resources across the spreads of its states. Onuses on State Governments to investigate, tap and exploit mineral resources on the guidelines of National Mineral Policies in the recent years have gained enormous momentum.

The rich resources of metallic and non-metallic minerals have enabled many mineral-rich states to support and sustain Industrial growth, which have augmented the economic prospects of the country. India could boast of the availability of 86 Minerals which include 4 Fuels, 10 Metallic, 46 Non-Metallic, 3 Atomic and 23 Minor Minerals (including building and other materials). Among the states, insofar as mineral reserves are concerned, Andhra Pradesh, Chhattisgarh, Goa, Gujarat, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, and Tamil Nadu occupy the special category of Mineral-rich states and account for a large share in the country's mineral production. In terms of value of Mineral Production, Orissa (14.70%), Chhattisgarh (6.46%), and Gujarat (5.09%) are leaders in the pack.

The Publication "Statewise Mineral Scenario" in a comprehensible nutshell has condensed the expanse of statewise minerals and mines data from availability of mineral resources, the production of minerals, value of mineral production, to the states individual share in the country's overall output and mineral worth in its three chapters, namely, Mineral Scenario of the States of India, National Mineral Scenario and Statewise Mineral Scenario amply supported by a huge body of Annexure containing tabular data and is aimed at providing the readers a mine of mineral information on a platter.

As handy as it could be, this Publication is a capsule exposition of India's Mines/Mineral Information which could enable information seekers to comprehend and assimilate data, particularly statewise mineral data, so as to draw an overall picture of India's ostensible mineral scenario.

Efforts from several quarters have confluenced in the compilation of the content of this publication. From its conception to its finalisation, every phase of this publication was steered and formalised under the stewardship of Shri S. Vijay Kumar, Special Secretary to the Government of India, Ministry of Mines. Indian Bureau of Mines owes immeasurable gratitude to him for his invaluable guidance and support. Sincerest thanks are due to Geological Survey of India for sharing information on geology and Geological map for this publication. IBM is also indebted to its team of officers and all other source agencies for every iota of cooperation extended.

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Chapter – I

STATE-WISE MINERAL SCENARIO

A Geological Overview

Geologically India is divided into three physiographic-tectonic provinces, namely -

- the Indian Peninsula comprising : 19,00,000 sq.km.
- the Indo-Gangetic Alluvial plains (and desert) comprising : 7,00,000 sq. km.
- Extra Peninsular (Himalayas & Naga-Lushai belt) comprising : 5,00,000 sq.km.

The total area of the country is 3.287 million sq. km out of which 2.386 million sq. km (in the Peninsula and Himalayan region) is comprised of hard rock and another 0.901 million sq. km represented by comprises of Quaternary Formations i.e. which are less than 1 million years old. Geologically, the country is represented by rocks ranging in age from Archaean (pre 2500 million years from now) to Recent. However, no single province is represented by rocks where the entire geological time spectrum covering a span of nearly 4600 million years of earth's history occurs. Moreover rocks of similar age, in different areas, are of diverse nature resulting in uneven distribution of mineral resource.

The major Stratigraphic units of Peninsular India can be broadly represented as follows: (Table 1)

Table - 1

Eon	Era	Period	Stratigraphy
Phanerozoic	Cenozoic		Tertiary rocks
	Cenozoic - Mesozoic (100 58 Ma)*	Early Cretaceous to Lower Paleocene	Lava (basalt) flows with intertrappean sediments (Deccan Traps)
	Mesozoic (251100 Ma)	Triassic to Early Cretaceous	Sandstone-shale sequences (Upper Gondwanas)
	Upper Palaeozoic (360 251 Ma)	Late Carboniferous to Permian	Sandstone shale/clay sequences with coal (Lower Gondwanas)
Proterozoic	Meso to Neo Proterozoic (5421800 Ma)		Sandstone-Carbonate-shale sequences (Cudappah / Vindhyan Supergroups etc)
	Palaeo Proterozoic (18002500 Ma)		Mainly meta sediments and granites/gneisses
Archaean	Meso to Neo Archaean (Pre 2500 Ma)		Basement granites and meta-sedimentaries

*Ma = Million annum

It is now believed that the Indian Precambrian Shield is a congregation of many Achaean cratonic nuclei that fused during the Achaean-Proterozoic transition period. Broadly the Geology of India is graphically depicted in Fig.1. It also needs to be mentioned here that the Achaean-Proterozoic rocks in India host most of the Metallic and non-Metallic minerals.(see Annexure-I)

A brief geological account of India is covered here broadly under the following heads:

A. Indian Peninsular Shield

B. Paleozoic and Mesozoic rocks of Peninsular India

C. Extra Peninsular Belt

D. Indo-Gangetic Alluvial Plain

E. Continental Margin deposits

A. Indian Peninsular Shield:

The Indian peninsular shield largely comprises Precambrian rocks of diverse tectonic settings. The earliest Precambrian provinces of Indian Shield are divisible into four major Precambrian domains. i) Southern Indian craton (Dharwar Craton), ii) Central Indian craton (Bastar Craton and Bundelkhand Craton), iii) Eastern Indian craton (Singbhum Craton), iv) Western Indian Craton (Aravalli craton). These cratonic domains are believed to have evolved through accretion around spatially separated pre 3.0 Ga Tonalite Trondhjemitic Gneisses nuclei. The evidences of proto-continent collision and suturing are obscured due to basement remobilization during subsequent Early Proterozoic events.

The brief description of the Cratons along with their tectonic domains/elements is described below in Table No. 2.

Table-2

Craton/Tectonic Domains	CHARACTERISTICS
I. SOUTHERN INDIAN CRATON: The shield region south of the Son Narmada tectonic zone in the north and the Godavari rift forms the Southern Indian craton. It is separated from the Eastern Ghat Mobile Belt to the east by a prominent shear zone/ thrust (Sileru Shear) and steep gravity gradient. The extent of this craton to the NW part is conjectural since it is covered by huge thickness of continental flood basalt. Broadly it is divisible into three tectonic domains as follows:	

Western Dharwar Craton [WDC]	▪ The major part of Dharwar craton is covered by an extensive group of grey gneisses designated as "Peninsular Gneiss". These gneisses contain enclaves of deformed and metamorphosed amphibolitic and granulitic grade rocks ▪ WDC principally comprise of banded Tonalite Trondhjemitic Gneisses ▪ These banded gneisses have undergone multiple deformation and metamorphosed to Upper Amphibolite facies ▪ These gneisses have three accretionary phases corresponding to 3.4 Ga ,3.2 Ga and 3.0-2.9 Ga of which last phase is most prolific.. ▪ The Achaean supracrustals rocks are having greenstone affinity belong to two ages: ▪ The older i.e. Sargur Group (3.3Ga) comprise of metapelite, meta basics, volcanics, subordinate BIF, fuchsite-quartzite and stratiform gabbro anorthosite complexes .sillimanite-kyanite-graphite-garnet-schist, calc-silicates, para gneisses interbedded basic rocks. These rocks occupy small narrow belts and have been metamorphosed to amphibolite-granulite facies ▪ The younger supracrustals are designated as Dharwar Supergroup (2.7-2.6 Ga) and are quite thick(8 Km).These comprise mainly meta pelites, meta-greywacke, metabasics, subordinate BIF, quartzite, acid volcanics and the rocks have been metamorphosed to greenschist to lower amphibolite facies.
2. Eastern Dharwar Craton [EDC]	▪ The Eastern Dharwar craton is separated from Western Dharwar craton by Chitradurga Shear/ and almost meridional Closepet granite massif. ▪ This domain is mainly constituted by basement gneisses of granite- granodiorite affinity ▪ The majority of granitoids of this domain have been emplaced between 2.6-2.5Ga however few gneisses were emplaced much earlier around 3.4 -3.0 Ga ▪ These basement gneisses have experienced multiple deformation and are metamorphosed up to granulite facies ▪ The magmatic fabric in this domain is superimposed by penecontemporaneous North-South sinistral shears of regional dimensions ▪ The supracrustals in this domain comprise of tholitic basic volcanics, greywacke, acid volcanics and BIF with subordinate polymictic conglomerate and very minor

	komatites and graphite schist's. These supracrustals belong to age group ranging between 2.75 to 2.55Ga. ▪ Kimberlites discovered in southern India till now are restricted to the EDC. EDC hosts these bodies along or at the intersection of the post-Cuddapah reactivated ENE-WSW and NW-SE fracture/fault systems and/or at the closure of domal structures. ▪ Gold, iron, manganese and titaniferous vanadiferous magnetite deposits are reported from the schist belts of Gadwal, Chitradurga, Holenarsipur, Khammam and Nellore in both EDC and WDC.
Southern Granulite Terrain [SGT] [The SGT is mainly exposed in the States of Tamil Nadu, Kerala and southern part of Karnataka comprising the Coorg Biligirirangan hills granulite belt of Karnataka in the north and the Nilgiri Madras granulite belt of Tamil Nadu]	▪ The gneisses and greenstone sequences described above grade southward into high grade rocks of granulite facies and which essentially constitute the Southern Granulite Terrain separated from Dharwar rocks by Palghat-Cauvery Shear zone. ▪ The Palghat shear zone is represented by a distinct geomorphic expression, a physiographic low, bounded by Nilgiri hills in the north and Anaimalai and Palni ranges in the south. The dominant rock types along the shear zone include migmatitic gneisses and banded charnockites. ▪ The SGT comprise mainly charnokites, mafic granulites, khondalites and also gneisses and supracrustals rocks of amphibolite facies are quite abundant. ▪ Several intrusive igneous rocks of distinctive petrological and petrochemical attributes of Proteozoic age occur amidst the granulites, greenstone belts, gneisses and the Proterozoic sediments ▪ The SGT is intersected by several shear zones of large dimensions ▪ The granite rock dating in SGT have revealed four peaks at 3.3 Ga,3.0 Ga,2.5 Ga and 2.0 Ga ▪ Plutonic activity within SGT around 700 Ma is believed to be in response to Pan African Orogeny. ▪ The SGT is associated with the metallogeny of the many metallic minerals- Gold mineralization in Archaean greenstone belts of Tamil Nadu; Banded Iron Formation (BIF) in northern Tamil Nadu; PGE and chromite mineralization in Archaean ultramafic-mafic-anorthosite complexes of Tamil Nadu; Base metal mineralization Tamil Nadu, Iron ore in the northern parts of the Archaean granulite terrain, Molybdenum mineralization related to

	Neoproterozoic magmatism in shear zones, Rare metals (U-Th-Nb-Ta-Y, Be) and REE mineralization associated with Neoproterozoic alkaline-carbonatite complexes of northern Tamil nadu, and granites and pegmatites in central Tamil Nadu and Tungsten mineralization (Skarn type) in calc-granulites associated with Neoproterozoic granites in the Tamil Nadu.
Cover Sediments [Andhra Pradesh and Karnataka, Tamil Nadu and Kerala]	• A substantial area of the stabilized Dharwar craton is unconformably overlain by undeformed or mildly deformed orthoquartzite carbonate shelf dominated cover sequences • These cover sediments occupy: a. intracratonic sag like basins (eg, Cuddapah-Kurnools, or b. linear basins (e.g. Bhimas, Pakhals,)
	• The sedimentary basins with cover sediments are partly covered by Deccan basalts in the north and hence their extent cannot be studied in true perspective. • The Southern Indian craton is also fringed to the east by marine transgressive cover sequence of Mesozoic and Cenozoic and Quaternary sediments of both fluvial and marine origin. • The coastal sediments of west coast of Dharwar craton is very narrow in comparison to that of the East Coast. In Konkan Kerala coast they are developed as peri- cratonic basin fills as a consequence of rifting of India from East Africa at around 180 Ma, from Madagascar at 83 Ma and Seychelles at 65 Ma. • The wider east coast sedimentary basins comprise both Deltaic sediments of Cenozoic as well as peri -cratonic basin fills characterized by NE SW trending grabens on attenuated continental crust of Meso - Cenozoic, as a consequence of rifting of India from Antarctica during Lower Cretaceous.

II. Central Indian Craton:

The Precambrian rock assemblages of Central India are spread over two distinct crustal provinces namely the Northern Crustal Province [Bundelkhand Craton]and the Southern Crustal Province[Bastar Craton] separated by a crustal scale tectonic discontinuity/ shear referred as Central Indian Shear which actually forms the southern part of Sausar Mobile Belt and includes dismembered granulites, gneisses and supracrustals. It grossly comprises Achaean basement, Palaeo and Meso

Proterozoic mobile belts and platform covers of Meso to Late Proterozoic The terrain to the south of the Sausar mobile belt is known as Bastar Craton and forms a triangular region in the central part of Indian shield. It is bound to the northeast by Mahanadi grabben, to the east by the Eastern Ghat Mobile Belt and to the south by Godavari grabben. The northwestern part of this craton is overlapped by Deccan basalts.

Bastar Craton [The Bastar Craton (BC) is bounded to the northeast by Mahanadi graben, to the southwest by the Pranhita-Godavari graben, to the northwest by Satpura mobile belt, and to the southeast by Eastern Ghats Mobile Belt]	▪ The basement complex constitute vast tract of Granitoid and gneisses with remnant/ engulfed supracrustals like Bengpal, Amgaon, Sukma and equivalents. ▪ The gneisses are very similar to that of Dharwar craton. ▪ The oldest of the suite is Tonalite Trondhjemitic gneiss (TTG) having Rb-Sr and U- Pb zircon ages greater than 3.0 Ga. ▪ The Cratonic components of Bastar includes Basement Gneiss (3.5Ga) followed by the (i) Sukma metamorphic suite (2.6 Ga), Bengpal Group (2.3 Ga), Bailadila Group (2.1 Ga), undifferentiated granites and basic dykes. ▪ Quartzite bands of Bailadila Group extend along strike for several kms in the southern parts of Bhamragarh Gadchiroli District and are interbanded with other meta-sedimentary rocks. They show gradational contact with BIF and calc-silicates rocks. Quartzites include orthoquartzites, at times micaceous, calcareous and ferruginous and commonly contain minor amounts of graphite. Magnetite specularite form BMQ (BIF) with impersistent folded quartz-magnetite banding on mm to cm scale extending for several kms and contains 67 to 68 % Fe. ▪ Older supracrustals within these gneissic domains often occur as mappable metamorphic complexes (Sukma, Bengpal, Amgaon groups etc) showing upper amphibolite facies of metamorphism, igneous components and polyphase deformation. ▪ The Bengpal Group of rocks consists of low to medium grade vocanosedimentary sequence of amygdular metabasalt, quartzite, conglomerate and andalusite and chloritoid schist. Bailadila group, consisting of quartzite phyllite and BIF, hosts iron rich deposits. ▪ The younger supracrustals ranging in age between Neoarchaean to Mesoproterozoic occur in large linear mobile belts and comprise sedimentary, volcanic and granitic components (Bailadila, Sakoli, Nandgaon, Sonakhan, Mahakoshal groups etc). ▪ These sequences shows deformation and metamorphism to green schist- lower amhibolite facies

