



Stylised version of the mythic Tena and Fura cliffs, the symbolic guardians of the emerald region in western Boyacá. As legend has it, Fura's tears turned into emeralds deep inside the mountain. (Original image is courtesy of Dawn Jehle, adornate.co.uk). Tear-shaped emerald drops by Lalta NYC. (Photo: Lalta NYC). Evoking the region's famed blue Morpho butterflies, this bejewelled brooch, with antennae *en tremblant*, is made in titanium, sapphires and diamonds, by Ioannis Alexandris. (Photo: Ioannis Alexandris)

The Greening of Colombia's Emerald Mines

It is no secret that emeralds from Colombia are considered to be the finest and most coveted in the world, but it is also no secret that, in the past, the nation's industry was plagued by violence and rivalries. Happily, these problems are now but a distant memory and today the sector is thriving. And, the emeralds produced in Colombia are "greener" than ever.

By Cynthia Unninayar

The Colombian government has joined with the emerald industry to improve the sector and ensure best practices, including sustainability, transparency and corporate social responsibility (CSR), all while helping meet the needs of small-scale miners. It also encourages foreign investors who bring state-of-the-art technology and financing for large-scale gemstone mining in the region, and who can help improve community life in the mining areas.

This article takes a look at three different types of mining operations in Colombia at different stages in their “green” evolution.

Geologically Speaking

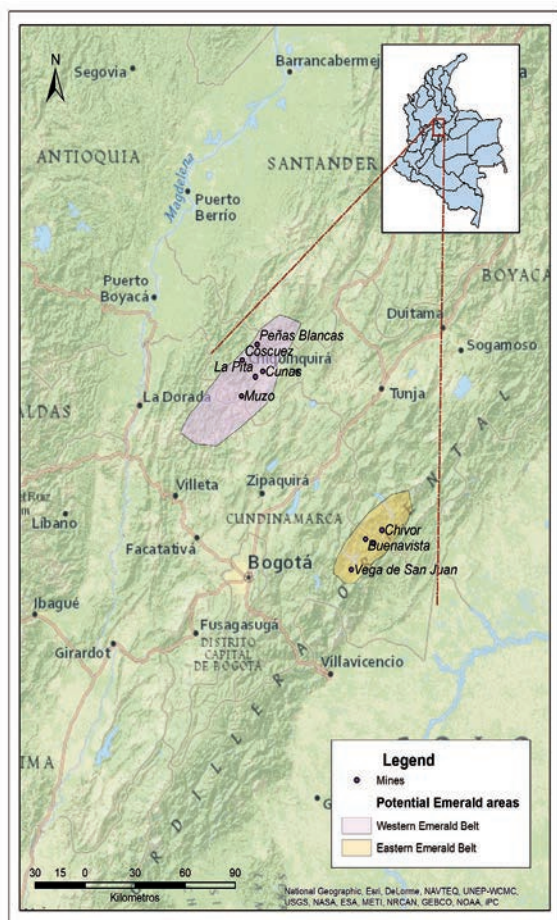
Colombia’s emerald deposits are found in the Department of Boyacá,

located in the Andean region in the Cordillera Oriental mountain range in central Colombia. The emeralds are distributed along both borders (eastern and western) of the Eastern Cordillera sedimentary basin, and the gems from the two areas exhibit different types of mineralisation due to their formation during different periods in geological history.

Emeralds in the eastern side were created around 65 million years ago, while deposits in the western basin are younger, with ages around 38 to 32 million years ago.

The western side includes the world-famous mining districts of Muzo, Coscuez, La Pita, Cunas and Peñas Blancas, among others.

The eastern side includes the older deposits of Chivor, Gachalá and Macanal. Found in heavily faulted and folded sedimentary layers



Map of the emerald mining areas in Colombia. (Image: USGS)



Entrance to Fura Gems' Coscuez mining camp.



One side of the Coscuez Mine, opposite to the main “La Paz” entrance. The black shale rocks indicate the sites of previous tunnels and explorations.



The main La Paz entrance to the Coscuez Mine. Note the traditional altar above the entrance for the safety of the miners.

of mostly black shale, the green gems crystallise in a hexagonal pattern and owe their colour to the presence of chromium and vanadium.

Legends & Lore

Many gemstones come steeped in legends and lore, and Colombian emeralds are no exception. One of these legends reveals the tale of “Fura” and “Tena,” two humans who were created by the god “Are” to populate the Earth. Are specified that the couple had to remain faithful to each other in order to retain eternal youth. Alas, Fura disobeyed and their immortality was taken away. When they eventually died, Are took pity on them and turned them into two cliffs protected from storms and serpents. Inside their great depths, realising what she had done, Fura wept, and her remorseful tears turned into beautiful emeralds.

Today, the Fura and Tena cliffs are the symbolic guardians of Colombia’s emerald zone, and rise 840 metres and 500 metres, respectively, above the Rio Minero valley. They are not far from the famous Muzo and Coscuez mines.

