

STATE REVIEWS



Indian Minerals Yearbook 2015

(Part- I)

54th Edition

STATE REVIEWS
(Kerala)

(FINAL RELEASE)

GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES

Indira Bhavan, Civil Lines,
NAGPUR – 440 001

PHONE/FAX NO. (0712) 2565471
PBX : (0712) 2562649, 2560544, 2560648
E-MAIL : cme@ibm.gov.in
Website: www.ibm.gov.in

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KERALA

Mineral Resources

Kerala is well-known for its deposits of excellent quality china clay and beach sands containing valuable minerals like ilmenite, rutile, sillimanite, zircon, garnet, leucosene and monazite. The State is the principal producer of kaolin, limeshell and sillimanite. The State also accounts for 88% zircon, 33% titanium minerals, 25% china clay and 11% sillimanite of the country's resources. Important mineral occurrences in the State are: **bauxite** in Kannur, Kasaragod, Kollam & Thiruvananthapuram districts; **china clay** in Alappuzha, Ernakulam, Kannur, Kasaragod, Kollam, Kottayam, Palakkad, Thiruvananthapuram & Thrissur districts; **limestone** in Alappuzha, Ernakulam, Kannur, Kollam, Kottayam, Kozhikode, Malappuram, Palakkad & Thrissur districts; **quartz/silica sand** in Alappuzha, Kasaragod, Thiruvananthapuram & Wayanad districts; **sillimanite** in Kollam and Thiruvananthapuram districts; and **titanium minerals** in Kasaragod, Kollam, Pathanamthitta & Thiruvananthapuram districts; and **zircon** in Kollam district.

Other minerals that occur in the State are **fire clay** in Alappuzha, Ernakulam, Kannur & Kollam districts; **garnet** in Kollam & Thiruvananthapuram districts; **gold** in Malappuram & Palakkad districts; **granite** in Palakkad and Thiruvananthapuram districts; **graphite** in Ernakulam, Idukki, Kollam, Kottayam & Thiruvananthapuram districts; **iron ore (magnetite)** in Kozhikode and Malappuram

districts; **kyanite** in Kollam and Thiruvananthapuram districts; **lignite** in Kannur district; **magnesite** in Palakkad district; and **steatite** in Kannur and Wayanad districts (Tables - 1 and 2).

Exploration & Development

GSI carried out exploration for Gold and Platinum Group of minerals in Palakkad district during 2014-15. Details of exploration carried out by GSI and other agencies are furnished in Table-3.

Production

The value of mineral production (excludes atomic mineral and value for February and March in respect of 31 minerals declared as minor mineral vide Gazette notification dated 10.02.2015) in Kerala during 2014-15 almost remained constant at ₹ 1,561 crore in comparison with the previous year. The important minerals produced in the state during 2014-15 were limestone, kaolin, silica sand, laterite, limeshell, sillimanite and clay (others) which together accounted for around 4% of the total value of mineral produced in the State while rest of the value was accounted by minor minerals. Kerala was the largest producer in the country of limeshell contributing almost entire output of the mineral.

Among important minerals, production of sillimanite increased by 51% and that of limestone by 2% whereas it decreased for limeshell by 14% as compared to the previous year (Table-4).

The value of production of minor minerals was estimated at ₹ 1,496 crore for the year 2014-15.

The number of reporting mines in Kerala remained same for the years 2013-14 and 2014-15.

Table -2 : Reserves/Resources of Lignite as on 1.4.2015 : Kerala

(In million tonnes)

| District | Proved | Indicated | Inferred | Total |
|--------------|--------|-----------|-------------|-------------|
| Total | - | - | 9.65 | 9.65 |
| Kannur | - | - | 9.65 | 9.65 |

Source: Coal Directory of India, 2014-15.