Sausar Mobile belt [SMB]/other belts [It is confined between the northern Bundelkhand Protocontinent and the south Deccan/ Bhandara Protocon-tinent].	▪ SMB trends E-W, in a curvilinear (southerly convex) belt extending from Balaghat in the east to Chindwara in the west, ▪ exposing a central domain of dominantly supracrustal rocks (metamorphosed quartzite, pellites and carbonates) and characterized by lack of volcanic rocks. ▪ It is intimately associated with a variety of granitic rocks of anatectic origin namely Tirodi gneiss and the Augen gneiss. ▪ SMB crustal belt have three lithotectonic units (i) Mafic granulite-felsic migmatite gneiss the Tirodi Biotite gneiss, (ii) Augen gneiss, foliated granite, and (iii) and main Sausar Group rocks comprising calc-silicate gneiss, calcite marble, dolomite marble and quartzite ▪ The southern periphery of the supracrustal sequence reveals linear suite of two pyroxene granulite-charnockite-metapelite granulite lenses and pods. The granulites reveal the pre-Sausar structure ▪ The main Sausar Orogeny is of 1000 Ma age ▪ The Tirodi gneiss indicates an age of 1525 ± 70 Ma ▪ The Tirodi biotite gneiss a granulite facies suite precedes the deposition of the Supracrustals. ▪ The Mahakoshal Group is a supracrustal sequence with dominant metasediments and subordinate tholeiite metavolcanics with intrusive dunite-peridodite and occasional sills of soda-granite. The group has a faulted contact with the Archaean gneisses and migmatites. ▪ The Betul supracrustal belt is a granitoid gneiss tract between Mahakoshal Belt to the north and the Sausar supracrustal belt in the south.This has quartzite, pelite, calc-silicate, BIF, garnet-anthophyllite schist intruded by mafic, ultramafic and granitic rocks with bimodal volcanics a low K-tholeiitic basalt and calc-alkaline to alkaline rhyolite ▪ The Amgaon gneiss, located in the southern and northern part of the triangular belt with Sakoli, Sausar and Dongargarh supracrustals and granulite belts, is intruded by the Dongargarh quartz monzonite and Malanjkhand granodiorite, ▪ Kotri-Dongargarh belt of volcano sedimentary-granite comprise of Dongargarh Super Group represented by older Nandgaon Group of Basic and acid lava and pyroclastics,

	the Dongargarh granite and younger Khairagarh Group of volcano-sedimentary sequence. ▪ The Nandgaon Group comprises Bijli Volcanics and Pitepani basic volcanics. Bijli consists mainly of rhyolite and sandstone. Pitepani Volcanics mainly includes massive to porphyritic basalt with rare pillow structure. ▪ The Sakoli Group comprises a metamorphosed volcano-sedimentary sequence. The volcanic to sedimentary rocks ratio is about 1:4. Both mafic and felsic volcanic rocks are present in nearly equal proportions. Sakoli Group includes metasediments dominated by phyllite (carbonaceous at places), mica schist (with varying proportions of magnetite, andalusite, chloritoid, garnet and staurolite), metabasalts, metarhyolites and banded iron formation (BIF). The gneiss and older supracrustals (Sukma-Amgaon) encircling the Sakoli Group represent basement to the Sakoli sequence and also occur as inliers within the Sakoli Fold Belt. ▪ Kimberlites occur as intrusive into Bastar craton. ▪ Other mineralisation in this part of the shield area includes the Malanjkhand copper. ▪ Recently several kimberlites bodies were located on the margins of Khariar and Indravati basins together with the occurrences of kimberlites in Andhra Pradesh. Search for Kimberlite-Lamproite bodies hosting diamonds in Indravati basin is so far encouraging and is one of the promising areas for likely new kimberlite-lamproite bodies. Gold occurrences in Sonakhan, Kotri and Raigarh belts hold promise to search for deposits.
Platform cover sequences in Bastar Craton [Mainly in Chattisgarh and adjoining Maharashtra]	▪ These range in age between Palaeoproterozoic Neoproterozoic and occur in distinct basins ▪ the volcani- sedimentary sequences owe their origin to the ensialic rift basins(Khairagarh, Abhujmar etc) ▪ The flat bedded shelf sequences were deposited in intracratonic sags (Chattisgarh, Indravati, Khariar, Ampani etc). ▪ These sequences show weak deformation locally and are by and large un-metamorphosed. ▪ The structural style is characterized by gravity faults, monoclines, broad warps and intra-basinal relief.

Bundelkhand Craton [bounded by the Great Boundary Fault to its west, the Son-Narmada North Fault of Central Indian Tectonic Zone to its south, Ganga Foreland to its north and wrapped around by the extensive Vindhyan Basin], [Madhya Pradesh and Uttar Pradesh]	▪ This highly deformed granite-greenstone terrain consists of the Bundelkhand Granite Massif ▪ This cratonic area comprises ultramafics, amphibolite, fuchsite quartzite, banded iron formation, schists, marble, calc-silicate rocks and tonalite-trondhjemite-granodiorite (TTG) intruded by undeformed hornblende-,biotite- and leuco granitoids. Dykes of porphyry, acid volcanics, rhyolite breccia and pegmatite veins pervade the massif. ▪ The NE quartz reefs and NW swarm of mafic dykes terminate the activity in this massif. ▪ The Bundelkhand Granite consists of an early porphyritic phase followed by several intrusive phases of monzonite, leucogranites, diorite-syenite-granite and other porphyries with three generations of dolerites. ▪ Bundelkhand Granite has been isotopically dated at 2.4 Ga.
Platform cover sequences in Bundelkhand Craton [in Madhya Pradesh, Uttar Pradesh and Rajasthan]	▪ A thick sequences of cover rocks (Vindhyans) occur in a sickle shaped interior basin forming a half girdle around Bundelkhand massif. ▪ The basin fill comprises alternating sequence of arenaceous, carbonaceous and argillaceous rocks representing a shelf facies. ▪ The Vindhyans are source of huge deposit of limestones. Only Known Diamond producing pipe is hosted by Vindhyans ▪ large deposits of valuable low silca dolomites are located within Bijawars and possibility for locating such deposits
III. The Western Indian Craton [Aravallis]The Aravalli constitutes three identifiable Precambrian tectonic domains, evolved through three major orogenic cycles namely the : Banded Gneissic Complex (BGC) (= Bhilwara Supergroup); the Aravalli Mobile Belt; and the Delhi Mobile Belt . These rocks are confined to western India especially in Rajasthan , Gujarat, Haryana and Delhi	

Banded Gneissic Complex (BGC) (Also Bhilwara Supergroup). [Gujrat, Rajasthan]	▪ The older component of the Aravalli craton occurs in the BGC in the eastern and southeastern parts of the Aravalli Range and is confined in the realm of Archaean. ▪ The BGC is a time transgressive crystalline complex, comprising gneisses of amphibolite to granulite facies derived from plutonic, volcanic and sedimentary protoliths. ▪ The crystallines are intruded by granitic plutons of several generations ranging in age from Archaean to Middle Proterozoic. ▪ The sedimentary component is dominantly pelitic and is well exposed on the eastern margin. ▪ The volcanic component is represented by basic lavas now occurring as hornblende schist or amphibolite. ▪ The eastern boundary of the BGC terrain is marked by a lineament and a long tract sedimentary rock forming extensive outliers such as Pur Banera, Dariba- Bhinder and similar belts. ▪ These sedimentary outliers have been considered as older than Aravalli Supergroup and have been clubbed with the Mangalwar complex and Hindoli Group under an umbrella of Bhilwara Supergroup. ▪ The Mangalwar complex represents a continental rift which developed into a ensimatic orogen. ▪ The eastern most unit (Hindoli Group) of the Bhilwara Supergroup comprises flysch facies rocks and juxtaposes against the Meso- Neoproterozoic cover sequence of Vidhyans along the Great Boundary Fault.
The Aravalli Mobile Belt [Rajasthan, Gujrat, Haryana, Delhi]	▪ The Proterozoic history of this craton starts with the Aravalli sedimentation and its orogenesis. ▪ The rocks have an unconformable contact with the underlying BGC marked by conglomerate beds as well as metamorphic and structural break. ▪ The Aravalli Supergroup shows two distinct 'facies sequence' indicating deep-sea and near-shore shelf environments interpreted as eugeosynclinal-miogeosynclinal couple or as foreland-hinterland duplex ▪ The Aravalli sequence is also marked by a development of a platform facies of rocks (Udaipur Group) consisting of carbonate and phosphorite bearing formations along eastern margin, underlain by tholeitic - calc alkaline volcanics (Debari Group) and a deep water facies at the center (Jharol Group).

	▪ The contact between the two facies is defined by a prominent discontinuity with an ultramafic suite (Rakhavdev ultramafic suit). ▪ Aravalli Supergroup is rich in ores of zinc, lead, copper, silver, cadmium with minor gold and molybdenum. The Lower Aravalli rocks of Udaisagar-Umra Belts, Udaipur district host uranium and copper and phosporite deposits around Udaipur and Sallopat in Banswara district.
The Delhi Mobile Belt [Rajasthan, Haryana and Delhi]	▪ The Aravalli rocks are succeeded to the west by the rocks of the Delhi Fold Belt. ▪ The Delhi fold Belt comprises of a thick volcani-sedimentary sequence and is divisible into two domains the North Delhi Fold Belt and the South Delhi Fold Belt. ▪ The North Delhi Fold Belt comprises an older shallow water facies with basic volcanics. It is much wider and comprises three sub basins namely Khetri, Alwar and Lalsot- Bayana. ▪ The South Delhi belt on other hand is much narrower and comprises deeper water facies with bimodal volcanics. ▪ The contact of Delhi rocks with that of Pre- Delhi is tectonic. ▪ Profuse post orogenic granite (Sendra, Erinpura) have intruded the South Delhi Fold belt.
Trans Aravalli region [Marwar Plateau, Rajasthan]	▪ To the west of Delhi Orogenic Belt lies the well known Trans Aravalli region forming a plateau namely the Marwar Plateau. ▪ The Marwar Plateau displays evidences of basement reactivation post dating Delhi Orogeny, evidenced by granite diapirism, rhyolite extrusion, positive gravity anomaly etc. ▪ the tectonic evolution of the terrain is related to the Pan African crustal addition and magmatic activity which were operative extensively all along the peripheral parts of Indian Shield. ▪ The extensive acid igneous rocks (Malani rhyolite and granites) are overlain by a platform sediments (Marwar Supergroup) ranging in age between Neoproterozoic- early Palaeozoic. ▪ The platform sediments, about, 1000m thick, comprises sandstone, limestone and siltstone interbedded with shale, gypsum and anhydrite.

IV. Eastern Ghat Mobile Belt [EGMB]. [EGMB extending for over 1000 km covering a distance of more than 600 km of Andhra Pradesh from Ongole and into the southern part of Orissa]	▪ The Eastern Ghat Mobile Belt is a high grade gneiss-granulite domain, is distinctly different from other adjoining cratonic domains (Southern, Eastern and Central Indian Craton). ▪ This belt is separated from the adjoining cratons by major shears. ▪ EGMB is intensively deformed with abundance of Khondalites and manganiferous sequences. ▪ The Marginal Transitional Zone (MTZ) occurs between the Dharwar craton to the west and the EGMB in the east and is made up of granite-gneiss and supracrustal rocks, reworked and overprinted by younger deformational events. ▪ EGMB is a granulite terrain mainly made up of charnockite, khondalite, quartzite, calc-granulite, pyroxene granulite and leptynites. ▪ The shear, which marks the western boundary of this belt, strikes parallel to the trend of this belt. It shows distinct strike variation, which is NNW in the extreme south, then veers round to the dominant NE strike for a considerable distance and ultimately turns E-W around the Mahanadi graben. ▪ In the south this shear zone is known as Sileru shear zone, and runs 20 Km east of Esatern Boundary Thrust of Cuddapah basin, in N-S strike. ▪ This shear zone is marked by extensive alkali magmatism as well as carbonatite anorthosite intrusions. ▪ The EGMB belt has undergone polyphase deformations and metamorphism. ▪ This is a typical Proterozoic mobile belt skirting Archaean cratonic blocks and characterized by strong linearity, ductile deformation, high grade of metamorphism and a high gravity gradient along its contact zone with cratons. ▪ Isotopic age data suggests that the major charnockitisation event took place between 1170 Ma and 950 Ma. ▪ EGMB granulites are rich in REE with K-rich alkalies compared to Na, Rb, Ba and Th rich alkalies of SGT. ▪ EGMB belt is famous for its large resources of bauxite (formed mainly by supergene enrichment of Al from metapelitic protoliths (khondalites), variety of dimension stones (commercial granites) using charnockite, leptynites, granitoids, anorthosite and alkaline rocks, occurrences of a

	variety of gemstones including emerald, chrysoberyl, aquamarine, ruby, sapphire, topaz and garnet, resources of high grade graphite and manganese ore. ▪ The world famous muscovite mica mines at Gudur are located in the Nellore Schist belt in MTZ.

V. EASTERN INDIAN CRATON:

The Precambrians of Eastern India is separated from the Bastar cratonic domain by Mahanadi Grabben in south and by a tectonothermal discontinuity / shear zone from the Eastern Ghat Mobile Belt in the south east. The Eastern India Craton rocks are associated with the mineralization of copper in Mosabani-Bedi Rakha mines in Jharkhand (south Bihar), Jaduguda uranium mineralization, iron, manganese, chromium, vanadium, titanium,gold and copper, molybdenum in the mafic magmatic provinces in Jharkhand and north Orissa, tin, niobium, lithium, beryllium occurrences in late Proterozoic granite-syenite-gabbroic province in western Orissa, occurrences of lead-copper, phosporite, mica and manganese in the carbonate-rich mobile belt of Gangpur-Chotanagpur and granite plutons with associated pegmatites and quartz veins carrying beryllium, tin, tungsten, uranium and tantalum.

Tectonically, the craton comprises three distinct domains:

Singbhum Granitoid Massif in the south; the Singbhum Mobile Belt in the middle, and the Chotanagpur Granite Gneiss complex in the north.

Singbhum Granitoid Massif [SGM]	▪ SGM is an oval shaped composite batholithic mass, which ranges in composition from tonalite to granite. ▪ Isotopic age data have suggested that the Singbhum Granitoid Massif (SGM) has evolved through three successive but closely related phases closing at 3300 Ma (Phase I & II) and 3100 Ma (Phase III). ▪ The Bonai Granite occurring to the west and the Kaptipada Granitoid to the south east are penecontemporaneous and components of this massifs, baring the fact that the Bonai Granitoid is richer in K_2O and SiO_2 content. ▪ The oldest recognizable unit occurring within this granitoid massif is a group of medium to high grade supracrustal rocks, namely the Older Metamorphic Group (OMG). ▪ This oldest supracrustal rocks are intruded by tonalite gneisses called Older Metamorphic Tonalite Gneiss (OMTG). ▪ The supracrustal rocks along with the tonalite gneiss, occur as rafts of varying dimension within the Singbhum

	granitoid massif. A number of shallow basins (the supracrustals) within and around the periphery of this granite batholith are also present viz. iron ore basins in the western sector containing large economic deposits of iron ores. ▪ This micro-continent comprising the OMG OMTG-SG is believed to have been cratonised around 3.2 Ga. ▪ Three distinct volcani sedimentary belt (Iron Ore supergroup), of Greenstone affinity with banded iron formations, skirt the Singbhum Granitoid Massif.
Singbhum Mobile Belt [SMB]	▪ SMB occupies the intervening area between Singbhum Granitoid Massif in the south and Chotanagpur Granite Gneiss Domain in the north. ▪ It is nearly 200 km long and 50 km wide arcuate shaped belt paralleling the northern margin of the Singbhum Granitoid Massif. ▪ A prominent ductile shear zone known as Singbhum Shear Zone (SSZ) passes close to the southern margin of the belt. The belt, to its north, is also marked by a brittle-ductile shear zone, with much smaller extent called South Purulia Shear Zone. ▪ SMB has been intensely folded into a synclinoriumalong E-W to NE-SW axes which is refolded at the easternand western extremities. ▪ The SMB comprises of phyllites (oftencarbonaceous), quartzites, shale, high magnesiankomatiitic serpentinised peridotites, lavas and vitric tuffswith quench textures, volcanoclastics, etc. Concordantbasic-ultrabasic plutonic bodies (Gabbro, pyroxenites) of considerable dimensions are also found interlayered withthe tuffaceous horizons in the eastern sector. ▪ the younger member of SMB comprise of Dalma high iron-low potash tholeiitic basalts along with some rhyolites. ▪ The depositional environment of Singbhum Orogenic belt, owe its origin to three sub basins: ➢ Ongarbira, Dhanjori and Simlipal volcanic dominated basin. ➢ The Dalma Belt is dominated by volcanics with minor sediments and forms the spine of this mobile belt. ➢ The sequence north of Dalma comprises flyschoid sediments.

