Indian Minerals Yearbook 2018

(Part- I)

57th 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

December, 2019

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, leucoxene and monazite. The State is the principal producer of limeshell and sillimanite. The State also accounts for 23% china clay and 10% sillimanite of the country's resources. As per the Department of Atomic Energy, Kerala state accounts for 144.02 million tonnes of ilmenite, 8.74 million tonnes of rutile and 7.83 million tonnes of zircon 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 & Thiruvananthapuram districts; and **titanium minerals** in Kasaragod, Kollam, Pathanamthitta & Thiruvananthapuram districts.

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 & Malappuram districts; **kyanite** in Kollam & 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 2017-18. Details of exploration carried out by GSI and other agencies are furnished in Table-3.

Production

Limestone, limeshell and sillimanite are important minerals produced in the State of Kerala (Table - 4).

The value of minor minerals production was estimated at ` 2,225 crore for the year 2017-18.

The number of reporting mines was 8 in both the years 2016-17 and 2017-18 in the case of MCDR minerals.

Table –2 : Reserves/Resources of Lignite as on 1.4.2018 : Kerala

(In million tonnes)

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

Source: *Coal Directory of India, 2017-18.*

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
Fireclay#	'000 tonnes	-	-	-	-	-	-	-	8200	51	9929	-	18181	18181
Garnet	tonne	-	-	45797	45797	-	-	-	100874	-	52190	-	153064	198861
Gold					-									
Ore (Primary)	tonne	-	-	-	-	-	-	-	462280	96180	-	-	558460	558460
Metal (Primary)	tonne	-	-	-	-	-	-	-	0.17	0.03	-	-	0.2	0.2
Ore (Placer)	tonne	-	-	-	-	-	-	-	-	2552000	23569000	-	26121000	26121000
Metal (Placer)	tonne	-	-	-	-	-	-	-	-	2.29	3.57	-	5.86	5.86
Granite (Dimension 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

Figures rounded off.

 # Declared as Minor Minerals vide Gazette Notification dated 10.02.2015.

Minor Mineral before Gazette Notification dated 10.02.2015.

Table –3 : Details of Exploration Activities in Kerala, 2017-18

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
GSI							
REE and other RM mineralisation							
Wayanad	-	1:12500	100	-	-	-	Reconnaissance survey was carried out in this area for the possible occurrence of REE and other RM mineralisation by the large-scale mapping of 100 sq km on 1:12500 scale. Besides, a total of 120 BRS, 61 channel samples, 16 petrochemical samples, 55 regolith samples and 15 petrographical samples were collected. The litho units in the area are metapyroxenite, talc-tremolite-sericite schist and banded magnetite quartzite. PGC is represented by hornblende-biotite gneiss which is the main litho unit in the study area. About 78 pegmatite zones were identified and mapped. The presence of REE range from 82.3 ppm to 1,632.7 ppm with mean of 563.1 ppm in 24 granite and 35.8 ppm to 1781.5 ppm with mean of 364.6 ppm in 22 pegmatite samples. Cu and Mo value ranged from 10 ppm to 4,382 ppm with mean of 161 ppm and 40 ppm to 1,590 ppm with mean of 677 ppm in granite. Two metapyroxenite samples showed Ni value of 1,877 ppm and 593 ppm.
Platinum Group of Minerals (PGM)							
Palakkad	Vellamari block	1:1000	0.75	-	121	-	Preliminary exploration for Platinum Group of Minerals (PGM) in this block was carried out involving mapping of about 0.75 sq km on 1:1000 scale and identification of the important rock units in the area. Sulphide mineralisation in the form of fresh specks of pyrite, chalcopyrite and pyrrhotite was noticed mainly in meta-pyroxenite and in the contacts of meta-pyroxenite with meta-gabbro and amphibolite. This sulphide-rich zone demarcated was the main target lithology for PGE exploration. Pitting/ trenching of 50 cu m was carried out and 66 trench samples along with 87 BRS, 50 SSS, 25 PS, 10 PCS, 15 ORM, 06 EPMA, 06 SEM and 10 XRD

(Contd)