Table –1: Reserves/Resources of Minerals as on 1.4.2010/1.4.2013* : Kerala

| Mineral | Unit | Reserves | | | | Remaining Resources | | | | | | Total Resources (A+B) | |
|----------------|-------------|------------------|----------|----------|--------------|---------------------|---------|--------------------|---------------------|--------------------|--------------------------|-----------------------|--------------|
| | | Proved STD111 | Probable | | Total (A) | Pre-feasibility | | Measured STD331 | Indicated STD332 | Inferred STD333 | Reconnaissance STD334 | | Total (B) |
| | | | STD121 | STD122 | | STD221 | STD222 | | | | | | |
| Bauxite* | '000 tonnes | - | - | - | - | 24 | 2037 | 9284 | 2722 | - | 14096 | 14096 | |
| China clay# | '000 tonnes | 3352 | 792 | 4144 | 2447 | 2985 | 43930 | 20439 | 569226 | 20200 | 659690 | 663834 | |
| Fireclay# | '000 tonnes | - | - | - | - | - | 8200 | 51 | 9929 | - | 18181 | 18181 | |
| Garnet | tonne | - | - | 45797 | - | - | 100874 | - | 52190 | - | 153064 | 198861 | |
| Gold* | | - | - | - | - | - | - | - | - | - | - | - | |
| Ore | | | | | | | | | | | | | |
| (Primary) | tonne | - | - | - | - | - | 462280 | 96180 | - | - | 558460 | 558460 | |
| Metal | | | | | | | | | | | | | |
| (Primary) | tonne | - | - | - | - | - | 0.17 | 0.03 | - | - | 0.20 | 0.20 | |
| Ore | | | | | | | | | | | | | |
| (Placer) | tonne | - | - | - | - | - | - | 2552000 | 23569000 | - | 26121000 | 26121000 | |
| Metal | | | | | | | | | | | | | |
| (Placer) | tonne | - | - | - | - | - | - | 2.29 | 3.57 | - | 5.86 | 5.86 | |
| Granite | | | | | | | | | | | | | |
| (Dim. Stone) | '000 cu m | 140 | - | 140 | - | - | - | 99 | 2570 | - | 2669 | 2808 | |
| Graphite* | tonne | - | - | 133980 | - | 8376 | 148762 | 1088550 | 312106 | - | 1557794 | 1691774 | |
| Iron Ore* | | | | | | | | | | | | | |
| (Magnetite) | '000 tonnes | - | - | - | - | - | - | 59912 | 23523 | - | 83435 | 83435 | |
| Kyanite | tonne | - | - | - | - | - | 192360 | - | 10000 | - | 202360 | 202360 | |
| Laterite** | '000 tonnes | - | - | 1430 | 953 | - | - | - | - | 16717 | 17670 | 19100 | |
| Limestone | '000 tonnes | 12959 | - | 12959 | 122659 | 77 | 1576 | 2888 | 35228 | - | 183589 | 196548 | |
| Magnesite* | '000 tonnes | - | - | - | - | - | 2 | - | 38 | - | 40 | 40 | |
| Quartz- | | | | | | | | | | | | | |
| silica sand# | '000 tonnes | - | 38 | 38 | 404 | 1959 | 3354 | 30241 | 77528 | - | 128096 | 128135 | |
| Sillimanite | tonne | 698056 | - | 698056 | 317569 | 120000 | 2479816 | 165408 | 3369200 | - | 6451993 | 7150049 | |
| Talc-steatite- | | | | | | | | | | | | | |
| soapstone# | '000 tonnes | - | - | - | - | - | - | - | 14390 | - | 14390 | 14390 | |
| Titanium** | | | | | | | | | | | | | |
| Minerals | tonne | 13796194 | - | 13796194 | 5198882 | - | - | 22668876 | 87048716 | - | 114916474 | 128712668 | |
| Zircon | tonne | 972624 | - | 972624 | 649938 | - | 81741 | 338525 | 716279 | - | 1786483 | 2759107 | |

Figures rounded off.

* Reserves/Resources as on 1.4.2013.

** Resources as per Department of Atomic Energy are provided in the respective Mineral Reviews.

Declared as minor mineral vide Gazette notification dated 10.2.2015.

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Table -3 : Details of Exploration Activities in Kerala, 2014-15