Chotanagpur Granite Gneiss complex [CGC] [The Chhotanagpur Gneiss Complex (CGC), extending from Madhya Pradesh in the west through Orissa and Jharkhand up to parts of the districts of Purulia, Bankura, Birbhum and Medinipur of West Bengal in the east]	▪ The (CGC) occupies a considerable area in the Norther part of EIC and are intrusive into the schists in the south. ▪ The major parts of CGC is a vast gneissic terrain exposing complex assemblages of diversified rocks, which have witnessed several periods of magmatism, tectonism, sedimentation, metamorphism, partial melting and mineralisation that have altered the pre-existing volcanic, plutonic and sedimentary rocks to a gneiss-granulite-granite association. ▪ CGC is characterized by protracted thermal history, high isostatic gravity anomaly and higher than normal heat flow. ▪ The gneisses and migmatites vary in composition from granite to tonalite. ▪ The younger members are richer in K2O. Radiometric age data is scanty for this terrain. ▪ The belt has all the features of basement reactivation.

B. Paleozoic and Mesozoic rocks of Peninsular India:

In Peninsular India, rocks for the major part of the Paleozoic era [542 to 360 Ma] are missing and probably were never deposited. However during later part of the Paleozoic era, i.e. around 360Ma [carboniferous period] deposition of the Gondwana sequences of rocks commenced, initially with glaciated sediments followed subsequently by rocks having carboniferous beds i.e. coal. This deposition of fluvial sediments of sandstone-coal-shale [ranging in thickness between 1 to 4 km] took place along certain basins within a basement of Archaean-Proterozoic rocks and these basins were concomitantly sinking with deposition, resulting in thick sequences of sediments including carbonaceous beds during the Carboniferous to Trissaic period [360 Ma to 206 Ma]. The Gondwana rock basins in India are disposed along the Son-Narmada-Damodar trend, Satpura-Wainganga and Damodar basins, Mahanadi basin, Pranihita-Godavari basin etc. The major portion of coal in India is derived from the Gondwana sediments.

The next major peninsular geological event was in the Mesozoic era (65 Ma) when massive basaltic lava flows occurred, forming lava sheets, presently covering about 5 lakh sq. km in the area called the Deccan Trap. The Deccan Trap consists of flow upon flow of lava, some thick, some thin, and at places intercalated with sediments (Intertrapeans). The flows cover parts of Gujarat (Kachchh), Madhya Pradesh, Maharashtra, Karnataka and Andhra Pradesh extending upto Belgaum in Karnataka, Rajamundhri in Andhra Pradesh and Amarkantak in Madhya Pradesh. A large part of the Deccan Trap lava pile is under the Arabian Sea. The basalts of the Deccan Trap provide building stones and road metal and bauxite in the form of laterite

C. Extra Peninsular Belt

Though recognized as a prototype of a continent- continent collision orogeny, in plate-tectonic parlance, the Himalaya in fact, records a poly-phase development over a protracted period of geological history.

The bulk of the Himalayan rocks are Proterozoic, which have been reactivated during Himalayan orogenesis. They have retained the vestiges of early tectonic history, which are yet to be understood in totality.

The ExtraPeninsula consists of tectonic mountain chains of recent origin and the area is therefore unstable and fragile. The Himalayas which extend over a length of nearly 2500 km is a series of parallel ridges. The initial mountain building process which initiated formation of the Himalayas started some 70 75 million years ago consequent to the collision of two continental tectonic plates. The rocks in the Himalayas are highly deformed and depict several phases of tectonic deformation. The Himalayas can be divided into six primary geotectonic zones that occur in almost parallel belts with each belt having a characteristic a

tectonic environment. These belts from south to north are designated as (i). Sub Himalayas (Siwaliks),(ii). Lesser (Lower) Himalayas (iii). Higher (greater) Himalayas (iv). Tethyan (Tibetian) Himalayas (v). Indus-Tsangpo suture zone and (vi) the Trans-Himalayan batholith.

The Sub-Himalayan zone comprises clastic sediments (molasse) and has experienced folding and faulting resulting in the Siwalik Hills. These rocks have been over thrust by the rocks of Lesser Himalayan Zone along the Main Boundary Thrust Fault (MBT), while the Sub-Himalayan rocks are bounded in the south by a fault system referred as the Himalayan Frontal Thrust. The Lesser Himalayan Zone which is bounded by MBT in south and Main Central Thrust (MCT) in the north consist primarily of sedimentary rocks with low grade metamorphism which have been folded into series of anticlines and synclines. The MCT is a longitudinal thrust fault and at many places consists of highly mylonitized and retrograde metamorphic assemblages of highly deformed rocks which at places are several kilometers thick. The higher Himalayan zone marks the axis of orogenic uplift and comprises mica schists, quartzites, paragneises and leucogranites. These rocks have experienced multi-phased deformation. The deformation along the MCT brings the rocks of higher Himalayas over the lower Himalayas. The Tethyan Himalayan zone comprises thick marine sediments of the continental shelf and have undergone very low grade metamorphism. The Indus-Tsangpo Suture zone is nearly 2000 km. long and hosts a complete succession of ophiolite, olistoliths, cherts, serpentinites and dunites, and mafic to felsic lavas. This zone marks the Suture line along which the Tethys Ocean was consumed. The Trans Himalayan zone is a linear plutonic complex comprising gabbros, diorites and granites and probably developed in phases ranging in age 110 to 40 million years ago. This complex is partly covered by fore-arc rocks and continental molasse.

The Himalayas house large number of glaciers which are of paramount importance in determining the water budget of North Indian Rivers. Thus the Extra Peninsular Region of India requires geoseismological, landslide, geoengineering, and glaciology studies on a large scale.

Along the north-eastern margin of India, immediately east of the Ganga Bramhaputra sediments, a north-south trending belt of Mesozoic-Cenozoic sediments of shelf affinity occur which have been folded into a series of north trending west vergent folds and thrusts. This zone, along the Indo Burman arc exhibits development of prominent strongly curved fold ranges with sharp bends "festoons" with ophiolites in the eastern part of the zone. The Burmese orogenic belt continues southwards into AndamanNicobar islands which further extend into Sumatra. Further east, in the Chindwin Irrawaddy valley of Burma, petroleum bearing Cenozoic rocks occur, which extend into the north Andaman Sea.

D. Indo-Gangetic Alluvial Plain:

It is a vast tract extending all over northern India from Punjab and Rajasthan to Assam. The tract dominantly comprises fluvial cover sediments deposited mainly by the Ganga, Brahmaputra, Indus and their tributaries. The sediments occupy the great peripheral foreland basin of the Himalaya, located frontal to the orogen. They are in the form of a wedge, being thickest at the foot of the Himalaya (about 12 Km.) and thin down southwards towards the Peninsular shield.

The basin fill comprises pre- orogenic sequence, overlain by post orogenic mollasse.

The basin contains major basement ridges trending NE- SW. Some of these are: - Monghyr- Saharsa ridge, Delhi- Hardwar ridge etc. The narrow Brahmaputra valley in Assam, though broadly a peripheral foreland basin, has a special tectonic setting. It is peripheral to two orogens: - the Himalayan orogen to the north and Indo- Burmese Orogen to the South-east.

Because of its constricted occurrence between two converging orogens, the foreland on either side of the narrow cratonic shelf has been flexed with thick wedge of mollasse sediments.

E. Continental Margin deposits:

In the continental margins along the western margin of India four sedimentary basins occur namely (i) Bombay basin which comprises Tertiary clastics and limestones having a thickness of 3000 m to 8000 m. overlying the Deccan traps. Hydrocarbon accumulation has taken place in this basin in the limestones of late Eocene Oligocene age. (ii) Kachhch basin which exhibits continuous sedimentation from the mid Jurassic with minor gaps up to Holocene, of limestone, sandstone and shale having thickness of 3000 m on the continental side to 9000 m towards the shelf side with sediments having Tethyan affinity. (iii) On the eastern margin of India there exists a shelf with an average 100 m depth and with a width of nearly 2.5 km near Chennai to over 210 km near Kolkata (Ganga delta) and (iv) Other marginal basins are in Kerala.

Mineral Potentiality in India

The baseline geoscience data generation carried out by GSI so far has resulted in an identification of an area of nearly 0.57 million sq. km of Obvious Geological Potential (OGP) for different minerals including Coal and lignite, in India, the details of which are indicated in Annexure-II.

Chronology of Mineral Occurrences in India

Annexure-I

Sl. No	Stratigra-phic Column	Metallic Deposits	Non-Metallic Deposits	Coal & Lignite	Precious Stones	Remarks
1	Holocene Quaternary 1.8 Ma	Bauxite, Nickel; Tin, Gold, Titanium Rare Earths	Refractory (Bauxite), Clays, sands, Building Materials, Geothermal springs, Sulphur, etc.	-	Diamonds, Garnets, etc.	Laterite Profiles in Peninsular India (Bauxite, Nickel); River Placers etc., in Peninsular & Himalayan alluvial tracts, beach sands in coastal tracts
2	Tertiary 65 Ma	Low values in igneous rocks (Tin, Tungsten) Gold	Limestone / Evaporites Sandstones Bentonite Clays	Tertiary Coals (Low ash, high sulphur), Lignite	-	Tertiary formations of NER, Syn-to Post –orogenic acid intrusive in Himalayas; Placers in Siwaliks
3	Mesozoic 230 Ma	Low values of Chromites, Base metals Platinoids Low Values of Mercury and other metals	Limestone-Dolomite	-	-	Ophiolitic suites of Himalayas, Naga-Patakai-Andaman-Nicobar, Deccan volcanics
4	Palaezoic 570 Ma	Lower Palaezoic base metal prospects and associated metal values	Building Stones, Potash, Clay, Refractories, Evaporites	Coking and Non-Coking Coal in Gondwana basins.	-	Metalliferrous shows essentially in Himalayan terrain; Coal in Peninsular parts and Lesser Himalayas. Potash in Rajasthan
5.	Proterozoic 2500 Ma	Base metal Deposits and Associated Metals ((Cu, Pb, Zn, Co, Mo, Cd, Au, Ag, etc) Iron Ores, Chromites, PGE	Marble, Granites, Dolomite, Limestone, Gypsum, Phosphorite, Graphite, Refractories (Kyanite, Sillimanite-Andalusite), Mica	-	Diamond, Sapphire, Emerald, Garnet	Essentially in defined belts of Peninsular India and Himalayas.
6	Archean (4600 Ma)	Iron Ores Manganese Titanium-Vanadium Gold Massive Sulphides (Cu-Pb-Zn)	Granites & other Ornamental stones	-	-	Banded Iron Formation Older Greenstone Settings in Tonalite Trondjhemite Granitoid Crust (TTG)

Mineral wise /State wise Obvious Geological Potential Area (OGP)

Annexure-II

Sl. No	Mineral→ / State ↓	State OG P	Gold	Diamond& Precious Stones**	Base metal	Platinum Group of Elements	Iron Ore	Manganese	Chromite	Molybdenum	Coal & Lignite	Tin & Tungsten	Bauxite
	Area	($Km^{2)}$	($Km^{2)}$	($Km^{2)}$	($Km^{2)}$	($Km^{2)}$	($Km^{2)}$	($Km^{2)}$	($Km^{2)}$	($Km^{2)}$	($Km^{2)}$	($Km^{2)}$	($Km^{2)}$
1	Andhra Pradesh	131500	3000	117000	33000	300	400	500	-	-	11000	-	6000
2	Rajasthan	102000	25000		85350	-	-	-	-	-	16000	-	-
3	Karnataka	80000	35000	62000	2000	4000	2130	1360	360	-	-	-	300
4	Chattisgarh	57250	2800	45000			205			-	7450		350
5	Orissa	47025	8680	29000	4800	1400	700	1110	1400	-	1725		19000
6	Madhya Pradesh	31300	5650	18400	9000	-	-	-	-	-	5600	-	350
7	Maharashtra	28100	5500	18000	5500	1000		430	-	-	3100	-	750
8	Gujarat	25100	5500		18300					-	5800		1000
9	Jharkhand & Bihar	23550	11180	-	12120	430	300	600	430	-	3350	-	250
10	Tamil Nadu	17300	1000	3000	1500	1000	800		500	6000	3300	-	200
11	Uttar Pradesh	9100	4500	5600	4500	-	-	-	-	-	-	-	-
12	Kerala	6000	1000	2000	-	-	-	-	-	-	-	-	3000
13	West Bengal	5240	2580		3330	-	-	-	-	-	1940	-	
14	Meghalaya	2510	-	-		-	-	-	-	-	760	-	-
15	Goa	1500	1500				600	600	-	-		-	1050
16	Haryana	1300	-	-	-	-	-	-	-	-	-	1300	-
17	Sikkim	1000			1000	-	-	-	-	-	-	-	-
18	Assam	940	-	-	750	-	-	-	-	-	190	-	-
	Total Area	570715	102890	300000	181150	8130	5135	4600	2690	6000	60215	1300	32520

Note : Due to geochemical affinity and varied geological reasons mineral occurrences are not mutually exclusive and there is an overlap of Areas. Therefore, it is difficult to show exclusively geological domain of individual mineral separately in each State.

Chapter – II

NATIONAL MINERAL SCENARIO

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.

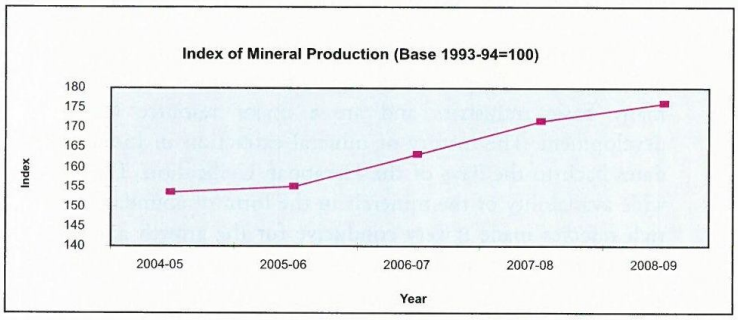
The country is endowed with huge resources of many metallic and non-metallic minerals. Mining sector is an important segment of the Indian economy. Since independence, there has been a pronounced growth in the mineral production both in terms of quantity and value. India produces as many as 86 minerals,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

Mineral Production

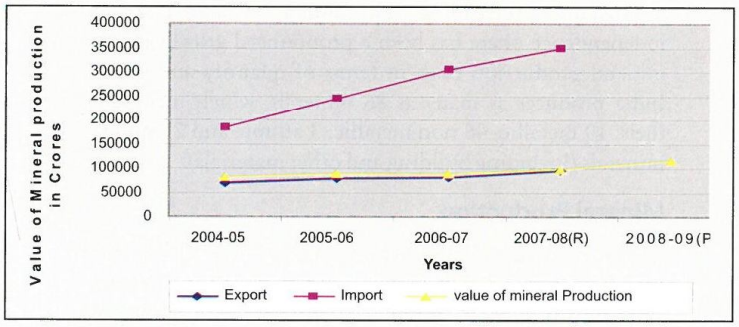
The index of mineral production (base 1993-94=100) for the year 2008-09 was 175.96 as compared to 171.57 for 2007-08 showing a positive growth of 2.55%. The trend of index of mineral production for the last five years is depicted in Figure .

