



# **Indian Minerals Yearbook 2019**

**(Part-III: Mineral Reviews)**

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**EMERALD**

**(FINAL RELEASE)**

**GOVERNMENT OF INDIA  
MINISTRY OF MINES  
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# 11 Emerald

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**E**merald in Hindi, commonly called as 'Panna', is a variety of mineral beryl and is chemically a complex silicate of aluminium and beryllium ( $\text{Be}_3\text{Al}_2(\text{SiO}_3)_6$ ). The hardness of Emerald is about 7.5-8 on Mohs scale. Emeralds are rare & precious gemstones that command immense value on account of their cut, colour, clarity and carat. Beauty, rarity and durability are the main virtues of a gemstone. The cut stones are known as gems, while the uncut ones are gemstones. Emeralds occur in hues varying from yellow-green to blue-green. However, emeralds with unique velvety green colour with high degree of transparency are considered as most precious among gemstones. The rose variety of beryl is called morganite, and the golden yellow variety is termed 'golden beryl'. If the colour is bluish green or blue then it is called 'aquamarine'. When emerald contains chromium as an impurity, it imparts the colour green. Emerald is generally found at the contact of pegmatites intruding schists, mainly amphibole schists.

## RESERVES/RESOURCES

As per NMI data, as on 01.04.2015 based on UNFC system, the total resources of emerald in the country are estimated at 55.87 tonnes. All resources are placed under Reconnaissance category and Unclassified grade resources have been reported in the State of Jharkhand (Table-1).

Occurrences of emerald are also reported from Rajasthan, Odisha and Chhattisgarh. However, resources have not been estimated so far. In Rajasthan, emeralds have been found to occur at a number of places in districts Rajsamand and Ajmer. In Ajmer-Rajsamand belt of Rajasthan, emerald occurrences are confined to the upper fringes of pegmatites. Emerald deposit is found in the 221 km long belt stretching from Gam Gurha in Rajsamand district to Bubani and Muhami in Ajmer district. Important localities are Rajgarh, Tikhi and Kalaguman (Rajsamand). The occurrences are highly sporadic and variable.

In Odisha, occurrences of emerald are reported from Bira-Mohorajpur belt in district Bolangir. In Chhattisgarh, occurrences of emerald are reported from Deobhog area in Raipur district. Sporadic and irregular crystals of emerald, aquamarine and amethyst are also reported in a few localities in Coimbatore district, Tamil Nadu.

## PRODUCTION

Production of emerald has not been reported since 1983. However, a single lease of 46.32 ha area was granted to M/s Serva Shri Mining & Mineral Industries in district Ajmer, Rajasthan in the year 1998.

## MINING AND MARKETING

Mining of emerald was mostly undertaken manually by opencast method. The pits were worked at shallow depths. The stones collected during mining were sorted out according to size, shape and quality. The stones so collected were deposited with the State Government under the supervision of DMG officials and mine owners. Worldwide, crude emerald was sold through public auction from time to time.

The beauty of rough stone is enhanced by skilful cutting and polishing into faceted or rounded form for use in jewellery. The rough stones are sorted out to determine the angles to which facets can be cut. They may be sawed or polished in any direction according to shape, size and colour to be retained. After the shape and size are determined, the next process of 'pre-shaping' is done. The third and important process called 'calibration' gives the pre-shaped stone a definite proportion and size. The process that follows is 'faceting' and 'polishing'. The aim of this process is to achieve maximum internal reflection enhancing the beauty of the stones. Emeralds are generally given a step-cut or cabochon-cut.