| Agency/ Mineral/ District | Location | Mapping | | Drilling | | Sampling (No.) | Remarks Reserves/Resources estimated |
|---|--|---------|-----------------|---------------------|----------|-------------------|--|
| | | Scale | Area (sq km) | No. of boreholes | Meterage | | |
| GSI | | | | | | | |
| Gold | | | | | | | |
| Palakkad | Attapady valley | - | - | - | - | 20 | G4 stage investigation for gold was carried out with an objective to trace the granite-supructrustal relationship and to delineate the mineralised zones by bedrock and soil geochemical survey. The method of panning the first order and second order streams in the area for gold was adopted for preliminary and rapid assessment of gold mineralisation. A total of 130 first-order streams were panned to establish the lithological control of mineralisation. Out of 130 locations, 61 yielded gold specks. Based on the results of gold panning, an ENE-WSW trending zone extending from around Puttumala to Kurukkankundu was identified as one of the target zones for soil sampling. Two other areas, one near Ommala and another between Jellippara and Mundanpara were also covered by soil sampling in 100 × 25 m grid pattern. Sulphide-bearing samples were collected from the trenches to understand the mode of mineralisation. Granites around Puttumala and Sholayur area have been considered for detailed geochemical study including major, trace and REE elements to decipher their origin and role in gold mineralisation. Twelve soil samples and 8 trench samples from these target zones yielded Au value above 25 ppb. Within this, the highest value of 800 ppb was yielded from a trench sample in the Puttumala area. The trench samples from the interface between soil and bedrock yielded anomalous values. Due to the huge thickness of soil cover (more than 20 feet), sampling from the 'B' and 'C' horizons of in situ soil developed over the bedrock is a tough task to precisely target the mineralised zone. The investigation is completed. |
| Platinum Group of Elements (PGE) | | | | | | | |
| Palakkad | Kavundikal, Kunnan- chala, Narasimukk, Bhutivali, East of Dodagatti and Kalpatti area | - | - | - | - | 110 | G4 stage investigation was taken up for delineating chromitite zones within the ultramafics and to evaluate its PGE potential. Since the chromite in the area are known to be PGE - bearing, importance was given to trace the chromite - bearing zones in the ultramafics. Bed rock sampling was done from chromite ± sulphide-bearing ultramafics. BRS/groove samples were collected for PGE and trace element |

(Contd.)

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Table- 3 (concl.d.)

| Agency/ Mineral/ District | Location | Mapping | | Drilling | | Sampling (No.) | Remarks Reserves/Resources estimated |
|---|---|---------|-----------------|---------------------|----------|-------------------|--|
| | | Scale | Area (sq km) | No. of boreholes | Meterage | | |
| | | | | | | | analysis. Five trenches were made towards the SW and NE direction of the magnesite-quarry section at Kalkandi to expose the chromite-bearing ultramafics. The strike extension of the chromitite exposed in a quarry section has been traced discontinuously along NE-SW for a length of 350 m by trenching. The analytical results of the trench and groove samples by ICPMS method show that some meta-pyroxenites show encouraging PGE values having total PGE values more than 200 ppb. The Platinum values in all rock types show a range from <5 ppb-317 ppb, palladium shows a range from <5-106 ppb, iridium values are all <3-56 ppb, ruthenium values range from <3-18 ppb and rhodium values range from <3-47 ppb. Two groove samples of meta-pyroxenite show encouraging total PGE values of more than 200 ppb. One trench sample of metapyroxenite shows encouraging total PGE value of 542 ppb (Pt = 317 ppb, Pd = 106 ppb, Ir = 56 ppb, Ru = 17 ppb and Rh = 47 ppb). PGE grains are identified in four samples out of 11 nos. of samples studied under EPMA. Out of the 110 samples analysed for PGE, 11 samples have yielded PGE values above 100 ppb and values of gold are not encouraging. The investigation is completed. |
| State Directorates of Geology and Mining | | | | | | | |
| Aluminous Laterite/China Clay | | | | | | | |
| Kannur | Vaipiriyam area, Kankol village | - | - | 07 | 250 | - | Reserves of china clay were estimated at 10 million tonnes (121). |
| -do- | Kannadipoyil area, Perinthatta village | - | - | 04 | 97 | - | Reserves not yet estimated. |
| -do- | Korom area, Kankol village | - | - | 09 | 354 | - | Reserves of china clay were estimated at 16 million tonnes (121). |
| -do- | Karinthadam area | - | - | 05 | 140.5 | - | Reserves not yet estimated. |
| Kasaragod | Nileswaram area | - | - | 05 | 113.5 | - | Reserves of china clay were estimated at 52,000 tonnes (KCCP area). |
| China Clay | | | | | | | |
| Kollam | N/v Mulavana | - | - | 12 | 447 | - | A tentative reserve of dull white to greyish sandy clay was estimated at 9.6 million tonnes. |

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**Table – 4: Mineral Production in Kerala, 2012-13 to 2014-15
(Excluding Atomic Minerals)**