The total value of mineral production (excluding atomic minerals) during 2008-09 was Rs. 1,22,098.90 crores, which shows an increase of about 1.97% over that of the previous year. During 2008-09, provisional value for fuel minerals account for Rs. 70,342.37 crores or 57.61% metallic minerals, Rs. 31,533.96 crores or 25.83% of the total value and non-metallic minerals including minor minerals Rs. 20222.59 crores or 16.56% of the total value.

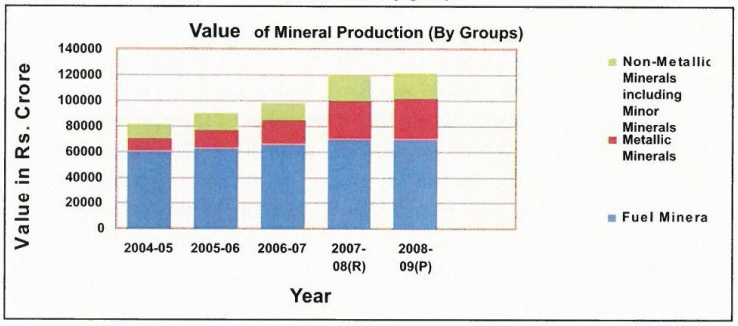
Index of mineral production



Trends in Value of Mineral Production, Export & Import



Value of Minerals by groups



Mining

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 2944 in 2008-09 as against 2964 in the previous year. Out of 2944 reporting mines, 428 were located in Gujarat followed by Andhra Pradesh (434), Madhya Pradesh (282), Jharkhand (294), Rajasthan (261), Orissa (233), Karnataka (224), Tamil Nadu (150), Maharashtra (152), Chhattisgarh (139) and West Bengal (112). These 11 states together accounted for 92 % of total number of mines in the country in 2008-09. The number of reporting mines are given below:-

Number of Reporting Mines

Sector	2006-07	2007-08	2008-09
All Minerals*	**3005**	**2964**	**2941**
Coal (including Lignite)	570	570	570
Metallic Minerals	639	691	691
Non-Metallic Minerals	1796	1703	1680

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

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%), Maharashtra (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 .. The contribution of States/Regions in the value of mineral production during 2008-09 is pictorially shown in Figure.

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.

India's ranking in 2007-08 in world production was 2nd in barytes, chromite and talc/steatite/pyrophillite, 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.

Self-Reliance in Minerals & Mineral-based Products

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 II.

Production Trends

Metallic Minerals

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. Gujarat accounted for 23% of the total output of bauxite during 2008-09 followed by Orissa (30%), Chhattisgarh (11%), Maharashtra (13%) and Jharkhand (10%).

During 2008-09, the production of lead concentrate at 314 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

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(.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 to that in 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 the 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 the 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 that in the 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 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 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

The value of production of minor minerals was Rs 16694.9 crore in 2006-07. 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.

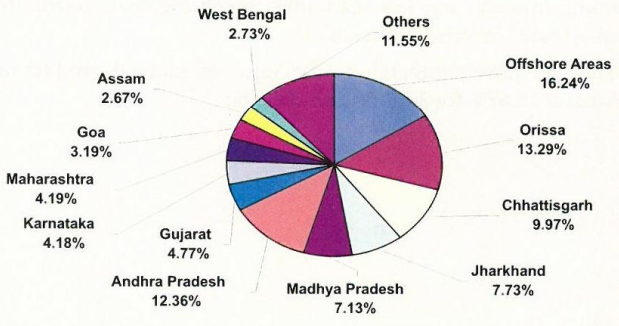
Chapter – III

STATE WISE MINERAL SCENARIO

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%), Maharashtra (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. The contribution of States/Regions in the value of mineral production during 2008-09 is pictorially shown in Figure.

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.

Share of States in Value of Mineral Production 2008-09(Provisional)



The State wise value of mineral production during 2004-05 to 2007-08 is given in Annexure 3

Scenario of Mineral Rich States

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, 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, Mahaboob-nagar, 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, Khmmam, Kurnool and Warangal districts; felspar 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, Srika-kulam, Visakhapatnam, 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 178.30 in 2007-08 as against 167.60 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 Koria, 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 219.01 in 2007-08 as against 203.10 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 205.45 in 2007-08 as against 201.60 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 Panchamahals district; lead-zinc and marble in Banaskantha and Vadodara districts; manganese ore in Panchamahals 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 125.33 in 2007-08 as against 125.40 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; 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 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 123.73 in 2007-08 as compared to 120.10 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, Chickmaglur, 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 decrease 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, shalc 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%., limeshel 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 305.08 in 2007-08 as compared to 272.60 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 disitrict.

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 199.47 in 2007-08 as against 179.10 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; felspar in Sindhudurg district; gold in Bhandara and Nagpur districts; granite in Bhandra, 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%, sillemanite 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 2007-08 was 185.26 as against 180.90 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 420.79 in 2007-08 as against 410.30 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 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%, felspar 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%, steatiite 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 200.56 in 2007-08 as against 175.70 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 Tiruchirapalli districts; fireclay in Cuddalore, Kanchipuram, Perambalur, Pudukottai, Sivaganga, Thiruvallur, Tiruchirapalli, 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, Tiruchirapalli, 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, Dharampuri, 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 Kannyakumari 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 196.20 in 2007-08 as against 194.80 in the previous year.

Reserves/Resources of Minerals as on 1.4.2005 : Andhra Pradesh

Mineral	Unit	Reserves				Remaining resources								Total resources
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Apatite	tonne	0	0	19629	19629	0	0	0	0	0	337541	0	337541	357170
Asbestos	tonne	2529	1336	15656	19521	0	1781	1170	0	0	27085	0	30036	49557
Ballclay	tonne	6677726	2806267	10746533	20230526	0	0	0	0	2279330	27647424	0	29926754	50157280
Barytes	tonne	31438494	347165	2203099	33988758	0	3980846	25083052	155391	127060	6561343	0	35907692	69896450
Bauxite	'000 tonnes	199	5	48	251	0	0	2260	188720	135860	288176	0	615016	615267
Calcite	tonne	5927	0	102345	108272	0	0	0	8562200	5200	121662	0	8689062	8797334
China clay	'000 tonnes	4490	2578	4841	11908	0	0	0	5	179	61582	0	61767	73675
Chromite	'000 tonnes	0	0	0	0	0	0	0	0	15	172	0	187	187
Copper														
Ore	'000 tonnes	686	338	433	1457	0	0	395	0	5396	1000	0	6791	8248
Metal	000 tonnes	6.88	4.33	5.84	17.05	0	0	7.54	0	89.91	8.32	0	105.77	122.82
Corundum	tonne	7	0	0	7	0	0	0	0	0	51088	0	51088	51095
Diamond	carats	0	0	0	0	0	1240	0	298638	1523077	0	0	1822955	1822955
Dolomite	'000 tonnes	78933	8077	36411	123422	0	0	0	0	130654	892349	0	1023003	1146425
Felspar	tonne	2115904	281751	2456752	4854407	0	0	0	0	3800000	2789906	0	6589906	11444314
Fire clay	'000 tonnes	1382	935	1444	3761	0	0	0	56	758	17928	0	18742	22503
Fuller's earth	tonne	0	0	0	0	0	0	0	0	0	25523983	0	25523983	25523983
Garnet	tonne	36000	600	0	36600	0	0	0	0	8800000	5934423	0	14734423	14771023
Gold														
Ore (primary)	tonne	655133	0	889515	1544648	0	0	0	8200000	661000	1692699	0	10553699	12098347
Metal(primary)	tonne	2.45	0	3.57	6.02	0	0	0	17.28	0.69	7.59	0	25.56	31.58
Granite														
(Dim. stone)	'000 cu m	0	0	0	0	0	0	0	0	0	2405890	0	2405890	2405890
Graphite	tonne	0	0	1135	1135	0	0	0	0	124759	301306	0	426064	427199
Gypsum	'000 tonnes	0	0	0	0	0	0	0	0	0	404	0	404	404
Iron ore														
(hematite)	'000 tonnes	24961	7377	7258	39596	205	0	0	377	1054	121807	0	123443	163038
Iron ore														
(magnetite)	'000 tonnes	0	0	0	0	43034	0	0	13800	1266666	140027	14	1463541	1463541
Kyanite	tonne	0	0	399	399	0	0	0	0	0	80353829	0	80353829	80354228
Lead-zinc														
Ore	'000 tonnes	686	0	105	791	0	0	0	1000	4159	670	0	5829	6620
Lead metal	'000 tonnes	25.90	0	3.96	29.86	0	0	0	28.70	119.53	21.74	0	169.97	199.83
Zinc metal	'000 tonnes	0.00	0.00	0.00	0.00	0	0	0	12.40	43.57	7.19	0	63.16	63.16
Limestone	'000 tonnes	2065743	188150	1126885	3380779	12689	44586	725250	113890	272610	27603548	3025184	31797756	35178535
Magnesite	'000 tonnes	0	0	0	0	0	0	0	0	0	80	0	80	80
Manganese ore	'000 tonnes	2457	188	1204	3849	0	0	42	322	3972	7398	0	11734	15583
Marble	'000 tonnes	0	0	0	0	0	0	0	0	0	3	0	3	3
Mica	kg	0	0	0	0	0	0	0	0	0	111315850	0	1 1 1 3	1 5 8 5 0
111315850														

(concld.)

Mineral	Unit	Reserves				Remaining resources								Total resources
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Ochre	tonne	3211035	926815	4174784	8312634	0	0	0	5000	0	2641348	0	2646348	10958982
Pyrite	'000 tonnes	0	0	0	0	0	0	0	0	0	880	0	880	880
Pyrophyllite	tonne	11220	0	9720	20940	0	0	0	0	0	15880	0	15880	36820
Quartz-silica sand	'000 tonnes	43626	7717	33112	84455	22	959	5114	5924	1502	55840	100	69461	153916
Quartzite	'000 tonnes	3300	3496	7187	13982	0	0	2	0	0	4586	0	4588	18570
Sillimanite	tonne	0	0	0	0	0	0	0	0	7430300	1346200	0	8776500	8776500
Silver														
Ore	tonne	686250	0	105000	791250	0	0	0	0	0	90000	0	90000	881250
Metal	tonne	5.19	0	0.79	5.98	0	0	0	0	0	1.08	0	1.08	7.06
Talc-steatite-soapstone	'000 tonnes	3134	131	2082	5346	0	0	0	13	143	3615	0	3771	9117
Titanium minerals														
Ilmenite	tonne	0	0	0	0	0	0	0	0	0	76683704	0	76683704	76683704
Rutile	tonne	0	0	0	0	0	0	0	0	0	18805	0	18805	18805
Tungsten														
Ore	tonne	0	0	0	0	0	0	0	3640000	4700800	5952500	509000	14802300	14802300
Contained WO_3	tonne	0.00	0	0	0	0	0	0	5096.00	6574.64	8273.65	318.28	20262.57	20262.57
Vermiculite	tonne	1508	3160	5646	10314	0	0	0	765	6101	93304	0	100170	110484

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Arunachal Pradesh

Mineral	Unit	Total Reserves (A)	Remaining resources				Total resources (A+B)
			Indicated STD332	Inferred STD333	Reconnaissance STD334	Total (B)	
Dolomite	'000 tonnes	0	204	77633	0	77837	77837
Graphite	tonne	0	0	0	72758257	72758257	72758257
Quartzite	'000 tonnes	0	0	5270	0	5270	5270

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Assam

Mineral	Unit	Reserves				Remaining resources							Total resources
		Proved	Probable		Total	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance (A+B)	Total	
		STD111	STD121	STD122	(A)	STD221	STD222	STD331	STD332	STD333	STD334	(B)	
China clay	'000 tonnes	0	131	0	131	3360	0	392	0	160	0	3912	4043
Fireclay	'000 tonnes	0	0	0	0	0	0	44	0	3117	0	3161	3161
Fuller's earth	tonne	0	0	0	0	0	0	0	0	18860000	0	18860000	18860000
Granite (Dim. stone)	'000 cu m	0	0	0	0	0	513000	0	800	70150	0	583950	583950
Iron ore (Hematite)	'000 tonnes	0	0	0	0	0	0	8600	2400	1600	0	12600	12600
Iron ore (Magnetite)	'000 tonnes	0	0	0	0	0	0	4240	1600	9540	0	15380	15380
Limestone	'000 tonnes	57156	157519	2000	216675	0	4257	98233	32200	953572	0	1088262	1304937
Quartz-silica sand	'000 tonnes	0	0	0	0	0	0	0	0	1790	0	1790	1790
Sillimanite	tonne	0	0	0	0	0	0	0	850000	6700	3748000	4604700	4604700

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Bihar

Mineral	Unit	Reserves				Remaining resources						Total resources (A+B)
		Proved STD111	Probable		Total (A)	Pre-feasibility STD222	Measured STD331	Indicated STD332	Inferred STD333	Reconnaissance STD334	Total (B)	
			STD121	STD122								
Bauxite	'000 tonnes	0	0	0	0	0	0	0	4114	0	4114	4114
China clay	'000 tonnes	0	0	0	0	0	104	39	1296	0	1438	1438
Felspar	tonne	0	0	0	0	0	0	4195	4848447	0	4852642	4852642
Fireclay	'000 tonnes	0	0	0	0	0	0	0	44	0	44	44
Gold												
Ore (Primary)	tonne	0	0	0	0	0	0	27042744	101842116	94000000	222884860	222884860
Metal (Primary)	tonne	0.00	0.00	0.00	0.00	0.00	0	3.33	18.27	16.00	37.60	37.60
Granite												
(Dim. stone)	'000 cu m	0	0	0	0	0	0	179000	698612	0	877612	877612
Iron ore												
(Hematite)	'000 tonnes	0	0	0	0	0	0	0	55	0	55	55
Iron ore												
(Megnetite)	'000 tonnes	0	0	0	0	0	0	0	2659	0	2659	2659
Lead-zinc												
Ore	'000 tonnes	0	0	0	0	0	0	435	11000	0	11435	11435
Lead metal	'000 tonnes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.00	0.00	24.00	24.00
Zinc metal	'000 tonnes	0.00	0.00	0.00	0.00	0.00	0.00	14.75	24.00	0.00	38.75	38.75
Limestone	'000 tonnes	4314	583	8795	13692	0	86379	38210	721143	0	845732	859424
Mica	kg	0	0	0	0	0	0	0	12937513	7700	12945213	12945213
Pyrite	'000 tonnes	13462	0	6680	20142	3000	0	51419	1500000	0	1554419	1574561
Quartz-silica sand	'000 tonnes	0	0	0	0	0	0	0	23378	0	23378	23378
Quartzite	'000 tonnes	16	6114	12084	18213	0	3118	22306	227568	0	252992	271205
Talc/steatite/ soapstone	'000 tonnes	62	0	2	64	0	0	0	1	0	1	65

