

EMERALD

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**EMERALD**

(ADVANCE RELEASE)



**GOVERNMENT OF INDIA  
MINISTRY OF MINES  
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# 11 Emerald

**E**merald, commonly called as 'Panna' in Hindi, 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 Moh's 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 01.04.2020 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 of 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 district Coimbatore, 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. The mine-head closing stocks of emerald at the end of the years 2020-21 and 2021-22 were 20 kg each (Table-2). The average daily employment was nil in both the years.

**Table – 2: Mine-head Stocks of Emerald, 2020-21 & 2021-22 (By State)**

State	2020-21	2021-22 (P)
India/ Rajasthan	20	20

## 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.

**Table – 1 : Reserves/Resources of Emerald as on 1.4.2020 (P)**  
**(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
<b>All India : Total</b>	-	-	-	-	-	-	-	-	<b>55869</b>	<b>55869</b>
<b>By Grade</b>										
Unclassified	-	-	-	-	-	-	-	-	55869	55869
<b>By State</b>										
Jharkhand	-	-	-	-	-	-	-	-	55869	55869

*Figures rounded off*

India is the leading exporter of cut and polished gems, but continued to depend on raw materials. The Diamond and Gem Development Corporation of India has 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. Emeralds have been found only on the eastern side of the valley, even though the western side has been searched extensively. The emerald mines of Afghanistan are located approximately 70 miles (113 km) north east of Kabul and extend from the village of Khenj to Dest-e-Rewat. The emerald mines are located at elevations between approximately 7,000 and 14,300 ft. (2,135 and 4,270 m) in mountainous terrain on the eastern side of River Panjshir. 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 of 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

Zambia is one of the world's most significant sources of fine-quality emerald and has been called the second most important producer by value after Colombia. The emerald mines are located in the Kafubu area of central Zambia, about 45 km southwest of the town of Kitwe. 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 southwest 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 is done through hand tools, without heavy machinery.

## FOREIGN TRADE

### Exports

In 2021-22, exports of emerald (cut & uncut) by value increased substantially by 103% to ₹ 1080.89 crore from ₹ 531.67 crore in the previous year. Exports were mainly to USA (31%), Hong Kong (27%), Thailand (12%), France & Italy (5% each) and UAE (4%). Out of the total export value of emerald (cut & uncut), the share of the export value of emerald (cut) was almost 98 per cent. The export value of emerald (cut) increased considerably by 101% to ₹ 1059.62 crore in 2021-22 from ₹ 527.09 crore in the preceding year. In terms of quantity, the export of emerald (cut) increased to 5,945 thousand carat in 2021-22 from 4,076 thousand carat in the preceding year. Exports of emerald (cut) were mainly to USA(39%), Hong Kong (20%), Thailand( 16%) and UK (6%). On the other hand, the share of the export value of emerald (uncut) was 2 %. In 2021-22, exports of emerald (uncut) by value increased manifold by 365% to ₹21.27 crore in 2021-22 from ₹4.6 crore in the preceding year. In terms of Value, exports of emerald (uncut) were mainly to UAE (65%), USA (20%), Hong Kong (6%), and Thailand (5%) (Tables- 3 to 5).

### Imports

In 2021-22, the total imports of emerald (cut and uncut) by value increased by 107% to ₹1656.09 crore from ₹799.78 crore in the preceding year. Imports were mainly from Zambia (43%), Hong Kong (18%), UAE (14%) USA (8%), Singapore(4%) and Thailand (3%). Out of the total import value of emerald (cut & uncut), the share of imports value of emerald (cut) was (15%), while the share of imports value of emerald (uncut) was 85%. The imports value of emerald (cut) increased substantially by 88% to ₹255.32 crore in 2021-22 as compared to ₹135.78 crore in the preceding year. In terms of quantity, the imports of emerald (cut)

decreased by 68 % to 3,174 thousand carat in 2021-22 from 9,842 thousand carat in the preceding year. In terms of quantity, imports were mainly from Hong Kong (37%), USA (8%), UAE(7%), and Thailand (6%). However, the import value of emerald (uncut) increased by 111% to ₹1,400.78 crore in 2021-22 as compared to ₹664 crore in the preceding year. In terms of quantity, the imports of emerald (uncut) also increased by 18% to 58 tonnes in 2021-21 from 49 tonnes in the preceding year. In terms of quantity, imports were mainly from Zambia (53%) and Brazil (28%)(Tables-6 to 8).