India is the leading exporter of cut and polished gem, but continued to depend on raw materials. The Diamond and Gem Development Corporation of India

**Table – 1 : Reserves/Resources of Emerald as on 1.4.2015  
(By Grades/States)**

	Reserves		Remaining Resources					Total Resources (A+B)			
	Proved STD111	Probable STD121 STD122	Total (A)	Feasibility STD211	Pre-feasibility STD221 STD222	Measured STD331	Indicated STD332		Inferred STD333	Reconnaissance STD334	Total (B)
<b>All India : Total</b>	-	-	-	-	-	-	-	-	-	<b>55869</b>	<b>55869</b>
<b>By Grades</b>											
Unclassified	-	-	-	-	-	-	-	-	-	55869	55869
<b>By States</b>											
Jharkhand	-	-	-	-	-	-	-	-	-	55869	55869

*Figures rounded off.*

have set up Diamond and Gem Parks for cutting and polishing of gems in different States. Jaipur in Rajasthan is the major centre for processing emeralds. Like diamonds, uncut emerald is imported and part of it is exported after processing. Emerald is next to diamond (uncut) amongst precious and semi-precious stones, being imported and re-exported after cutting and polishing.

Prices are governed by many factors including beauty, clarity, defect, demand, durability and rarity. Prices of precious stones also vary over time.

## WORLD REVIEW

World production of emerald is reported mainly from Colombia, Pakistan, Afghanistan, Africa, Nigeria, Mozambique, United States of America, Madagascar, Brazil, Zambia and Zimbabwe.

### Afghanistan

Afghanistan's Panjshir Valley has shown potentiality for commercial emerald production. The emerald mines of Afghanistan are located approximately 70 miles (113 km) northeast of Kabul and extend from the village of Khenj to Dest-e-Rewat. The emerald deposits lie south-east of the Panjshir fault zone. The Panjshir emerald crystals vary in quality from mine to mine. In general, Panjshir emeralds are mined and marketed in a free-enterprise system.

### Madagascar

Madagascar was a globally significant producer of gemstone that included emerald, ruby and sapphire. Emerald was produced from the Kianjavato emerald mines which are located in the rain-forest region of eastern Madagascar, approximately 60 km west of the coastal city of Mananjary. Emeralds are also mined at the Ianapera (Sakalava) emerald deposits in the Ianapera (Janapera) area of Tuléar (Toliara) Province, 350 km east of the town Toliara. Societe Orgaco of France mined the emerald (536 kg Heaven's gift) in matrix at the Morafeno mine near Mananjary and exported it to Reunion.

### Pakistan

In Pakistan, the Fizzagat emerald mine is situated near the district headquarters Mingora in Swat valley.

### Brazil

Since the 1970's, Brazil has been consistent source of emerald. Brazilian emerald deposits are found in a typical geological setting with Archean basement and supracrustal, ultramafic and granitoid rocks. Brazil emerald mines are located in the states of Bahia, Minas Gerais and Goias. Brazil's emerald production goes to both domestic cutting and foreign buyers who take the rough back to cutting centres in their own country.

### Colombia

In Colombia, the mining activity of emerald has been concentrated in the departments of Cundinamarca and Boyaca, in the denominated East and West emerald belts. Mining districts of Chivor, Gachala and Macanal (Eastern Belt) and Muzo, Coscuez, Penas Blancas, La Palma-Yacoi and La Pita (Western Belt) are located in Colombia. The most representative mines are Muzo, Cunas, Coscuez, La Pita and Chivor.

### Zambia

The majority of the gems produced in Zambia are found in the Kamakanga and Kagem mines. Both are located in the north-eastern region of the country. Gemfields, the world's biggest emerald miner has found a gem that weighs more than 1.1 kg at its mine in Lufwanyama. Earlier 5,655 carat stone was found at the Kagem Mines.

### Others

Zimbabwe produces rough emeralds from the Sandawana mine, located in the south-west of the country. In the United States of America, in Beaver County, Utah rare red emeralds are found in the eastern slopes of the Wah Wah Mountains. In Ethiopia, a new deposit of high-quality emeralds has been found in the rural areas of Kenticha and Dermi, in the district Seba Boru. Mining still is done through hand tools, without heavy machinery.

## FOREIGN TRADE

MMTC is an authorised agency of the Government of India for import of precious & semi-precious stones including emerald and supply these items to jewellers for domestic sales and exports.