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Chhattisgarh

Mineral	Unit	Reserves				Remaining resources								Total resources (A+B)
		Proved	Probable		Total (A)	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total (B)	
		STD 111	STD121	STD122		STD211	STD221	STD222	STD331	STD332	STD333	STD334		
Bauxite	'000 tonnes	30706	46981	11279	88966	0	36759	3823	1262	2572	14933	0	59349	148315
China clay	'000 tonnes	914	179	1585	2678	0	600	110	0	0	11378	0	12088	14766
Corundum	tonne	310	0	288	597	0	0	0	0	0	288	0	288	885
Diamond	Carats	0	0	0	0	0	0	0	0	0	1304000	0	1304000	1304000
Dolomite	'000 tonnes	52108	64526	27972	144606	242	190795	6499	19840	33670	449108	1950	702105	846711
Fireclay	'000 tonnes	0	50	12	62	0	0	0	10580	0	10336	0	20916	20978
Fluorite	tonne	0	0	0	0	65889	153132	9288	185485	5573	126088	0	545455	545455
Garnet	tonne	0	0	0	0	0	0	0	0	0	28800	0	28800	28800
Gold Ore (primary)	tonne	0	0	0	0	0	0	0	0	600000	300000	0	900000	900000
Metal (primary)	tonne	0	0	0	0	0	0	0	0	1.8	0.9	0	2.7	2.7
Granite (Dim. stone)	'000 cu m	0	0	0	0	0	0	0	0	0	50057	0	50057	50057
Iron ore (Hematite)	'000 tonnes	570227	190285	0	760512	101548	0	656	81555	526906	779609	480000	1970275	2730787
Limestone	'000 tonnes	669205	197381	200015	1066602	0	1544395	600882	2136876	619250	3069683	0	7971087	9037689
Marble	'000 tonnes	0	0	0	0	0	0	0	0	0	83000	0	83000	83000
Quartz-silica sand	'000 tonnes	424	0	304	727	0	0	457	0	0	282	0	739	1466
Quartzite	'000 tonnes	3402	4142	4121	11664	0	0	0	0	0	14688	0	14688	26353
Talc/steatite/ soapstone	'000 tonnes	22	0	8	30	0	0	0	0	70	8	0	78	108
Tin Ore	tonne	188136	0	48669	236805	0	2516392	0	168326	595914	29109378	0	32390010	32626816
Metal	tonne	73.05	0	26.40	99.45	0	369.92	0	662.49	213.60	13103.43	0	14349.44	14448.89

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Delhi

Mineral	Unit	Reserves			Remaining resources				Total resources (A+B)
		Proved STD111	Probable STD122	Total (A)	Measured STD331	Indicated STD332	Inferred STD333	Total (B)	
China clay	'000 tonnes	18.66	60.11	78.77	857.32	629.65	3723.47	5210.44	5289.21
Fireclay	'000 tonnes	0	0	0	6.3	12.6	45.2	64.1	64.1

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Goa

Mineral	Unit	Reserves				Remaining resources								Total resources
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Bauxite	'000 tonnes	27037	1097	6492	34626	0	1320	263	5500	0	8646	0	15729	50355
China clay	'000 tonnes	0	0	0	0	0	0	16	0	0	0	0	16	16
Iron ore (hematite)	'000 tonnes	268126	93658	96919	458704	25018	33010	48403	3327	7906	136581	0	254244	712948
Iron ore (magnetite)	'000 tonnes	10738	37583	1791	50112	0	9071	0	0	3046	149943	1997	164057	214169
Manganese ore	'000 tonnes	28	444	2388	2860	0	706	1150	1019	423	12899	0	16197	19057
Quartz-silica sand	'000 tonnes	0	0	0	0	0	20	1736	0	0	18248	0	20004	20004

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Gujarat

Mineral	Unit	Reserves				Remaining resources								Total resources
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Apatite	tonne	0	0	0	0	0	0	0	0	0	0	351000	351000	351000
Ballclay	tonne	0	103560	146250	249810	0	0	0	0	0	49670	0	49670	299480
Bauxite	'000 tonnes	43952	2400	21861	68214	0	40440	27806	12195	328	39354	0	120124	188337
Bentonite	tonne	0	0	12460170	12460170	0	0	0	2163813	1904	81927561	0	84093278	96553448
Calcite	tonne	0	0	0	0	0	0	0	0	0	12380	0	12380	12380
China clay	'000 tonnes	38581	924	27685	67190	0	148	867	3088	936	38917	3	43958	111148
Copper														
Ore	'000 tonnes	0	4955	845	5800	0	0	0	129	0	7131	0	7260	13060
Metal	'000 tonnes	0	80.75	13.78	94.53	0	0	0	0.69	0	113.38	0	114.07	208.60
Diatomite	'000 tonnes	0	0	0	0	0	0	0	0	0	811	0	811	811
Dolomite	'000 tonnes	28096	119	26085	54300	0	30716	62435	20263	63780	293000	0	470194	524494
Fireclay	'000 tonnes	1629	337	797	2763	0	265	418	270	909	53744	0	55605	58368
Fluorite	tonne	7663840	0	200160	7864000	0	0	5723360	0	0	337920	0	6061280	13925280
Granite														
(Dim. stone)	'000 cu m	0	0	0	0	0	0	0	0	0	421296	0	421296	421296
Graphite	tonne	0	0	0	0	0	0	0	0	2520805	835000	0	3355805	3355805
Gypsum	'000 tonnes	9	9	24	42	0	0	0	0	0	15138	0	15138	15179
Lead-zinc														
Ore	'000 tonnes	0	4955	845	5800	0	0	0	129	0	200	0	329	6129
Lead metal	'000 tonnes	0	104.37	17.81	122.18	0	0	0	3.90	0	0	0	3.90	126.08
Zinc metal	'000 tonnes	0	224.04	39.37	263.41	0	0	0	1.10	0	0	0	1.10	264.51
Lead & zinc														
metal	'000 tonnes	0	0	0	0	0	0	0	0	0	0.90	0	0.90	0.90
Limestone	'000 tonnes	585071	122861	222216	930149	234	86484	167762	26876	857691	17943215	0	19082262	20012410
Manganese ore	'000 tonnes	0	0	0	0	0	0	0	0	0	2954	0	2954	2954
Marble	'000 tonnes	0	0	0	0	0	26571	45000	0	17129	5040	0	93740	93740
Ochre	tonne	14385	33209	65047	112641	0	0	26520	6971	6210	2906608	0	2946309	3058950
Perlite	'000 tonnes	188	0	316	504	0	0	334	0	0	0	1051	1385	1889
Quartz-														
silica sand	'000 tonnes	26367	3111	21964	51442	0	2442	7708	2144	2999	30017	0	45311	96753
Phosphorite/rock														
phosphate	tonne	0	0	0	0	0	0	0	0	0	314820	0	314820	314820
Talc/steatite/														
soapstone	'000 tonnes	8	1	8	16	0	18	8	0	0	4	0	29	45
Vermiculite	tonne	0	0	0	0	0	0	0	0	0	1960	0	1960	1960
Wollastonite	tonne	0	0	0	0	0	0	0	0	0	1990000	0	1990000	1990000

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Haryana

Mineral	Unit	Reserves				Remaining resources								Total resources
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Barytes	tonne	0	0	0	0	0	0	0	0	0	440	0	440	440
Calcite	tonne	0	0	0	0	166900	0	183900	0	0	0	0	350800	350800
China clay	'000 tonnes	0	7	29	36	2367	782	3348	13	34	5485	0	12029	12065
Copper														
Ore	'000 tonnes	0	0	0	0	0	2230	0	0	0	15000	0	17230	17230
Metal	'000 tonnes	0	0	0	0	0	11.82	0	0	0	45.00	0	56.82	56.82
Dolomite	'000 tonnes	0	0	0	0	5371	5149	3722	0	0	15257	0	29500	29500
Felspar	tonne	0	0	0	0	0	0	0	0	0	72164	0	72164	72164
Granite														
(Dim. stone)	'000 cu m	0	0	0	0	0	0	0	0	0	34000	0	34000	34000
Limestone	'000 tonnes	0	9675	0	9675	0	8222	2954	0	0	50398	0	61574	71249
Marble	'000 tonnes	0	0	0	0	0	1234	1602	0	0	19492	0	22328	22328
Quartz-silica sand	'000 tonnes	196	138259	129444	267900	307	114776	96071	27839	46300	1257938	0	1543231	1811131
Quartzite	'000 tonnes	15702	0	16200	31902	0	89742	96165	86951	85333	231887	0	590078	621980
Tin														
Ore	tonne	0	0	0	0	22580000	0	31330000	0	0	0	0	53910000	53910000
Metal	tonne	0	0	0	0	32187.80	0	54032.80	0	0	0	0	86220.60	86220.60
Ore	tonne	0	0	0	0	2230000	0	0	0	0	0	0	2230000	2230000
Contained WO,	tonne	0	0	0	0	3568	0	0	0	0	0	0	3568	3568

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Himachal Pradesh

Mineral	Unit	Reserves				Remaining resources								Total resources
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Antimony														
Ore	Tonne	0	0	0	0	0	0	0	0	0	10588	0	10588	10588
Metal	Tonne	0	0	0	0	0	0	0	0	0	174	0	174	174
Barytes	Tonne	26699	0	11001	37700	0	37700	0	36160	12370	15126	0	101356	139056
Gypsum	'000 tonnes	0	0	0	0	0	0	1365	0	0	3081	0	4446	4446
Limestone	'000 tonnes	275755	100816	64032	440604	3721	976539	9860	1154802	1891	2174926	0	4321739	4762342
Magnesite	'000 tonnes	0	0	0	0	0	0	0	0	100	198	0	298	298
Pyrite	'000 tonnes	0	0	0	0	0	0	0	0	0	2560	0	2560	2560
Quartz-silica sand	'000 tonnes	0	0	0	0	0	0	0	428	0	2500	0	2928	2928
Quartzite	'000 tonnes	95	0	39	134	48	0	0	0	0	0	0	48	182
Rock salt	'000 tonnes	8470	0	5060	13530	0	0	0	0	0	0	0	0	13530

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Jammu & Kashmir

Mineral	Unit	Reserves				Remaining resources								Total resources
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Bauxite	'000 tonnes	0	0	0	0	0	0	0	1323	182	520	0	2025	2025
Bentonite	Tonne	0	0	0	0	0	0	0	0	0	147400	0	147400	147400
Borax	Tonne	0	0	0	0	0	0	0	0	0	0	74204	74204	74204
China clay	'000 tonnes	0	0	0	0	0	0	0	0	0	28122	0	28122	28122
Diaspore	Tonne	0	0	0	0	0	0	0	0	566	711	0	1277	1277
Graphite	Tonne	0	0	0	0	0	0	0	0	0	1059520	61681035	62740555	62740555
Gypsum	'000 tonnes	6044	0	6875	12919	285	9852	44	7680	0	146055	0	163916	176835
Limestone	'000 tonnes	45409	18990	27428	91827	0	26801	160102	43621	0	1033672	203	1264400	1356227
Magnesite	'000 tonnes	0	2813	0	2813	0	0	0	0	0	150	45	195	3008
Marble	'000 tonnes	0	0	0	0	0	0	0	0	0	404703	0	404703	404703
Quartz-silica sand	'000 tonnes	0	0	0	0	0	0	0	0	0	3110	0	3110	3110
Quartzite	'000 tonnes	0	1112	0	1112	0	0	0	0	0	0	0	0	1112
Sapphire	kg	0	0	0	0	0	0	0	0	0	450	0	450	450
Sulphur (native)	'000 tonnes	0	0	0	0	0	0	0	0	0	210	0	210	210

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Jharkhand

Mineral	Unit	Reserves				Remaining resources								Total resources
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Andalusite	'000 tonnes	0	0	0	0	0	0	0	0	0	4000	0	4000	4000
Apatite	Tonne	0	0	0	0	0	0	0	2110000	1620000	3540000	0	7270000	7270000
Asbestos	Tonne	0	0	0	0	0	3871	18309	2885	5769	124059	0	154893	154893
Barytes	Tonne	0	0	0	0	0	0	0	0	0	35900	0	35900	35900
Bauxite	'000 tonnes	13408	5528	12722	31657	0	566	5242	320	17397	61827	536	85888	117545
Bentonite	Tonne	0	0	609406	609406	0	3067	65200	0	0	134000	0	202267	811673
China clay	'000 tonnes	22162	711	7774	30647	0	1383	28	2007	7280	148753	42	159493	190140
Chromite	'000 tonnes	0	0	0	0	0	0	0	15	98	623	0	736	736
Cobalt	Million tonnes	0	0	0	0	0	0	0	0	2	0	7	9	9
Copper Ore	'000 tonnes	4464	42356	29075	75895	0	0	0	40307	66188	43692	0	150187	226083
Metal	'000 tonnes	39.20	400.45	278.82	718.47	0.00	0.00	0.00	490.55	631.85	562.70	0.00	1685.10	2403.57
Dolomite	'000 tonnes	21918	1897	9674	33489	0	0	0	0	0	17606	0	17606	51094
Dunite	'000 tonnes	303	3446	3324	7073	0	0	0	0	0	3410	0	3410	10483
Felspar	Tonne	174914	91940	423007	689861	0	0	19845	32510	117705	797470	0	967530	1657391
Fireclay	'000 tonnes	979	634	743	2356	0	23	18	0	0	64405	0	64447	66802
Garnet	Tonne	0	58	234	292	0	0	0	0	0	0	682	682	975
Gold Ore (primary)	Tonne	0	0	92850	92850	0	0	0	0	0	254000	0	254000	346850
Metal(primary)	Tonne	0.00	0.00	0.83	0.83	0.00	0.00	0.00	0.00	0.00	2.29	0.00	2.29	3.12
Granite (Dim. stone)	000 cu m	0	0	0	0	0	0	0	0	651300	8196064	0	8847364	8847364
Graphite	Tonne	442537	670448	2163106	3276091	0	0	720000	2750	1143701	5180124	24350	7070925	10347016
Iron ore (hematite)	'000 tonnes	2237629	35730	221065	2494423	0	343	328	30000	50000	460651	1000000	1541323	4035746
Iron ore (magnetite)	'000 tonnes	14	836	2540	3391	0	5	11	411	3948	2472	32	6879	10269
Kyanite	Tonne	629475	190200	85458	905133	0	0	0	0	1754900	3048500	0	4803400	5708533
Limestone	'000 tonnes	249920	42009	52889	344818	894	1630	2772	1956	9460	382745	1503	400961	745778

(Concld.)