(Value in ₹ '000)

| Mineral | Unit | 2012-13 | | | 2013-14 | | | 2014-15 (P) | | |
|----------------------|-------|--------------|----------|-----------------|--------------|----------|-----------------|--------------|----------|-----------------|
| | | No. of mines | Quantity | Value | No. of mines | Quantity | Value | No. of mines | Quantity | Value |
| All Minerals | | 55 | | 14621046 | 53 | | 15635219 | 53 | | 15609380 |
| Clay (others)# | t | 1 | - | - | 2 | 78703 | 10571 | 2 | 141843 | 17346 |
| Graphite (r.o.m.) | t | | | | - | - | - | 1 | 50 | 400 |
| Kaolin# | t | 21 | 708257 | 187628 | 20 | 743138 | 166817 | 22 | 561565 | 131480 |
| Sillimanite | t | 2 | 4936 | 44424 | 2 | 5109 | 44635 | 2 | 7690 | 69271 |
| Laterite# | t | 2 | 97909 | 35219 | 4 | 169672 | 76063 | 3 | 148357 | 61894 |
| Limestone | '000t | 1 | 488 | 229727 | 1 | 501 | 234597 | 1 | 511 | 252130 |
| Limeshell | t | 5 | 23939 | 41825 | 5 | 18690 | 35102 | 5 | 16120 | 36153 |
| Silica Sand# | t | 23 | 91833 | 160183 | 19 | 50793 | 107973 | 17 | 38628 | 81245 |
| Minor Minerals@ | | - | - | 13922040 | - | - | 14959461 | - | - | 14959461 |

Note: The number of mines excludes minor minerals.

@ Figures for earlier years have been repeated as estimates, wherever necessary, because of non-receipt of data.

Declared as minor mineral vide Gazette notification dated 10.02.2015.

Mineral-based Industry

The present status of each mineral-based industry is not readily available. However, the important mineral-based industries in organised sector in the State are given in Table - 5.

Table – 5 : Principal Mineral-based Industries in Kerala

| Industry/plant | Capacity ('000 tpy) | | |
|--|---------------------|--|------|
| Abrasives | | | |
| Carborandum Universal Ltd, Ernakulam. | NA | | |
| Carborandum Universal Ltd, Thrissur. | NA | | |
| Carborandum Universal Ltd, Pathanamthitta. | NA | | |
| Asbestos Products | | | |
| Hyderabad Industries Ltd (formerly Malabar Building Products Ltd) Mulagunnathukavu, Distt. Thrissur. | 84 | | |
| Cement | | | |
| Malabar Cements, Walayar, Distt. Palakkad. | 420 | | |
| Malabar Cement, Cherthala, Distt. Alappuzha (G). | 200 | | |
| The Travancore Cements Ltd, Nattakom, Distt. Kottayam. | 81 | | |
| Ceramic | | | |
| Kerala Ceramics Ltd, Kundara, Distt. Kollam. | 23 | | |
| Tata Ceramics, Kozhikode. | NA | | |
| FACR-RCF Building Product Ltd (FRBL) Kochi. | NA | | |
| | (Contd.) | | |
| Chemical | | | |
| Tecil Chemicals and Hydro Power Ltd, Chingavanam, Distt. Kottayam. | | 30 (calcium carbide) 2 (acetylene black) 7.5 (ferro silicon) | |
| Synthetic Rutile | | | |
| CMRL, Edayar, Distt. Ernakulam. | | | 45 |
| KMML, Chavara, Distt. Kollam. | | | 50 |
| TiO₂ Pigment | | | |
| TTPL, Kochuveli, Distt. Thiruvananthapuram. | | | 17 |
| KMML, Chavara, Distt. Kollam. | | | 40 |
| Fertilizer | | | |
| FACT Ltd, Udyogmandal, Distt. Ernakulam. | | 148.5 (Complex) 225 (AS) | |
| FACT Ltd, Ambalamedu (Cochin II), Distt. Ernakulam. | | 485 (NP/NPKs) | |
| Ferro-alloys | | | |
| INDSIL Electrosmelts Ltd, Pallatheri, Distt. Palakkad. | | | 14 |
| The Silcal Metallurgic Ltd, Wayalur. | | | 3.6 |
| Foundry | | | |
| HMT Machine Tools Ltd, Bengaluru. | | | NA |
| Glass | | | |
| Excel Glass Ltd, Pathirapally, Distt. Alappuzha. | | | 72 |
| Lead-Zinc | | | |
| BZL Zinc Ltd, Binanipuram. (Edayar Zinc Ltd) | | 38 (Zn ingot) 0.08 (Cd ingot) 50 (H ₂ SO ₄) | |
| Petroleum Refinery | | | |
| BPCL, Kochi. | | | 9500 |

G; Grinding Unit

Note: Data, for Fertilizer Industries, has been taken from Indian Fertilizer Scenario, 2015/FAI Statistics, 2014-15.