## Exports

In 2018-19 exports value of emerald (cut & uncut) increased to ` 2,303 crore from ` 1,776 crore in the previous year. Exports were mainly to Hong Kong (51%), USA (24%), Thailand (7%), Switzerland (5%) and Belgium & UK (3% each). Out of the total export value of emerald (cut & uncut), the share of the export value of emerald (cut) was 98%. The export value of emerald (cut) increased considerably by 31% to ` 2,253 crore in 2018-19 from ` 1,715 crore in the preceding year. In terms of quantity the export of emerald (cut) decreased considerably by 26% to

31,790 thousand carat in 2018-19 from 43,007 thousand carat in the preceding year. Exports were mainly to USA (45%), Hong Kong (28%), Thailand (9%), Italy, UK & Japan (3% each) and Switzerland (1%). On the other hand, the share of the export value of emerald (uncut) was only 2%. The export value of emerald (uncut) decreased by 18% to ` 49.56 crore in 2018-19 from ` 60.25 crore in the preceding year, similarly, in terms of quantity the export of emerald (uncut) decreased drastically by 81% to 3 tonnes in 2018-19 from 16 tonnes in preceding year. Exports were mainly to Hong Kong (67%) (Tables- 2 to 4).

**Table – 2: Exports Value of Emerald (Cut & Uncut)  
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (`carat)	Value (` '000)	Qty (`carat)	Value (` '000)
<b>All Countries</b>	<b>**</b>	<b>17756467</b>	<b>**</b>	<b>23026249</b>
Hong Kong	**	9563307	**	11633445
USA	**	3168282	**	5441398
Thailand	**	1049585	**	1537578
Switzerland	**	1003931	**	1138119
Belgium	**	269522	**	666069
UK	**	232579	**	593000
Italy	**	322780	**	414979
France	**	415664	**	400696
Japan	**	108542	**	234427
UAE	**	642441	**	201579
Other countries	**	979836	**	764959

*Figures rounded off*

**Table – 3: Exports of Emerald (Cut)  
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (‘carat)	Value (` ‘000)	Qty (‘carat)	Value (` ‘000)
<b>All Countries</b>	<b>43006612</b>	<b>17153937</b>	<b>31789951</b>	<b>22530565</b>
Hong Kong	13272666	9438475	8825341	11551661
USA	13632853	3158636	14247539	5435730
Thailand	4909593	1046078	2751105	1535260
Switzerland	371420	1000986	366062	1138119
Belgium	15140	269522	45913	666040
Italy	1797461	322672	851001	414979
France	130474	415556	29606	400654
UK	3593269	232579	908693	277457
Japan	2163780	108505	1090034	234311
UAE	500825	567297	345016	197841
Other countries	2619131	593631	2329641	678514

*Figures rounded off***Table – 4: Exports of Emerald (Uncut)  
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (` ‘000)	Qty (t)	Value (` ‘000)
<b>All Countries</b>	<b>16</b>	<b>602531</b>	<b>3</b>	<b>495684</b>
UK	-	-	++	315543
Hong Kong	1	124832	2	81785
Israel	++	798	++	40600
Zambia	++	383231	++	32571
Brazil	-	-	++	10054
USA	15	9646	++	5668
UAE	++	75144	++	3738
Thailand	++	3507	++	2319
Austria	++	82	++	1698
Bahrain	-	-	-	726
Other countries	++	5291	++	983

*Figures rounded off*

## Imports

In 2018-19, the total imports value of emerald (cut and uncut) decreased drastically by 53% to `3,659 crore from `7,793 crore in the preceding year. Imports were mainly from Hong Kong (37%), Madagascar (17%), Zambia (13%), UAE (12%), USA & Thailand (6% each), Switzerland (3%) and Singapore (2%). In the total import value of emerald (cut & uncut) the share of imports value of emerald cut was (59%), on the other hand the share of imports value of emerald (uncut) was 41%. The imports value of emerald (cut) decreased substantially by 43% to `2,176 crore in 2018-19 as compared to `3,823 crore in the preceding year. In terms of quantity, the

