

STATE REVIEWS



Indian Minerals Yearbook 2016



(Part- I)

55th Edition

STATE REVIEWS (Kerala)

(FINAL RELEASE)

GOVERNMENT OF INDIA
MINISTRY OF MINES
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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 81% zircon, 31% titanium minerals, 23% china clay and 10% 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, Kasargod, 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 districts; **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 2015-16. Details of exploration carried out by GSI and other agencies are furnished in Table-3.

Production

The total estimated value of mineral production (excludes atomic mineral) in Kerala during 2015-16 at ₹ 2,760 crore was almost remained constant in comparison with the previous year. The important minerals produced in the State during 2015-16 were limestone, kaolin, silica sand, limeshell, sillimanite which together accounted for around 99% of the total value of mineral produced in the State. Kerala was the largest producer in the country of limeshell contributing 88% production of the mineral.

Among important minerals produced in the State, decrease in production was reported in graphite (4%), limestone (5%), sillimanite (33%) and limeshell (45%) as compared to the previous year (Table-4).

The value of production of minor minerals was estimated at ₹ 2,726 crore for the year 2015-16.

The number of reporting mines in Kerala was only 8 for the years 2015-16 as compared to 53 during the previous year, 2014-15.

Table -2 : Reserves/Resources of Lignite as on 1.4.2016 : Kerala

(In million tonnes)

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

Source: Coal Directory of India, 2015-16.

Table -1: Reserves/Resources of Minerals as on 1.4.2015: Kerala

Mineral	Unit	Reserves				Remaining Resources					Total Resources (A+B)			
		Proved STD 111	Probable		Total (A)	Feasibility STD211	Pre-feasibility		Measured STD331	Indicated STD332		Inferred STD333	Reconnaissance STD334	Total (B)
			STD121	STD122			STD221	STD222						
Bauxite	'000 tonnes	-	-	-	-	29	-	24	2037	9284	2722	-	14096	14096
China clay*	'000 tonnes	7097	200	725	8022	4573	463	4112	43930	20439	571644	20200	665360	673383
Fire clay	'000 tonnes	-	-	-	-	-	-	-	8200	51	9929	-	18181	18181
Garnet	tonne	-	-	45797	45797	-	-	-	100874	-	52190	-	153064	198861
Gold		-	-	-	-	-	-	-	-	-	-	-	-	-
Ore		-	-	-	-	-	-	-	462280	96180	-	-	558460	558460
(Primary) Metal	tonne	-	-	-	-	-	-	-	-	-	-	-	-	-
(Primary) Ore	tonne	-	-	-	-	-	-	-	0.17	0.03	-	-	0.2	0.2
(Placer) Metal	tonne	-	-	-	-	-	-	-	-	2552000	23569000	-	26121000	26121000
(Placer) Granite	tonne	-	-	-	-	-	-	-	-	2.29	3.57	-	5.86	5.86
(Dimen Stone)	'000 cum	140	-	-	140	-	-	-	-	99	2570	-	2669	2808
Graphite	tonne	-	-	16518	16518	-	8376	-	-	1088550	322606	-	1419532	1436050
Iron Ore		-	-	-	-	-	-	-	-	-	-	-	-	-
(Magnetite)	'000 tonnes	-	-	-	-	-	-	-	-	59912	23523	-	83435	83435
Kyanite	tonne	-	-	-	-	-	-	-	192360	-	10000	-	202360	202360
Laterite	'000 tonnes	-	-	1156	1156	953	-	-	-	-	16717	-	17670	18826
Limestone	'000 tonnes	11472	-	-	11472	123106	77	-	21161	2888	35228	-	182459	193931
Magnesite	'000 tonnes	-	-	-	-	-	-	-	2	-	38	-	40	40
Quartz-		-	-	-	-	-	-	-	-	-	-	-	-	-
Silica Sand#	'000 tonnes	221	33	136	389	179	1985	3588	14611	30241	77489	-	128092	128481
Sillimanite	tonne	-	-	-	-	1015625	120000	-	2479816	160300	3369200	-	7144941	7144941
Talc-steatite-soapstone#	'000 tonnes	-	-	-	-	-	-	-	-	-	14390	-	14390	14390
Titanium minerals*	tonne	-	-	-	-	18995076	-	-	-	22668876	87048716	-	128712668	128712668
Zircon	tonne	972624	-	-	972624	649938	-	-	81741	338525	716279	-	1786483	2759107

Figures rounded off.

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

Declared as minor mineral vide Gazette notification dated 10.02.2015.