Table-3 (contd)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							samples were collected. A total of 121 m drilling have been carried out in scout boreholes with a maximum depth of about 80 m. The important litho units intersected in the borehole were quartzo feldspathic gneiss, amphibolites, meta-gabbro and meta-pyroxenite with sulphide mineralisation. An important PGE mineralised zone towards further NE was traced for up to a strike length of 300 m. A total of 10 BRS were collected and analysed for PGE (Pt+Pd) and their values ranged from 170 ppb to 3,759 ppb with weighted average of 1,926.40 ppb in a 5 m wide zone. Besides one additional PGE-bearing meta-pyroxenite zone was establish in Trench-17 just 100 m to 120 m south of the northern PGE-bearing zone. In this band, a 0.50 m wide PGE-bearing zone i.e.,Pt=1,668 ppb and Pd=2,378 ppb a total of 4,046 ppb Pt+ Pd were established. A total of 5 scout boreholes have been proposed in PGE zone.
Gold							
Malappuram	Mattattur-Ponmala	1:12500	100	-	-	363	Reconnaissance survey for gold was carried out in this area. The project involved large-scale mapping of 100 sq km on 1:12500.The rocks identified in the study area included mafic granulite, charnockite, quartzo-feldspathic rock, migmatite/ hornblende gneiss, granite, pegmatite, vein quartz, dolerite and laterite. Sulphide-bearing quartz veins have been mapped, in which pyrite, chalcopyrite and bornite were observed as disseminations. Fifteen old workings in the form of lateral excavation within laterite have been mapped in and around Ponmala-Mattattur area. Out of the total 363 samples collected, analytical results of 181 samples have yielded gold value ranging from <0.05 ppm to 0.07 ppm, while the arsenic content ranges from <1.00 to 1000 ppm.

(Contd)

Table-3 (concld)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
Gold							
Malappuram	Karimpuzha-Thalipuzha sector of Nilambur.	1:12,500	132	-	-	362	Reconnaissance survey was carried out for gold in this area. An area of 132 sq km was mapped on 1:12500 scale. Quartz veins and pegmatites were found emplaced mainly in the gneisses. Trenching & pitting, soil sampling and geophysical survey were carried out in the area. A total of 362 samples were collected for study. During panning of stream sediment samples, 3-4 visible specks of gold were reported in most of the samples. Analytical results of two BIF samples from Tumbi Mala showed gold values 0.18 ppm and 0.07 ppm.
Directorate of Mining & Geology Kerala							
Aluminous laterite/ Chinaclay							
Kannur	Karakundu area Alakkad Desham, Panappuzha village, Thaliparamba Taluka.	-	-	16	414.50	104	The lithology of the area mainly comprised aluminous laterite overburden followed by lateritic clay & variegated clay. The average thickness of aluminous laterite overburden was about 4 m and that of low-grade chinaclay was about 8.5 m. The tentative Indicated Category resources of low-grade china clay estimated in the area were 11.00 million tonnes and that of aluminous laterite were 5.00 million tonnes.
	Ezhum Vayal area, Alakkad Desham, Panappuzha village, Thaliparamba Taluka.	-	-	4	140.50	46	The average thickness of aluminous laterite overburden is about 6 m and that of low grade china clay is about 18 m. The tentative indicated category resources of low grade china clay in the area estimated at 4.00 million tonnes and that of aluminous laterite at 2.00 million tonnes.
	Ooradipara, Koipra area, Vellora Desham, Vellora village, Thaliparamba Taluka.	-	-	20	591.00	170	The average thickness of overburden was about 5 m and that of low-grade china clay was about 13 m. The tentative Indicated Category resources of low-grade china clay in the area estimated were 20.00 million tonnes and aluminous laterite were 7.5 million tonnes.

Table-4: Mineral Production in Kerala, 2015-16 to 2017-18
(Excluding Atomic Minerals)

(Value in `'000)

Mineral	Unit	2015-16			2016-17			2017-18 (P)		
		No. of mines	Quantity	Value	No. of mines	Quantity	Value	No. of mines	Quantity	Value
All Minerals		**8**	**-**	**22680870**	**8**	**-**	**22690151**	**8**	**-**	**22618270**
Graphite (r.o.m.)	t	1	650	5200	1	660	5280	1	150	1200
Sillimanite	t	2	5121	49585	2	9254	87400	2	7548	71193
Limestone	'000 t	1	487	353323	1	376	325069	1	444	262352
Limeshell	t	4	9132	27355	4	8341	26995	4	10133	38118
Sulphur	t	-	32169	-	-	33287	-	-	155695	-
Minor Minerals@	-	-	-	22245407	-	-	22245407	-	-	22245407

Note: *The number of mines excludes Minor Minerals.*
 # Recovered as by-product from oil refinery.
@ Figures for earlier years have been repeated as estimates, wherever necessary, because of non-receipt of data.

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.	660
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
Chemical	
Tecil chemicals and Hydro Power Ltd, Chingavanam, Distt Kottayam.	30 (calcium carbide) 2 (acetylene black) 7.5 (ferro silicon)

(Contd)

Table – 5 (concld)

Industry/Plant	Capacity ('000 tpy)
Synthetic Rutile	
CMRL, Edayar, Distt Ernakulam.	45
KMML, Chavara, Distt Kollam.	50
TiO_2 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.	38 (Zn ingot)
(Edayar Zinc Ltd)	0.08 (Cd ingot) 50 (H_2SO_4)
Petroleum Refinery	
BPCL, Kochi.	9500

G; Grinding Unit
Note: *Data for Fertilizer Industries is taken from Indian Fertilizer Scenario, 2015/FAI Statistics, 2015-16.*