Indian Minerals Yearbook 2021

(Part- I)

60th Edition

STATE REVIEWS (Kerala)

(ADVANCE 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

July, 2023

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 AMDER of the Department of Atomic Energy, Kerala state accouts for 144.02 million tonnes of ilmenite, 7.83 million tonnes of rutile and 7.96 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 & 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 districts; **magnesite** in Palakkad district; and **steatite** in Kannur & Wayanad districts (Tables - 1 and 2).

Exploration & Development

GSI carried out exploration for bauxite and rare earth elements in Kasargod and Idukki Districts during 2020-21. Details of exploration carried out by GSI and other agencies are furnished in Table-3.

Production

Limestone is the important minerals produced in Kerala State. The value of minor mineral's production is estimated as ₹ 3848 crores for the year 2020-21. There were 1 reporting mines in 2020-21 in case of MCDR of minerals (Table-4).

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 –2 : Reserves/Resources of Lignite as on 1.4.2021 : Kerala

(In million tonnes)

District	Proved	Indicated	Inferred	Total
Total/Kannur	–	–	**9.65**	**9.65**

Source: *Coal Directory of India, 2020-21.*

Table –1: Reserves/Resources of Minerals as on 1.4.2020: 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	14637	2722	-	19449	19449
Garnet	tonne	-	-	-	-	-	-	45797	100874	-	52190	-	198861	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
Graphite	tonne	-	-	15443	15443	-	8376	-	-	1088550	322606	-	1419532	1434975
Iron Ore (Magnetite)	'000 tonnes	-	-	-	-	-	-	-	-	59912	23523	-	83435	83435
Kyanite	tonne	-	-	-	-	-	-	-	174733	-	10000	-	184733	184733
Limestone	'000 tonnes	10475	-	65	10540	123286	103	-	21161	2888	36622	-	184059	194599
Magnesite	'000 tonnes	-	-	-	-	-	-	-	2	-	38	-	40	40
Pt.Group of Metals	'000 tonnes	-	-	-	-	-	-	-	-	-	0.18	-	0.18	0.18
Sillimanite	tonne	553000	-	-	553000	432713	-	-	2564254	-	3369200	-	6366167	6919167
Titanium	toone	2370712	-	-	2370712	10597943	-	-	-	19961000	87048716	-	117607659	119978371
Zircon	'000 tonnes	156509	-	-	156509	400650	-	-	123426	-	716279	-	1240355	1396864

Figures rounded off.

Table –3 : Details of Exploration Activities in Kerala, 2020-21

Agency/ Mineral/ District	Location Area/ Block	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
GSI							
Bauxite							
Kasargod	Perla area	1:12500	100	-	-	253	Reconnaissance survey (G4) was carried out in this area for bauxite. Large scale mapping of 100 sq km was carried out on 1:12500 scale in toposheet no.48P/2 with collection of 131 bed rock samples, 36 vertical section samples, 50 pit samples, 13 petrographic, 10 XRD and 13 petro chemical samples. Laterite is the major rock unit in the area and bauxite is seen as intermixed with laterite as pockets and patches. Analytical results of BRS samples yielded Al_2O_3 content of 5.23 to 52.92% with an average of 34.59%. SiO2, Fe2O3 and TiO2 of BRS samples gives an average value of 26.50%, 23.23% and 1.33%. About 17 BRS samples yield Al_2O_3 greater than 40. TREE values of BRS samples ranges from 115.48 to 474.26 ppm. Al_2O_3 content in pit samples ranges from 22.74 to 40.71% with an average of 32.80%. Analytical results of vertical profile samples reveal that the bauxite occurrence is mainly confined to a depth of 2m to 5m from the ground surface with an average of 35.71%. Intergration of geological and geochemical data of aluminous laterite/bauxite samples, demarcated 5 mineralised zones of having total area of 2.73 sq. km, around Yetadka, Ukkinadka, Maniampara and Perla by fixing cut- off grade for bauxite at 40% Al2O3.
Rare Earth Elements (REE)							
Idukki	Chittirapuram	1:12500	100	-	-	344	Reconnaissance Survey (G4)was carried out for REE and other Rare Metals mineralisation.The work involves large scale mapping of 100 sq. km on 1: 12,500 scale with 50 cu.m pitting/trenching and collection of 118 nos. of BRS, 50 nos. of PTS, 50 nos. of regolith, 50 nos. of SSS, 30 nos. of PCS, 26 nos. of PS, 5 nos. of EPMA, 10 nos. of XRD and 5 nos. of HMS samples. Pegmatites, granite and (contd)

Table – 3 (concld)