**Table-3: Exports Value of Emerald  
(Cut & Uncut): Total  
(By Countries)**

Country	2020-21 (R)		2021-22 (P)	
	Qty **	Value (₹'000)	Qty **	Value (₹'000)
<b>All Countries</b>	**	<b>5316603</b>	**	<b>10808861</b>
USA	**	1293175	**	3306692
Hong Kong	**	2060857	**	2915677
Thailand	**	561998	**	1249771
France	**	77620	**	588629
Italy	**	314455	**	543945
UAE	**	241815	**	408946
Belgium	**	188189	**	361469
Switzerland	**	59761	**	312073
UK	**	90841	**	244424
Germany	**	44796	**	106956
Other countries	**	383096	**	770279

*Figures rounded off*

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

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**Table – 4: Exports of Emerald (Cut)  
(By Countries)**

Country	2020-21 (R)		2021-22 (P)	
	Qty ( <sup>'000</sup> 'carat)	Value (₹'000)	Qty ( <sup>'000</sup> 'carat)	Value (₹'000)
<b>All Countries</b>	<b>4076</b>	<b>5270862</b>	<b>5945</b>	<b>10596194</b>
USA	777	1289117	2337	3263404
Hong Kong	1130	2023042	1199	2903541
Thailand	542	561091	925	1239983
France	7	77580	18	588627
Italy	148	314455	221	543945
Belgium	17	186418	20	356026
Switzerland	2	59761	17	312073
UAE	39	241353	143	271409
UK	1107	90764	368	244314
Germany	34	44796	160	106851
Other countries	273	382485	537	766021

Figures rounded off

**Table – 5: Exports of Emerald (Uncut)  
(By Countries)**

Country	2020-21 (R)		2021-22 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>++</b>	<b>45741</b>	<b>++</b>	<b>212667</b>
UAE	++	462	++	137537
USA	++	4058	++	43288
Hong Kong	++	37815	++	12136
Thailand	++	907	++	9788
Belgium	++	1771	++	5443
China	++	397	++	2591
Australia	++	56	++	995
Japan	++	126	++	281
Singapore	--	--	++	172
Czech Republic	--	--	++	113
Other countries	++	149	++	323

Figures rounded off

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

Country	2020-21 (R)		2021-22 (P)	
	Qty ( <sup>'000</sup> 'carat)	Value (₹'000)	Qty ( <sup>'000</sup> 'carat)	Value (₹'000)
<b>All Countries</b>	<b>**</b>	<b>7997796</b>	<b>**</b>	<b>16560915</b>
Zambia	**	3180916	**	7131002
Hong Kong	**	1483680	**	3034626
UAE	**	1494356	**	2295634
USA	**	578980	**	1375688
Singapore	**	467434	**	592360
Thailand	**	175476	**	422600
Belgium	**	6081	**	346850
Brazil	**	192980	**	286784
France	**	20559	**	254971
Russia	**	134343	**	250676
Other countries	**	262991	**	569724

Figures rounded off

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

**Table – 7: Imports of Emerald (Cut)  
(By Countries)**

Country	2020-21 (R)		2021-22 (P)	
	Qty ( <sup>'000</sup> 'carat)	Value (₹'000)	Qty ( <sup>'000</sup> 'carat)	Value (₹'000)
<b>All Countries</b>	<b>9842</b>	<b>1357766</b>	<b>3174</b>	<b>2553209</b>
USA	214	394861	259	861348
Hong Kong	1001	524784	1159	476181
Thailand	98	120151	198	319781
France	++	20559	1	254971
Switzerland	++	27652	2	220884
UAE	325	8502	215	170643
Baharain Is	--	--	47	68055
Italy	1	30230	2	56114
UK	1	27194	3	48187
Singapore	1	15569	1	17164
Other countries	8201	188264	1287	59881

Figures rounded off

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**Table – 8: Imports of Emerald (Uncut)  
(By Countries)**

Country	2020-21 (R)		2021-22 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>49</b>	<b>6640030</b>	<b>58</b>	<b>14007706</b>
Zambia	35	3180916	31	7131002
Hong Kong	1	958896	1	2558445
U Arab Emts	1	1485854	1	2124991
Singapore	1	451865	++	575196
USA	++	184119	++	514340
Belgium	++	584	++	330619
Brazil	6	189902	16	286746
Russia	2	111853	1	250676
Thailand	++	55325	1	102819
Ethiopia	++	760	1	86982
Other countries	3	19956	6	45890

*Figures rounded off*

## FUTURE OUTLOOK

Gems and Jewellery Export Sector has been contributing about 10%-12% to India's total merchandise exports accounting for the third largest commodity share. As per industry estimates, the sector employs more than 4.64 million employees. The Government of India, along with all the stakeholders of gems and jewellery sector, is well committed towards exports identifying challenges and addressing them with necessary interventions, assisting exporters, especially SME units, and exploring new markets while consolidating existing ones. 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.