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Table –3 : Details of Exploration Activities in Kerala, 2015-16

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
GSI							
Platinum Group Minerals							
Palakkad	Vellamari block	1:12500	50.0	-	-	202	G4 stage Preliminary Exploration of Platinum Group Minerals in Vellamari Block, has been carried out. Three to seven-metre-wide chromite-bearing zone could be delineated in metapyroxenite with magnesite veins exposed in Mulli area. In LSM area, metapyroxenite/talc-tremoliteactinolite rocks, amphibolite and pyroxene granulites of the Attapadi Group (equivalent to the Sargur Group of Dharwar Craton) occur as linear bands in hornblende-biotite gneiss and granite gneiss of the Bhavani Gneissic Complex. These bands are mainly exposed in and around Mukkali, Pakulam, Kalkandi, Mulli, Elaichivazhi, and Chalayur area. These rocks are mostly massive and medium- to coarse-grained. Banded magnetite quartzite is mainly associated with amphibolite. A 3 to 7 m-wide chromite-bearing zone could be delineated in metapyroxenite with magnesite veins exposed in Mulli area. During detailed mapping in Vellamari area, the mafic and ultramafic rocks were mapped along with the gneissic country rock. The ultramafics are represented by metapyroxenite and mafics are represented by gabbro and amphibolites. The metapyroxenites exhibit relict cumulus texture and consist of websterite, clinopyroxenite and enstatite. Metagabbro is generally medium-grained massive in appearance and is occasionally foliated. Some of the metagabbro are garnetbearing. Other rock types include BMQ and sheared granite. The gneisses include hornblende-biotite gneiss, quartzofeldspathic gneiss and granite gneiss. BMQ occurs as nearly a discontinuous band mainly associated with mafics. General trend of these lithounits are NE-SW to ENE-WSW. Chromite-bearing metapyroxenites are sampled from one of the trenches. Some of the metapyroxenites are sulphidebearing. Since the chromites in the area are known to be PGE-bearing, importance was given to trace the chromitebearing zones in the ultramafics. Bed rock sampling was done from chromite ± sulphide-bearing ultramafics. A total of 202 BRS/groove samples have been collected for PGE and trace element analysis. Three trenches (T-6 to T-8) were made near Vellamari
	Attapady valley	1:2000	1.5				

(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		
							<p>area to expose the chromite-bearing ultramafics, sulphide-bearing metapyroxenite and the contact zone between metapyroxenite and gabbro. A total of 10.5 cu m of pitting/ trenching has been completed and 25 trench samples have been collected for chemical analysis in search of PGE. The strike extension of the chromitite zone in metapyroxenite exposed in the quarry section at Kalkandi mapped during FS 2014-15 has been traced discontinuously towards SW for a length of 400 m and it has a width of 3-6 m. The available PGE values in this zone range from 11 to 543 ppb. A sulphidebearing pyroxenite analysed 618 ppb in previous year has been resampled in FS 2015-16. Samples from mafics and ultramafics were collected for different types of study including petrography, ore-petrography, petrochemical, REE, XRD and EPMA. Analytical data of 201 BRS/groove samples collected during FS 2014-15 were received and the PGE values vary from 9 ppb-726 ppb. The sample with 726 ppb is from magnesite mine dump near the quarry at Kalkandi. The higher values are 618 ppb, 541 ppb, 490 ppb, 266 ppb, 213 ppb and 205 ppb. Four PGE grains were found during EPMA analysis in four samples. They are associated with chromitite and sulphide minerals. A total of four PGE-bearing minerals could be identified in 11 thin-polished sections during EPMA work carried out at EPMA Lab, GSI, Faridabad. Sulphides are present in all of the mafic and ultramafic rocks. The sulphides found in chromitite are mainly pentlandite and chalcopyrite and in ultramafic rocks they are mainly chalcopyrite, pyrrhotite and pyrites.</p>

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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		
State Directorates of Geology and Mining							
Aluminous Laterite/China Clay							
Kannur	Vaipiriyam area, Kankol village	-	-	07	250	-	Reserves of china clay was estimated at 16 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 was estimated at 52,000 tonnes (KCCP area).
-do-	Karinthadam area	-	-	05	140.5	-	A tentative reserves of dull white to greyish sandy clay was estimated at 9.6 million tonnes.
Kasaragod	Nileswaram area	-	-	05	113.5	-	-
China Clay							
Kollam	N/v Mulavana	-	-	12	447	-	-

Table – 4: Mineral Production in Kerala, 2013-14 to 2015-16
(Excluding Atomic Minerals)

(Value in ₹ '000)										
Mineral	Unit	2013-14			2014-15			2015-16 (P)		
		No. of mines	Quantity	Value	No. of mines	Quantity	Value	No. of mines	Quantity	Value
All Minerals		53		15635219	53		27578875	8		27596428
Clay (others)#	t	2	78703	10571	2	141843	17346	-	-	-
Graphite (r.o.m.)	t	-	-	-	1	250	2000	1	240	1920
Kaolin#	t	20	743138	166817	22	561565	131480	-	-	-
Sillimanite	t	2	5109	44635	2	7690	69271	2	5121	46158
Laterite#	t	4	169672	76063	3	148357	61894	-	-	-
Limestone	'000t	1	501	234597	1	511	271081	1	487	264194
Limeshell	t	5	18690	35102	5	16123	36867	4	8808	26037
Silica Sand#	t	19	50793	107973	17	38628	81245	-	-	-
Minor Minerals@		-	-	14959461	-	-	26907761	-	-	27258119

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.

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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, is taken from Indian Fertilizer Scenario, 2016/FAI Statistics, 2015-16.