Agency/ Mineral/ District	Location Area/ Block	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							foliated granite are the favourable host rocks for REE. Based on the analytical results of bed rock samples, two potential REE mineralised zones were demarcated viz. MZ-I and MZ-II. MZ-I is located southeast of Pallivasal and covered an area of 1.15 sq. km, which is associated with N-S trending shear zone. In MZ-I, pegmatites are the host rock for REE. Eight pegmatite samples collected from MZ-I show ÓREE- 433.9 to 2896.7 ppm with an average of 1576.1 ppm. MZ-II is located south of Randam Mile and covered an area of 2.86 sq. km. Pegmatites, foliated granite, charnockite and granite are the exposed rock types. Six foliated granite samples yielded ÓREE- 418.4 to 2077.5 with an average of 897.2 ppm, two charnockite show ÓREE- 2079.7 ppm and 967.5 ppm, two pegmatite show ÓREE-617.8 ppm and 1089 ppm and one granite show ÓREE of 1535.4 ppm. One heavy mineral sample yielded ÓREE of 3274 ppm and one alkali-feldspar syenite sample from a tunnel section yielded ÓREE of 6390.3 ppm.
Rare Earth Elements (REE)							
Kasaragod	Uppala area	1:12500	100	-	-	230	Reconnaissance survey (G4) was carried out for REE. Large scale mapping on 1: 12,500 scale has been carried out and 100 sq. km area was covered. The field study implies that the gneisses and associated granite, pegmatites, quartz veins are the favourable rock for REE mineralisation. In the study area, number of non-mappable pegmatites observed within different lithounits, systematic sampling was carried out from this pegmatite. The intense laterisation noticed in the area may contribute to secondary clay associated REE mineralisation. Systematic sampling representative of different horizons viz. parent rock (protolith), saprolite zone, oxidized zone, and clay rich zones were done. Systematic soil sampling in grid pattern was carried out in the (contd)

Table – 3 (concld)

Agency/ Mineral/ District	Location Area/ Block	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							south-western and eastern part of the study area due to non-availability of outcrops. A total of 101 nos. of bed rock samples, 51 nos. of regolith samples, 50 nos. of trench samples and 28 nos. of petrochemical samples were collected and submitted for chemical analysis. Based on the available analytical results of bed rock samples (27 nos.), the REE values in pegmatite ranges from 67.42 to 1254.54 ppm, in hornblende biotite gneiss the REE value ranges from 55.08 to 611.72 ppm and in granite gneiss, the REE value ranges from 606.81 to 985.19 ppm.

Table – 4: Mineral Production in Kerala, 2018-19 to 2020-21 (Excluding Atomic Minerals)

(Value in ₹'000)

Mineral	Unit	2018-19			2019-20			2020-21 (P)		
		No. of mines	Quantity	Value	No. of mines	Quantity	Value	No. of mines	Quantity	Value
All Minerals		8	-	38807569	2	-	38835180	1	-	38792470
Graphite										
(r.o.m.)	t	1	-	-	-	-	-	-	-	-
Sillimanite	t	3	7318	82173	-	-	-	-	-	-
Limestone	'000t	1	325	230958	1	398	342144	1	376	315113
Limeshell	t	3	3996	17081	1	3583	15679	-	-	-
Sulphur #	t	-	225857	-	-	227253	-	-	142166	-
Minor										
Minerals @		-	-	38477357	-	-	38477357	-	-	38477357

Note: *The number of mines excludes Minor minerals.*
 # Recovered as by-product from oil refinery.
@ Figures for earlier years have been repeated as estimates because of non-receipt of data for 2019-20.

Table – 5 : Principal Mineral-based Industries

Industry/Plant	Capacity ('000 tpy)
Abrasives	
Carborandum Universal Ltd, Ernakulam	NA
Carborandum Universal Ltd, Thrissur	NA
Carborandum Universal Ltd, Pattanamthitta	NA
Asbestos Products	
Hyderabad Industries Ltd (formerly, Malabar Building Products Ltd) Mulagunnathukavu, Distt. Thrissur	84
Cement	
J K Tex Coats Nadama, Kanayannur	0.030 (Cerastone) 0.025 (Rock tiles) 0.35 (Others)
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	18000
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 (ferrosilicon)
Cochin Minerals and Rutile Ltd, Kadungalloor, Alwaye	50 (Synthetic Rutile) 82.5 (Ferrous cloride) 30 (Ferric cloride) 8 (Recovered Tio_2) 6 (Recovered Upgraded Ilmenite)

(contd)

Table – 5 (concld)

Industry/Plant	Capacity ('000 tpy)
Electrode	
Super Electrode, Patlla	0.6
Synthetic Rutile	
CMRL, Edayar, Distt. Ernakulam	50
KMML, Chavara, Distt. Kollam	50
TiO_2 Pigment	
TTPL, Kochuveli, Distt. Thiruvananthapuram	1.8
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.	1500
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_2SO_4)
Petroleum Refinery	
BPCL, Kochi.	12400

G; Grinding Unit

Note: *Data for Fertilizer Industries is taken from Indian Fertilizer Scenario, FAI Statistics.*