Mineral	Unit	Reserves				Remaining resources								Total resources
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Manganese ore	'000 tonnes	687	359	4002	5049	0	0	0	0	0	2429	0	2429	7478
Mica	kg	0	0	0	0	0	0	0	0	0	1494430	170700	1665130	1665130
Nickel ore	Million tonnes	0	0	0	0	0	0	0	0	2	7	0	9	9
Ochre	Tonne	220943	0	12231	233174	0	0	0	0	0	9037	0	9037	242211
Phosphorite/Rock phosphate	Tonne	0	0	0	0	0	0	0	0	0	107370000	0	107370000	107370000
Quartz-silica sand	'000 tonnes	7213	980	6222	14414	1615	941	1223	64	758	135745	6	140352	154766
Quartzite	'000 tonnes	409	0	416	825	0	0	0	197	275	38934	0	39405	40230
Sillimanite	Tonne	0	0	0	0	0	0	0	0	0	83000	0	83000	83000
Silver														
Ore	Tonne	0	0	0	0	0	0	0	0	0	23840000	0	23840000	23840000
Metal	Tonne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.22	0.00	5.22	5.22
Talc-steatite-soapstone	'000 tonnes	4	5	22	31	1	0	54	2	4	250	0	311	341
Titanium mineraals														
Ilmenite	Tonne	0	0	0	0	0	0	0	0	0	744000	0	744000	744000
Rutile	Tonne	0	0	0	0	0	0	0	0	0	11000	0	11000	11000
Titaniferous magnetite	Tonne	0	0	0	0	0	0	0	0	3630000	0	0	3630000	3630000
Vermiculite	Tonne	0	0	0	0	0	0	0	0	0	30048	0	30048	30048

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Karnataka

Mineral	Unit	Reserves				Remaining resources								Total resources
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Asbestos	Tonne	0	0	0	0	0	0	0	0	2441037	5841420	0	8282457	8282457
Barytes	Tonne	0	0	0	0	0	0	0	0	0	15175	0	15175	15175
Bauxite	'000 tonnes	4576	367	786	5729	0	394	7180	378	2940	32882	0	43774	49503
Calcite	Tonne	0	0	118	118	0	0	0	0	14400	52415	0	66815	66933
China clay	'000 tonnes	1805	3714	2168	7687	241	311	1997	220360	443	26017	0	249369	257056
Chromite	'000 tonnes	470	0	620	1090	0	68	41	0	20	571	0	700	1789
Copper														
Ore	'000 tonnes	963	0	2595	3558	0	0	0	1750	7148	21948	0	30846	34404
Metal	'000 tonnes	5.99	0.00	20.34	26.33	0.00	0.00	0.00	22.00	66.90	111.33	0.00	200.23	226.56
Corundum	Tonne	0	0	0	0	0	756	915	13	49	14157	0	15890	15890
Dolomite	'000 tonnes	84865	35916	23929	144710	0	0	0	9360	17578	461377	484	488800	633509
Dunite	'000 tonnes	428	153	955	1537	0	0	0	23909	0	4038	0	27947	29483
Felspar	Tonne	67789	0	206430	274219	0	0	0	25000	135133	207245	0	367378	641597
Fireclay	'000 tonnes	119	242	728	1089	0	16	81	0	226	9928	0	10251	11340
Fullers earth	Tonne	0	0	58200	58200	0	0	0	0	551640	1471276	0	2022916	2081116
Gold														
Ore (primary)	Tonne	14898956	1075868	1641629	17616453	0	0	1724132	3676371	7914931	1990500	33250000	48555934	66172387
Metal(primary)	Tonne	64.47	3.80	10.00	78.27	0.00	0.00	6.74	17.43	20.12	5.12	25.73	75.14	153.41
Granite														
(Dim. stone)	000 cu m	19212	16617	18983	54812	0	0	0	4198	1231625	7998043	19000	9252866	9307678
Graphite	Tonne	1308	6794	188812	196914	0	0	0	0	18200	52500	0	70700	267614
Gypsum	'000 tonnes	0	0	0	0	0	0	0	0	0	3784	0	3784	3784
Iron ore														
(hematite)	'000 tonnes	465677	190168	284584	940430	939	5524	1034	274600	43380	400813	9502	735792	1676222
Iron ore														
(magnatite)	'000 tonnes	0	0	0	0	130062	0	18375	1498957	479372	5345018	340000	7811784	7811784
Kyanite	Tonne	127830	16	94409	222256	0	0	0	386247	1610502	10682763	0	12679512	12901767
Limestone	'000 tonnes	746295	230249	389331	1365875	19970	152101	450529	2493208	14327809	33076293	0	50519911	51885786

(Concld.)

Mineral	Unit	Reserves				Remaining resources								Total resources
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Magnesite	'000 tonnes	243	6	777	1025	0	0	0	88	10	2734	0	2832	3857
Manganese ore	'000 tonnes	6735	4426	8057	19218	384	1362	1835	1498	7329	51110	0	63518	82736
Molybdenum														
Ore	Tonne	0	0	0	0	0	0	0	0	0	1320900	0	1320900	1320900
Contained MoS_2	Tonne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1718.70	0.00	1718.70	1718.70
Nickel ore	Million tonnes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.23	0.23
Ochre	Tonne	487731	0	326100	813831	0	0	0	0	0	952620	0	952620	1766451
Pyrite	'000 tonnes	0	0	0	0	0	0	0	0	0	3000	0	3000	3000
Quartz-silica sand	'000 tonnes	15276	3464	13582	32321	305	1504	1829	80	80	44397	17	48211	80532
Quartzite	'000 tonnes	43	0	680	724	0	0	0	0	0	393	0	393	1116
Sillimanite	Tonne	0	0	0	0	0	0	0	0	0	982725	0	982725	982725
Silver														
Ore	Tonne	7208303	0	69462	7277765	0	0	0	0	0	314150	0	314150	7591915
Metal	Tonne	2.67	0.00	0.48	3.15	0.00	0.00	0.00	0.00	0.00	2.92	0.00	2.92	6.07
Talc-steatite-soapstone	'000 tonnes	97	0	82	179	20	135	344	0	30	1213	0	1742	1921
Titanium minerals														
Titaniferous magnetite	Tonne	0	0	0	0	0	0	0	0	0	13862094	0	13862094	13862094
Tungsten														
Ore	Tonne	0	0	0	0	0	0	0	15534073	11805499	0	9338246	36677818	36677818
Contained WO_3	Tonne	0	0	0	0	0	0	0	3057	1775	0	1403	6235	6235
Vanadium	Tonne													
Ore	Tonne	0	500000	4000000	4500000	0	0	0	0	0	14884430	0	14884430	19384430
Metal	Tonne	0.00	700.00	5600.00	6300.00	0.00	0.00	0.00	0.00	0.00	43197.55	0.00	43197.55	49497.55
Vermiculite	Tonne	0	17350	10330	27680	0	0	0	0	1562	66658	0	68220	95900

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Kerala

Mineral	Unit	Reserves				Remaining resources								Total resources
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Bauxite	'000 tonnes	55	0	0	55	0	0	2037	9284	2722	0	14043	14098	
China clay	'000 tonnes	7826	1055	670	9551	303	2077	43930	20439	534582	19770	621101	630652	
Fireclay	'000 tonnes	0	0	0	0	0	0	8200	51	9929	0	18181	18181	
Garnet	Tonne	0	0	45797	45797	0	0	100874	0	52190	0	153064	198861	
Gold														
Ore (primary)	Tonne	0	0	0	0	0	0	462280	96180	0	0	558460	558460	
Metal (primary)	Tonne	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.03	0.00	0.00	0.20	0.20	
Ore (placer)	Tonne	0	0	0	0	0	0	0	2552000	23569000	0	26121000	26121000	
Metal (placer)	Tonne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.29	3.57	0.00	5.86	5.86	
Granite (Dim. stone)	'000 cu m	140	0	0	140	0	99	0	0	2570	0	2669	2808	
Graphite	Tonne	0	8300	17762	26062	0	35600	0	1148350	240418	0	1424368	1450430	
Iron ore (magnetite)	'000 Tonnes	0	0	0	0	0	7074	0	56571	19790	0	83435	83435	
Kyanite	Tonne	0	0	0	0	0	0	218962	0	10000	0	228962	228962	
Limestone	'000 Tonnes	136695	77	10936	147709	0	0	21551	2888	34838	0	59276	206985	
Magnesite	'000 Tonnes	0	0	0	0	0	0	2	0	38	0	40	40	
Quartz-silica sand	'000 Tonnes	864	765	749	2379	1626	1753	14611	31419	76350	0	125759	128138	
Sillimanite	Tonne	0	0	2621240	2621240	0	0	3258481	0	3369200	0	6627681	9248921	
Talc-steatite-soapstone	'000 Tonnes	0	0	0	0	0	0	0	0	14390	0	14390	14390	
Titanium minerals														
Ilmenite	Tonne	10591891	0	0	10591891	0	0	0	18406000	85231816	0	103637816	114229707	
Rutile	Tonne	745901	0	0	745901	0	0	0	1555000	1474951	0	3029951	3775852	
Leucoxene	Tonne	624903	0	0	624903	0	0	0	0	341949	0	341949	966852	
Zircon	Tonne	2438147	0	0	2438147	0	0	0	0	569748	0	569748	3007895	

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Madhya Pradesh

Mineral	Unit	Reserves				Remaining resources								Total resources
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Barytes	Tonne	0	0	4472	4472	0	18500	0	0	35000	233940	0	287440	291912
Bauxite	'000 tonnes	13530	1768	1540	16838	0	8316	237	8920	53715	46037	0	117225	134064
Calcite	Tonne	226970	63500	202028	492498	0	0	0	20250	184921	396005	97476	698652	1191150
China clay	'000 tonnes	943	0	443	1386	0	0	17	0	17	11741	0	11774	13161
Copper														
Ore	'000 tonnes	101813	0	125336	227149	0	0	0	49650	33150	94399	0	177199	404348
Metal	'000 tonnes	1343.93	0.00	1641.90	2985.83	0.00	0.00	0.00	155.75	100.57	913.11	0.00	1169.43	4155.26
Diamond	Carats	605577	0	600000	1205577	0	0	0	0	0	245359	4022	249381	1454958
Diaspore	Tonne	798652	506308	699324	2004284	0	0	0	693	0	1552836	59012	1612541	3616824
Dolomite	'000 tonnes	36284	25644	54063	115990	5580	62704	42243	91178	37403	1506850	113830	1859788	1975779
Felspar	Tonne	0	0	0	0	0	0	0	0	0	23509	0	23509	23509
Fireclay	'000 tonnes	2128	1415	4462	8006	19	2898	1233	1438	791	100305	100	106784	114790
Fuller's earth	Tonne	0	0	0	0	0	0	0	0	0	117200	0	117200	117200
Gold														
Ore (primary)	Tonne	0	0	0	0	0	0	0	0	5375000	1947000	0	7322000	7322000
Metal (primary)	Tonne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.59	2.22	0.00	7.81	7.81
Granite														
(Dim. stone)	'000 cu m	0	969224	0	969224	0	0	150	0	540	1024170	0	1024860	1994084
Graphite	Tonne	0	0	0	0	0	0	0	0	0	1006660	0	1006660	1006660
Gypsum	'000 tonnes	0	0	0	0	0	0	0	0	0	69	0	69	69
Iron ore														
(hematite)	'000 tonnes	21093	2355	10469	33917	8280	451	4500	4710	1760	151310	10	171021	204938
Lead-zinc														
Ore	'000 tonnes	0	0	0	0	0	0	0	1510	0	2260	3150	6920	6920
Lead metal	'000 tonnes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.12	0.00	0.00	0.00	26.12	26.12
Zinc metal	'000 tonnes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	114.76	0.00	123.45	101.12	339.33	339.33
Limestone	'000 tonnes	562773	97810	134510	795092	0	423310	445248	390901	229338	3394373	242920	5126090	5921183
Manganese ore	'000 tonnes	22796	36	4647	27479	6143	23587	2639	0	0	2309	265	34943	62422

(Concld.)

Mineral	Unit	Reserves				Remaining resources								Total resources
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Molybdenum														
Ore	Tonne	0	0	0	0	0	0	0	0	0	8000000	0	8000000	8000000
Contained														
MoS_2	Tonne	0	0	0	0	0	0	0	0	0	5020	0	5020	5020
Ochre	Tonne	390370	1578522	815741	2784634	0	108987	225967	436877	2085255	3772380	749250	7378716	10163350
Phosphorite/Rock														
phosphate	Tonne	7605864	1763187	9787162	19156213	3131683	13700000	5990814	0	2730000	5725000	0	31277497	50433710
Potash	Million tonnes	0	0	0	0	0	0	0	0	1206	0	0	1206	1206
Pyrophyllite	Tonne	3539365	2447445	4309863	10296673	47400	48354	0	257000	6017	4706948	248405	5314124	15610797
Quartz-														
silica sand	'000 tonnes	106	11	35	152	0	0	75	47	316	2195	0	2634	2786
Quartzite	'000 tonnes	0	0	0	0	0	0	0	0	0	832	0	832	832
Sillimanite	Tonne	0	0	0	0	0	0	0	0	0	0	101600	101600	101600
Talc/steatie/														
soapstone	'000 tonnes	4	65	402	471	0	276	522	0	1679	6086	0	8563	9034
Vermiculite	Tonne	0	66420	99632	166052	0	0	0	0	0	106960	0	106960	273012

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Maharashtra

Mineral	Unit	Reserves				Remaining resources								Total resources
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Barytes	Tonne	0	0	0	0	0	0	17000	14800	89450	1610	0	122860	122860
Bauxite	'000 tonnes	21091	5568	12499	39157	335	515	2598	38831	8354	21852	0	72485	111643
China clay	'000 tonnes	418	0	354	772	0	256	502	11	184	5523	0	6477	7248
Chromite	'000 tonnes	5.4	0	0	5.4	0	0	0	42.3	67.27	418.03	0	528	533
Copper														
Ore	'000 tonnes	0	0	2180	2180	0	0	0	0	1419	5982	0	7401	9581
Metal	'000 tonnes	0.00	0.00	17.44	17.44	0.00	0.00	0.00	0.00	21.30	62.51	0.00	83.81	101.25
Dolomite	'000 tonnes	12907	2644	6889	22440	0	265	1915	0	17800	335654	0	355633	378074
Felspar	Tonne	1392461	0	133521	1525982	0	0	160477	0	0	0	0	160477	1686459
Fireclay	'000 tonnes	272	0	392	663	0	0	0	0	0	6849	0	6849	7513
Fluorite	Tonne	287975	0	64100	352075	0	0	0	0	0	100000	0	100000	452075
Gold														
Ore (primary)	Tonne	0	0	0	0	0	0	0	0	0	1517000	0	1517000	1517000
Metal(primary)	Tonne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.55	0.00	3.55	3.55
Granite														
(Dim. stone)	'000 cu m	0	0	0	0	0	6300	0	486925	0	665622	0	1158847	1158847
Graphite	Tonne	0	0	0	0	0	0	0	0	0	1160000	0	1160000	1160000
Iron ore (hematite)	'000 Tonnes	9816	3520	661	13997	0	4852	0	79793	71806	62566	32343	251359	265356
Iron ore (magnetite)	'000 tonnes	513	0	108	621	0	0	0	0	0	0	0	0	621
Kyanite	Tonne	151360	0	76644	228004	0	4317	1744479	0	54000	1084034	0	2886830	3114833
Lead-zinc														
Ore	'000 tonnes	0	0	0	0	0	0	0	1967	6305	1000	0	9272	9272
Zinc metal	'000 tonnes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	133.56	428.11	28.00	0.00	589.67	589.67
Limestone	'000 tonnes	142077	11199	124165	277442	290	378430	27750	116650	150489	786271	0	1459879	1737322
Manganese ore	'000 tonnes	11544	64	5573	17182	341	300	2530	58	8120	1794	29	13173	30354
Marble	'000 tonnes	0	324	0	324	0	0	81	0	0	57642	0	57723	58047
Mica	kg	0	0	65916000	65916000	0	0	0	0	0	0	0	0	65916000
Ochre	Tonne	39940	38080	116980	195000	0	0	0	6010	6010	286000	0	298020	493020

(Concld.)