imports of emerald (cut) increased slightly by 1% to 51,012 thousand carat in 2018-19 from 50,612 thousand carat in the preceding year. Imports were mainly from Thailand (47%), Hong kong (23%), Madagascar (16%), UAE (5%) and USA( 3%). Similarly, the import value of emerald (uncut) decreased drastically by 63% to `1,483 crore in 2018-19 as compared to `3,970 crore in the preceding year. In terms of quantity, the imports of emerald (uncut) also decreased substantially by 26% to 46 tonnes in 2018-19 from 62 tonnes in the preceding year. Imports were mainly from Zambia (37%), Brazil (35%), Hong Kong (22%) and UAE & Russia ( 2% each) (Tables- 5 to 7).

**Table – 5: Imports of Emerald (Cut & Uncut) : Total  
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (` '000)	Qty (t)	Value (` '000)
<b>All Countries</b>	**	<b>77934747</b>	**	<b>36592286</b>
Hong Kong	**	47377304	**	13486307
Madagascar	**	74995	**	6338939
Zambia	**	10626882	**	4747143
UAE	**	4498171	**	4322254
USA	**	841971	**	2107550
Thailand	**	2679789	**	2102837
Switzerland	**	24111	**	1202097
Singapore	**	334293	**	552473
Brazil	**	599241	**	434381
France	**	10588	**	256713
Other countries	**	10867402	**	1041594

*Figures rounded off*

*Note: Quantity not given due to partial coverage; value figures, however, have full coverage.*

**Table – 6: Imports of Emerald (Cut)  
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (000'carat)	Value (` '000)	Qty (000'carat)	Value (` '000)
<b>All Countries</b>	<b>50612</b>	<b>38234807</b>	<b>51012</b>	<b>21758892</b>
Hong Kong	22811	25080541	11857	9355497
Madagascar	--	--	8256	6151030
Thailand	15388	2612098	24137	2032510
USA	469	769235	1442	1643634
Switzerland	++	24111	442	1202097
Zambia	121	136075	342	278009
France	++	10588	6	256713
Italy	106	39376	71	162258
UAE	3808	2101420	2742	133131
Sri Lanka	1151	315276	834	105308
Other countries	6757	7146086	884	438706

*Figures rounded off***Table – 7: Imports of Emerald (Uncut)  
(By Countries)**

Country	2017-18 (R)		2018-19 (P)	
	Qty (t)	Value (` '000)	Qty (t)	Value (` '000)
<b>All Countries</b>	<b>62</b>	<b>39699940</b>	<b>46</b>	<b>14833394</b>
Zambia	27	10490807	17	4469134
UAE	2	2396751	1	4189123
Hong Kong	17	22296763	10	4130810
Singapore	++	236543	++	519768
USA	++	72736	++	463916
Brazil	13	589618	16	434381
Madagascar	++	74995	++	187909
Russia	1	2685249	1	122672
China	++	89399	++	89585
Israel	++	34896	++	75155
Other countries	1	732183	1	150941

*Figures rounded off*



## **FUTURE OUTLOOK**

Gems and Jewellery export sector has been contributing about 13%-15% to India's total merchandise exports during the last five years. As per industry estimates, this sector employs more than 4.64 million employees. With a view to strengthen the Gems & Jewellery Industry in the country, the Government has taken a number of steps, such as, establishment of Special Notified Zone (SNZ); announcement of separate ITC HS Code for lab-grown diamonds; introduction of Gold Monetisation Scheme; amendment of wastage and value addition norms for gems and jewellery items;

approved scheme for setting up of Common Facility Centres for Gem and Jewellery Sector; and providing financial assistance for participation in international fairs, organising buyer-seller meets etc. under Market Development Assistance (MDA) and Market Access Initiative (MAI) Schemes of the Department of Commerce.

As per minutes of the Coordination-cum-Empowered Committee (CCEC) Meeting held on 12<sup>th</sup> October 2018, the Jharkhand State planned for auction of 2 blocks of emerald in FY 2018-19. It may boost the Indian Gems & Jewellery sector in near future.

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