Mineral	Unit	Reserves				Remaining resources								Total resources
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Pyrophyllite	Tonne	235741	226873	41000	503614	0	0	190000	0	0	20000	0	210000	713614
Quartz-silica sand	'000 tonnes	32650	5037	27937	65624	0	524	29079	0	355	52624	0	82581	148205
Quartzite	'000 tonnes	4	28	43	75	0	0	0	0	0	17	0	17	92
Sillimanite	Tonne	150815	0	15534	166349	0	0	15000	0	0	6066	0	21066	187415
Silver														
Ore	Tonne	0	0	0	0	0	0	0	0	0	235000	0	235000	235000
Metal	Tonne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.23	0.23
Talc/steatite/ soapstone	'000 tonnes	0	0	0	0	0	0	0	0	2565	14262	0	16827	16827
Titanium minerals														
Ilmenite	Tonne	0	0	0	0	0	151888	0	1020326	846000	510000	0	2528214	2528214
Titaniferous magnetite	Tonne	423500	0	868500	1292000	0	0	0	0	0	668000	0	668000	1960000
Tungsten														
Ore	Tonne	0	0	0	0	0	0	0	610000	5637250	1830000	0	8077250	8077250
Contained WO_3	Tonne	0	0	0	0	0	0	0	1903	10304	3828	0	16035	16035
Vanadium														
Ore	Tonne	490663	0	108000	598663	0	0	0	0	0	0	0	0	598663
Metal	Tonne	1913.58	0.00	421.20	2334.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2334.78

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Manipur

Mineral	Unit	Total reserves (A)	Remaining resources				Total resources (A+B)
			Measured STD331	Indicated STD332	Inferred STD333	Total (B)	
China clay	'000 tonnes	0	2520	0	0	2520	2520
Chromite	'000 tonnes	0	0	529	6052	6581	6581
Limestone	'000 tonnes	0	19953	2138	23962	46053	46053

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Meghalaya

Mineral	Unit	Reserves				Remaining resources					Total
		Proved	Probable		Total	Pre-feasibility	Measured	Indicated	Inferred	Total	resources
		STD 111	STD121	STD122	(A)	STD222	STD331	STD332	STD333	(B)	(A+B)
Apatite	Tonne	0	0	0	0	0	0	0	1300000	1300000	1300000
China clay	000 tonnes	0	0	0	0	0	1890	5786	81199	88875	88875
Copper											
Ore	'000 tonnes	0	0	0	0	0	0	880	0	880	880
Metal	'000 tonnes	0	0	0	0	0	0	9	0	9	9
Felspar	Tonne	0	0	0	0	0	0	0	37449	37449	37449
Fireclay	'000 tonnes	0	0	0	0	0	0	0	10999	10999	10999
Granite (Dim. stone)	'000 cu m	0	0	0	0	0	0	0	286467	286467	286467
Iron ore (Hematite)	'000 tonnes	0	0	0	0	0	0	0	225	225	225
Iron ore (Magnetite)	'000 tonnes	0	0	0	0	0	0	0	3380	3380	3380
Lead-zinc											
Ore	'000 tonnes	0	0	0	0	0	0	880	0	880	880
Lead metal	'000 tonnes	0.00	0.00	0.00	0.00	0.00	0.00	16.50	0.00	16.50	16.50
Zinc metal	'000 tonnes	0.00	0.00	0.00	0.00	0.00	0.00	14.00	0.00	14.00	14.00
Limestone	'000 tonnes	85470	59240	12579	157289	186000	459600	2588804	12662369	15896773	16054062
Phosphorite/Rock phosphate	Tonne	0	0	0	0	0	0	0	1311035	1311035	1311035
Quartz-silica sand	'000 tonnes	0	0	0	0	0	0	177	6906	7083	7083
Sillimanite	Tonne	0	0	0	0	0	0	0	55807	55807	55807
Silver											
Ore	Tonne	0	0	0	0	0	0	880000	0	880000	880000
Metal	Tonne	0.00	0.00	0.00	0.00	0.00	0.00	19.80	0.00	19.80	19.80
Titanium minerals											
Anatase	Tonne	0	0	0	0	3345000	0	0	0	3345000	3345000

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Nagaland

Mineral	Unit	Reserves		Remaining resources				Total resources (A+B)
		Proved STD111	Total (A)	Indicated STD332	Inferred STD333	Reconnaissance STD334	Total (B)	
Cobalt ore	Million tonnes	0	0	0	2.5	2.5	5	5
Iron ore (magnetite)	'000 tonnes	0	0	5280	0	0	5280	5280
Limestone	'000 tonnes	825	825	1010000	27000	0	1037000	1037825
Nickel ore	Million tonnes	0	0	0	5	0	5	5

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Orissa

Mineral	Unit	Reserves				Remaining resources								Total resources
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Asbestos	Tonne	10000	0	27200	37200	0	0	10000	0	0	9500	0	19500	56700
Bauxite	'000 tonnes	380363	161711	65924	607997	0	0	188630	309684	152807	549153	0	1200274	1808271
China clay	'000 tonnes	557	1523	37293	39373	0	0	230	76	35316	201907	1259	238789	278162
Chromite	'000 tonnes	30417	10217	24399	65033	0	1123	2245	39609	29972	39124	25849	137922	202956
Cobalt	Million tonnes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.63	0.00	0.28	0.00	30.91	30.91
Copper														
Ore	'000 tonnes	0	0	0	0	0	0	3234	0	722	2095	0	6051	6051
Metal	'000 tonnes	0.00	0.00	0.00	0.00	0.00	0.00	40.55	0.00	3.20	20.69	0.00	64.44	64.44
Dolomite	'000 tonnes	34821	18577	113845	167243	0	12733	985	43136	15496	596423	63	668836	836079
Dunite	'000 tonnes	4429	876	2965	8270	0	557	1157	0	384	627	0	2725	10995
Fireclay	'000 tonnes	2933	7196	1180	11309	0	4387	3398	26000	42418	87972	0	164176	175485
Garnet	Tonne	0	0	13793101	13793101	0	0	0	2000	0	351000	0	353000	14146101
Granite (Dim. stone)	'000 cu.m.	0	80000	0	80000	0	0	0	330328	0	1432492	240	1763060	1843060
Graphite	Tonne	1553293	336327	1217349	3106969	12000	38900	172032	8740	103281	1954721	26290	2315964	5422933
Iron ore														
(Hematite)	'000 tonnes	1341025	470129	440623	2251777	42459	55443	211673	8668	315042	1863531	12032	2508848	4760625
Iron ore														
(Magnetite)	'000 tonnes	0	102	54	156	0	0	0	0	0	54	0	54	210
Lead-zinc													0	0
Ore	000 tonnes	961	0	119	1080	0	0	0	0	0	670	0	670	1750
Lead metal	000 tonnes	34.32	0.00	4.25	38.57	0.00	0.00	0.00	0.00	0.00	38.39	0.00	38.39	76.96
Limestone	000 tonnes	260968	496768	240094	997830	35	120500	183605	56574	20291	359525	0	740530	1738360
Manganese ore	000 tonnes	31442	11166	18106	60715	1098	3586	3775	1278	4189	76069	2255	92250	152964
Nickel ore	Million tonnes	0.00	0.00	0.00	0.00	0.00	20.84	20.62	30.70	51.06	51.26	0.00	174.48	174.48
Platinum Group of metals	Tonne	0.00	0.00	0.00	0.00	0.00	0.00	7.70	0.00	0.00	6.50	0.00	14.20	14.20

(Concld.)

Mineral	Unit	Reserves				Remaining resources								Total resources
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Pyrophyllite	Tonne	4529600	824800	1097800	6452200	0	66800	3223100	80	1514040	1024800	0	5828819	12281019
Quartz-silica sand	'000 tonnes	907	502	990	2399	167	96	0	0	63077	4022	0	67362	69761
Quartzite	'000 tonnes	3263	11160	4075	18498	753	1014	114	823	234	36534	0	39473	57971
Ruby	kg	143.10	0.00	1782.00	1925.10	0.00	0.00	1683.01	0.00	0.00	1662.63	0.00	3345.64	5270.74
Sillimanite	Tonne	0	0	7767913	7767913	0	0	6557013	0	0	4943600	0	11500613	19268526
Silver													0	0
Ore	Tonne	960500	0	119000	1079500	0	0	0	0	0	670000	0	670000	1749500
Metal	Tonne	27.43	0.00	3.40	30.83	0.00	0.00	0.00	0.00	0.00	34.17	0.00	34.17	65.00
Talc-steatite-soapstone	'000 tonnes	137	95	129	361	0	2	73	0	0	268	0	343	704
Tin													0	0
Ore	Tonne	12692	0	0	12692	0	1701	101	0	0	1000	0	2802	15494
Metal	Tonne	34.63	0.00	0.00	34.63	0.00	522.08	0.90	0.00	0.00	10.00	0.00	532.98	567.61
Titanium minerals														
Ilmenite	Tonne	0	602635	6642180	7244815	0	0	0	0	0	18000000	0	18000000	25244815
Rutile	Tonne	0	760500	286380	1046880	0	0	0	0	0	0	0	0	1046880
Titaniferous magnetite	Tonne	0	0	0	0	0	0	0	950000	0	20280000	0	21230000	21230000
Vanadium													0	0
Ore	Tonne	0	1220000	0	1220000	0	0	0	1382875	263000	1998920	0	3644795	4864795
Metal	Tonne	0.00	2135.00	0.00	2135.00	0.00	0.00	0.00	7162.20	552.30	3708.44	0.00	11422.94	13557.94
Zircon	Tonne	0	852642	193140	1045782	0	0	0	0	0	0	0	0	1045782

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Punjab

Mineral	Unit	Reserves	Remaining resources			Total
		Total (A)	Indicated STD 332	Inferred STD 333	Total (B)	resources (A+B)
Quartz/silica sand	'000 tonnes	0	2550	1377	3927	3927
Quartzite	'000 tonnes	0	31782	78734	819122	819122

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Rajasthan

Mineral	Unit	Reserves				Remaining resources								Total resources
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Apatite	Tonne	0	0	0	0	0	0	0	51521	1016000	0	0	1067521	1067521
Asbestos	Tonne	2961297	203656	2818871	5983824	0	316195	2177860	87802	42101	4526861	57800	7208619	13192443
Ballclay	Tonne	8108900	152950	3787607	12049457	112700	1610220	1398102	0	0	13663957	0	16784979	28834436
Barytes	Tonne	174741	12648	94461	281850	0	310668	1382221	37808	11500	997088	0	2739285	3021135
Bauxite	'000 tonnes	0	0	0	0	0	0	0	0	0	528	0	528	528
Bentonite	Tonne	0	11415982	574950	11990932	0	0	0	24356005	222017000	139423096	25730000	411526101	423517033
Calcite	Tonne	2985359	114920	3040863	6141142	0	12346	922470	515185	1037038	3399557	0	5886596	12027738
China clay	'000 tonnes	23050	1858	17384	42292	606	22317	25328	545	1017	279266	340	329418	371710
Copper Ore	'000 tonnes	27535	80	25327	52942	3375	0	10253	16513	42794	542580	0	615515	668457
Metal	'000 tonnes	247.93	1.09	266.62	515.64	3.37	0.00	10.25	320.48	469.37	2662.97	0.00	3466.44	3982.08
Corundum	Tonne	0	0	0	0	0	0	0	0	0	11925	0	11925	11925
Diatomite	'000 tonnes	634	0	0	634	0	0	0	0	0	1440	0	1440	2074
Dolomite	'000 tonnes	57862	54	43417	101333	0	24069	34299	33	1772	338798	0	398970	500304
Felspar	Tonne	12197678	3882963	10924565	27005206	57004	968210	2415248	1224589	821150	23692430	0	29178631	56183837
Fireclay	'000 tonnes	9013	1438	4948	15399	0	126	0	2293	2592	40778	0	45789	61188
Fluorite	Tonne	633309	165222	199225	997756	0	297036	491530	1528348	489488	1293519	145183	4245103	5242859
Fuller's earth	Tonne	0	0	0	0	0	0	0	0	350000	189709080	0	190059080	190059080
Garnet	Tonne	12964	9041	20054	42059	0	0	0	1957	24128	88959	0	115045	157104
Gold Ore (primary)	Tonne	0	0	0	0	0	0	0	14724000	41840000	9025000	0	65589000	65589000
Metal (primary)	Tonne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.20	84.55	14.09	0.00	125.84	125.84
Granite (Dim. stone)	'000 cu m	0	0	4500	4500	0	0	0	0	0	8500708	20000	8520708	8525208
Graphite	Tonne	47600	0	165920	213520	0	0	0	0	250000	1450034	0	1700034	1913554
Gypsum	'000 tonnes	34381	1142	18670	54192	0	197	653	1353	710454	239951	0	952608	1006800
Iron ore (Hematite)	'000 tonnes	6774	2334	1705	10813	0	2090	419	0	11510	5016	0	19035	29848
Iron ore (Magnetite)	'000 tonnes	3074	247	904	4225	177	43	0	0	0	522431	0	522652	526877

(Concld.)

Mineral	Unit	Reserves				Remaining resources								Total resources
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Kyanite	Tonne	13097	0	5303	18400	0	0	5303	0	0	0	0	5303	23703
Lead-zinc														
Ore	'000 tonnes	61213	1183	55187	117583	3375	0	12172	3917	145855	185416	190	350925	468509
Lead metal	'000 tonnes	1202.76	18.94	1169.66	2391.36	85.39	0.00	283.25	44.54	1319.13	2275.10	0.00	4007.41	6398.77
Zinc metal	'000 tonnes	5503.16	45.19	5265.11	10813.46	269.32	0.00	562.57	107.27	4597.05	6133.22	0.53	11669.96	22483.42
Lead & zinc metal	'000 tonnes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	117.55	0.00	117.55	117.55
Limestone	'000 tonnes	1121846	77206	508279	1707331	0	2367136	5679033	317246	263307	8956152	196049	17778922	19486253
Magnesite	'000 tonnes	1081	84	2118	3283	0	1336	3	0	149	49033	0	50521	53804
Manganese ore	'000 tonnes	1154	0	647	1801	0	0	0	0	0	3020	0	3020	4821
Marble	'000 tonnes	0	2184	2193	4377	0	0	189633	0	0	928426	0	1118058	1122435
Mica	kg	1270873	9668	1373302	2653843	0	0	1418	109494690	43264890	44578331	2020054	199359383	202013226
Ochre	Tonne	21383075	1350329	12682540	35415944	856596	1324741	15076755	189535	952858	12871901	0	31272386	66688330
Phosphorite/Rock phosphate	Tonne	22420760	1696307	1100855	25217922	20667000	15274156	13127187	276903	68773	21295240	0	70709259	95927181
Potash	Million tonnes	0	0	0	0	0	0	0	0	16936	3462	22	20419	20419
Pyrite	'000 tonnes	13667	0	22917	36584	0	0	0	9590	26310	18392	0	54292	90876
Pyrophyllite	Tonne	132260	4725	100955	237940	0	3150	36565	232212	68587	216993	0	557507	795447
Quartz-silica sand	'000 tonnes	103741	11668	65736	181145	161	5351	3964	66	167	69181	0	78890	260035
Quartzite	'000 tonnes	185	0	104	289	0	18	0	0	0	706	0	724	1013
Sillimanite	Tonne	300	0	236	536	0	0	283	0	0	0	0	283	819
Silver														
Ore	Tonne	46897000	1271200	58096400	106264600	3375000	0	11864000	0	31370000	51452579	0	98061579	204326179
Metal	Tonne	2247.90	118.56	3636.62	6003.08	270.00	0.00	878.18	0.00	917.98	1802.17	0.00	3868.33	9871.41
Talc-steatite-soapstone	'000 tonnes	22631	3206	17908	43745	175	46407	16422	23	689	49724	5	113445	157190
Tungsten														
Ore	Tonne	0	0	0	0	0	0	0	0	963666	17000628	5964000	23928294	23928294
Contained WO_3	Tonne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1421.44	90171.50	2115.00	93707.94	93707.94
Vermiculite	Tonne	20623	0	4428	25051	0	2773	0	0	13000	2883	0	18656	43707
Wollastonite	Tonne	7423894	0	1109417	8533311	372866	0	3836224	0	3325042	2180647	0	9714779	18248090

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Sikkim

Mineral	Unit	Reserves			Remaining resources			Total resources (A+B)
		Probable		Total (A)	Measured	Inferred	Total (B)	
		STD121	STD122		STD331	STD333		
Copper								
Ore	'000 tonnes	448.49	63	511.49	300	150	450	961.49
Metal	'000 tonnes	7.77	0.91	8.68	8.47	4.23	12.7	21.38
Dolomite	'000 tonnes	0	0	0	0	2756	2756	2756
Lead-zinc								
Ore	'000 tonnes	435.85	63.78	499.63	300	150	450	949.63
Lead metal	'000 tonnes	6.9	1.68	8.58	0	0	0	8.58
Zinc metal	'000 tonnes	12.88	3.14	16.02	3	1.05	4.05	20.07
Limestone	'000 tonnes	0	0	0	0	2380	2380	2380
Marble	'000 tonnes	0	0	0	0	2382.08	2382.08	2382.08
Quartzite	'000 tonnes	0	1125	1125	0	15993.7	15993.7	17118.7
Silver								
Ore	tonne	435843	63780	499623	300000	150000	450000	949623
Metal	tonne	15.25	0.04	15.29	27.6	13.8	41.4	56.69
Talc-steatite-soapstone	'000 tonnes	0	60	60	0	0	0	60

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Tamil Nadu

Mineral	Unit	Reserves				Remaining resources								Total resources
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Apatite	tonne	0	0	0	0	0	0	0	0	0	240000	0	240000	240000
Barytes	tonne	0	0	0	0	0	0	0	0	500	221919	0	222419	222419
Bauxite	'000 tonnes	4029	0	1865	5894	0	1913	2140	0	10084	6814	0	20951	26845
Bentonite	tonne	0	0	0	0	0	0	0	0	3725333	5818519	0	9543852	9543852
Calcite	tonne	0	0	0	0	0	0	0	0	0	116632	0	116632	116632
China clay	'000 tonnes	0	0	0	0	0	0	0	0	327	56570	0	56897	56897
Chromite	'000 tonnes	0	0	0	0	0	0	0	7	0	276	0	282	282
Copper														
Ore	'000 tonnes	0	0	0	0	0	0	0	200	590	0	0	790	790
Metal	'000 tonnes	0	0	0	0	0	0	0	1.08	2.73	0	0	3.81	3.81
Corundum	tonne	0	0	0	0	0	0	0	0	0	4000	0	4000	4000
Dolomite	'000 tonnes	0	0	0	0	0	0	0	2010	135	0	0	2145	2145
Dunite	'000 tonnes	7554	0	103640	111194	0	0	0	0	0	5773	0	5773	116967
Felspar	tonne	3271850	31813	396498	3700161	0	39800	204524	18870	69822	5447875	0	5780890	9481052
Fireclay	'000 tonnes	7702	1813	2551	12067	0	1300	102	261	0	102133	0	103796	115863
Garnet	tonne	6670662	0	387093	7057755	0	0	0	15000	1408995	19871019	0	21295014	28352769
Gold														
Ore (primary)	tonne	0	0	0	0	0	0	0	0	0	67000	0	67000	67000
Metal(primary)	tonne	0	0	0	0	0	0	0	1.00	0	1.00	1.00	1.00	1.00
Granite														
(Dim. stone)	'000 cu m	0	9218	8472	17690	0	37920	0	7	0	503818	0	541745	559435
Graphite	tonne	3118767	0	810450	3929217	0	39486	2486	29136	647500	3266390	0	3984999	7914216
Gypsum	'000 tonnes	369	125	1010	1505	0	369	5660	0	227	19540	10	25806	27311
Iron ore														
(Magnetite)	'000 tonnes	0	0	0	0	0	0	0	107388	62000	85567	226921	481876	481876
Kyanite	tonne	0	0	0	0	0	0	0	0	167000	87676	0	254676	254676

(Concld.)

Mineral	Unit	Reserves				Remaining resources								Total resources
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Lead-zinc Ore	'000 tonnes	0	0	0	0	0	0	0	200	590	0	0	790	790
Lead metal	'000 tonnes	0	0	0	0	0	0	0	2.26	5.48	0	0	7.74	7.74
Zinc metal	'000 tonnes	0	0	0	0	0	0	0	11.76	24.76	0	0	36.52	36.52
Limestone	'000 tonnes	478504	60601	99259	638365	48	29715	25453	81462	20962	386416	0	544056	1182420
Magnesite	'000 tonnes	12055	6692	9682	28430	0	27	12	17	737	16294	0	17088	45517
Molybdenum Ore	tonne	0	1500000	0	1500000	0	0	425180	36000	569304	5945348	1490000	8465832	9965832
Contained MoS	tonne	0	1050.00	0	1050.00	0	0.00	127.55	83.00	287.00	3310.32	1043.00	4850.87	5900.87
Pyrite	'000 tonnes	0	0	0	0	0	0	0	0	0	24	0	24	24
Quartz-silica sand	'000 tonnes	33910	433	6054	40398	0	4476	73	3387	95837	26828	0	130601	170998
Sillimanite	tonne	306190	0	561766	867956	0	4000	13525323	0	0	3529577	0	17058900	17926856
Silver Ore	tonne	0	0	0	0	0	0	0	0	330000	460000	0	790000	790000
Metal	tonne	0	0	0	0	0	0	0	0	15.87	26.68	0.00	42.55	42.55
Talc-steatite-soapstone	'000 tonnes	194	210	1618	2023	0	0	181	0	0	524	0	705	2727
Titanium minerals														
Ilmenite	tonne	1135649	0	2209232	3344881	0	0	0	70000	18029942	86579420	0	104679362	108024243
Rutile	tonne	80220	0	132553	212773	0	0	0	4460	1657205	6887274	0	8548939	8761712
Leucoxene	tonne	18869	0	25625	44494	0	0	0	1994	0	0	0	1994	46488
Tungsten Ore	tonne	0	0	0	0	0	0	0	0	0	0	250000	250000	250000
Contained WO	tonne	0	0	0	0	0	0	0	0	0	0	50	50	50
Vermiculite	tonne	1534533	0	0	1534533	0	0	0	0	0	343051	0	343051	1877584
Wollastonite	tonne	0	0	0	0	0	0	0	0	0	3533	0	3533	3533
Zircon	tonne	46540	0	175443	221983	0	0	0	0	0	0	0	0	221983

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Tripura

Mineral	Unit	Total reserves (A)	Remaining resources			Total resources (A+B)
			Measured STD331	Inferred STD333	Total (B)	
Fireclay	'000 tonnes	0	1	369	370	370
Quartz silica sand	'000 tonnes	0	326	164	490	490

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Uttarakhand

Mineral	Unit	Reserves				Remaining resources								Total resources
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Asbestos	tonne	0	0	0	0	0	0	0	0	311	0	0	311	311
Barytes	tonne	0	0	0	0	0	0	0	0	0	25000	0	25000	25000
Copper					0									
Ore	'000 tonnes	0	0	0	0	0	0	0	3170	390	660	0	4220	4220
Metal	'000 tonnes	0	0	0	0	0	0	0	53.45	1.44	5.15	0	60.04	60.04
Dolomite	'000 tonnes	0	0	0	0	0	721	349	1946	981	199553	0	203549	203549
Graphite	tonne	0	0	0	0	0	0	0	10700	0	0	0	10700	10700
Gypsum	'000 tonnes	0	0	0	0	0	0	35	0	0	2012	0	2047	2047
Lead-zinc														
Ore	'000 tonnes	0	0	0	0	0	0	1400	3170	390	660	0	5620	5620
Lead metal	'000 tonnes	0	0	0	0	0	0	23.10	138.85	11.15	9.50	0.00	182.60	182.60
Zinc metal	'000 tonnes	0	0	0	0	0	0	68.88	151.21	19.11	27.63	0.00	266.83	266.83
Limestone	'000 tonnes	3945	540	2423	6907	0	91872	56051	29486	173604	1181881	0	1532894	1539801
Magnesite	'000 tonnes	7483	602	32497	40582	0	0	0	58902	58756	73037	0	190695	231277
Marble	'000 tonnes	0	0	0	0	0	0	0	0	0	6000	0	6000	6000
Phosphorite/ Rock phosphate	tonne	3063503	0	1734370	4797873	0	0	0	2760000	890000	15730513	0	19380513	24178386
Silver														
Ore	tonne	0	0	0	0	0	0	0	1600000	1790000	0	0	3390000	3390000
Metal	tonne	0	0	0	0	0	0	0.00	134.00	4.59	0	0	138.59	138.59
Talc-steatite-soapstone	'000 tonnes	38720	4861	19621	63202	5987	985	2921	105	1524	24884	197	36604	99806
Tungsten	tonne													
Ore	tonne	0	0	0	0	0	0	0	0	138000	0	520000	658000	658000
Contained WO,	tonne	0	0	0	0	0	0	0	0	25	0	680	705	705

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Uttar Pradesh

Mineral	Unit	Reserves				Remaining resources								Total resources
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Andalusite	'000 tonnes	0	0	0	0	0	0	0	0	0	14450	0	14450	14450
Bauxite	'000 tonnes	0	0	0	0	0	0	0	10390	500	8018	0	18908	18908
Calcite	tonne	0	0	0	0	0	0	0	0	0	11000	0	11000	11000
China clay	'000 tonnes	0	0	0	0	0	0	0	11600	3447	10018	0	25065	25065
Diaspore	tonne	863566	24704	232479	1120749	0	0	0	545	0	538682	59317	598544	1719292
Dolomite	'000 tonnes	0	17094	0	17094	0	0	0	3500	0	66230	0	69730	86824
Felspar	onne	0	0	0	0	0	0	0	0	0	200000	0	200000	200000
Fireclay	'000 tonnes	0	0	0	0	0	0	0	0	0	3221	0	3221	3221
Granite (Dimension stone)	'000 cu m	0	0	0	0	0	0	0	0	0	494819	0	494819	494819
Iron ore (Hematite)	'000 tonnes	0	0	0	0	0	0	0	0	0	38000	0	38000	38000
Limestone	'000 tonnes	0	106772	19060	125832	0	4800	7050	142763	40000	185533	0	380146	505978
Ochre	tonne	0	0	0	0	0	0	0	25000	35000	10000	0	70000	70000
Potash	million tonnes	0	0	0	0	0	0	0	0	0.13	189.62	0.30	190.05	190.05
Pyrophyllite	tonne	1136361	150000	691889	1978250	0	0	0	378450	49808	885900	964831	2278989	4257239
Quartz-silica sand	'000 tonnes	6095	18621	2275	26991	40	2248	2992	652	6307	51421	0	63659	90650
Phosphorite/ Rock phosphate	tonne	0	432898	3118586	3551484	0	0	0	0	740000	21481960	0	22221960	25773444
Sillimanite	tonne	0	0	0	0	0	0	0	2100000	9350000	0	0	11450000	11450000

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : West Bengal

Mineral	Unit	Reserves				Remaining resources							Total resources
		Proved	Probable		Total	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	
		STD 111	STD121	STD122	(A)	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Apatite	tonne	6125946	0	0	6125946	0	0	120000	8845250	521175	666646	10153071	16279017
Barytes	tonne	0	0	0	0	0	0	0	433000	0	0	433000	433000
China clay	'000 tonnes	757	461	7173	8390	0	300	36	331935	79418	591	412281	420671
Copper													
Ore	'000 tonnes	0	0	0	0	0	113	0	0	0	0	113	113
Metal	'000 tonnes	0	0	0	0.00	0	2.09	0	0	0	0	2.09	2.09
Dolomite	'000 tonnes	0	12528	48000	60528	0	0	0	73226	104275	0	177501	238029
Felspar	tonne	0	0	0	0	0	0	934370	3433130	133750	0	4501250	4501250
Fireclay	'000 tonnes	741	396	690	1827	432	344	0	0	10333	958	12067	13894
Gold													
Ore (primary)	tonne	0	0	0	0	0	0	0	0	0	12833333	12833333	12833333
Metal (primary)	tonne	0	0	0	0	0	0	0	0	0	124	124	124
Granite (Dim. stone)	'000 cu m	3658	0	0	3658	0	0	19827	1140	8802	0	29768	33426
Kyanite	tonne	0	0	0	0	0	0	0	0	26520	0	26520	26520
Lead-zinc													
Ore	'000 tonnes	0	0	0	0	0	0	0	3371	335	0	3706	3706
Lead metal	'000 tonnes	0	0	0	0	0	0	0	130.07	10.00	0	140.07	140.07
Zinc metal	'000 tonnes	0	0	0	0	0	0	0	130.42	13.00	0	143.42	143.42
Limestone	'000 tonnes	0	0	0	0	0	0	7104	15482	22120	0	44706	44706
Manganese ore	'000 tonnes	0	0	0	0	0	0	0	0	200	0	200	200
Pyrite	'000 tonnes	0	0	0	0	0	0	0	0	2500	0	2500	2500
Quartz-silica sand	'000 tonnes	239	11	912	1162	0	0	0	0	5203	0	5203	6365
Sillimanite	tonne	0	0	0	0	0	0	0	0	1653000	0	1653000	1653000
Titanium minerals													
Ilmenite	tonne	0	0	0	0	0	0	0	0	2087000	0	2087000	2087000
Rutile	tonne	0	0	0	0	0	0	0	0	192000	0	192000	192000
Tungsten	tonne												
Ore	tonne	0	0	0	0	0	173063	0	190739	400000	0	763802	763802
Contained WO$_3$	tonne	0	0	0	0	0	450.00	0	80.84	1000.00	0	1530.84	1530.84
Vermiculite	tonne	0	0	0	0	0	0	0	490	5076	0	5566	5566

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Daman & Diu

Mineral	Unit	Total reserves (A)	Remaining resources			Total resources (A+B)
			Pre-feasibility STD221	Measured STD331	Total (B)	
Limestone	'000 tonnes	0	48840	79830	128670	128670

Figures rounded off.

Reserves/Resources of Minerals as on 1.4.2005 : Puducherry

Mineral	Unit	Total reserves (A)	Remaining resources				Total resources (A+B)
			Pre-feasibility STD221	Measured STD331	Inferred STD333	Total (B)	
China clay	'000 tonnes	0	0	0	2940	2940	2940
Limestone	'000 tonnes	0	4333	4433	6966	15732	15732

Figures rounded off.