The Iconic Coscuez Mine

Starting our mine visit from Bogotá, where even before dawn had cracked over Colombia’s capital city, I joined five other intrepid adventurers who set out on the five-hour trip to visit the iconic Coscuez Mine. The first couple of hours were on highways, but when we entered the mining region in the Boyacá State, travel slowed to a snail’s pace. Although our drivers skilfully manoeuvred the 4x4s, they still jostled over the narrow bumpy dirt roads that zigzagged through the incredibly lush jungle. As we travelled through the luxurious



During its bulk-sampling phase, Fura Gems found this remarkable 25.97-ct rough emerald in terms of size, colour, saturation and transparency. It named the gem “Are Emerald” in honour of the ancient legend. (Photo: Fura Gems)



Dev Shetty, CEO of Fura Gems, talks to our group about the company’s plans for Coscuez. (Photo: ©Hirsh London/Alex Garcia)

rainforest, it was like a scene out of the movie *Avatar*.

Coscuez is one of Colombia’s most iconic mines and has produced some of the world’s finest emeralds since its discovery in 1646. Over the centuries, it was mined in the traditional manner with no investment in geology, technology or infrastructure. The main tunnel ran along a slope from 896 metres at the main La Paz entrance up to 1251 metres at its Sabore opening. About 80% of the secondary tunnels in Coscuez

have been closed or are inaccessible because of very high inside temperatures and other unsafe conditions.

In January 2018, the newly created company, Fura Gems—named after the famous cliff—purchased 76% of Esmeracol, the previous owner of the Coscuez mine and holder of the Coscuez mining licence that covers 0.47 square kilometres. Under the leadership of CEO Dev Shetty, Fura approached its new acquisition scientifically by making geological



On the way to the Green Power Mine, a small new mine, we arrived at the Rio Minero where men and women “guaqueros” were searching for emeralds that may have washed into the river.



One of the “guaqueros” shows the only emerald find of the morning, demonstrating how difficult it has become to earn a living at this type of “mining”.



Maria Angelica Castilla, head of sustainability at the Coscuez Mine (right) shows us the sewing centre, one of Fura Gems' CSR projects for the local community.



Among the modernisation efforts at Coscuez is the introduction of a diamond-drilling programme. (Photo: Fura Gems)

friendly, sustainability-driven and community-centred.”

“In the 10 months since our acquisition of the Coscuez Mine, we have hired 270 local miners and have committed to working with 70 local suppliers,” added Rosey Perkins, manager of new projects and corporate communication. Among its community-oriented non-mine activities is support for a health clinic, bakery, sewing centre and English lessons. And, because removing the large amounts of mine waste in an environmentally friendly manner is important, Fura created a special washing plant that is run by women. “We have received more than 95% positive feedback from the local population about our activities,” said Maria Angelica Castilla, head of sustainability, adding that Fura’s all-inclusive approach relies upon good communication with the local people and aligns with other emerald producers in the region that are also raising operational standards and prioritising community development.

The Fura team clearly wants to restore Coscuez to its former glory, while being a “green” operation and a real partner with the community.

Searching for Green

The next morning, up again at the crack of dawn, we headed to the Green Power Mine in the Muzo district. As the crow flies, the distances are not that great, but over the narrow mountainous roads, it took several hours. We drove first to the town of Muzo,

surveys and mapping existing tunnels, while modernising techniques. In March 2018, it began a bulk sampling stage, digging 25 kilometres of tunnels through 10,000 tonnes of rock. Two months later, it discovered an exceptional 25.97-carat gem that it dubbed the “Are Emerald”, after the mythological god in the Fura and Tena legend.

Scientific understanding and technical innovation are only part of Fura Gems’ approach. The company has also made major changes in the way the mine interacts with the local community. “We aim to set a new precedent for best practices in the gemstone industry,” explained Shetty, “by transforming current standards into the premier example of an enterprise that is employee-

In March 2018, Fura began a bulk sampling stage, digging 25 kilometres of tunnels through 10,000 tonnes of rock. Two months later, it discovered an exceptional 25.97-carat gem that it dubbed the ‘Are Emerald’, after the mythological god in the Fura and Tena legend.



After leaving Coscuez, our group stopped in the town of Muzo, where we were shown a variety of emeralds in many forms. Here is a sample of emerald in matrix for sale for about \$400.



The Cunás Mine, owned by Esmeraldas Santa Rosa, is one of the region's largest and most productive mines.



With industrial mining now largely underground as required—instead of previous examples of razing entire mountains—the amount of emeralds in the river has declined dramatically, thus affecting the livelihoods of “guaqueros”.

where we met Julio Lopez, manager and part owner of the Green Power Mine, who transferred us to his drivers and vehicles for the rest of the journey. Before long, we came to the banks of the Rio Minero, the main river flowing through the area. Here, dozens of “guaqueros” (independent surface miners) were looking for emeralds that may have washed into the river from the mountains or from mining operations. Lopez explained that, with industrial mining now largely underground as required—instead of previous examples of razing entire mountains—the amount of emeralds in the river has declined dramatically, thus affecting the livelihoods of these “guaqueros”.

As we climbed further into the mountains, we caught a glimpse of the distant Green Power mining camp and the mine entrance a

few hundred metres below the buildings.

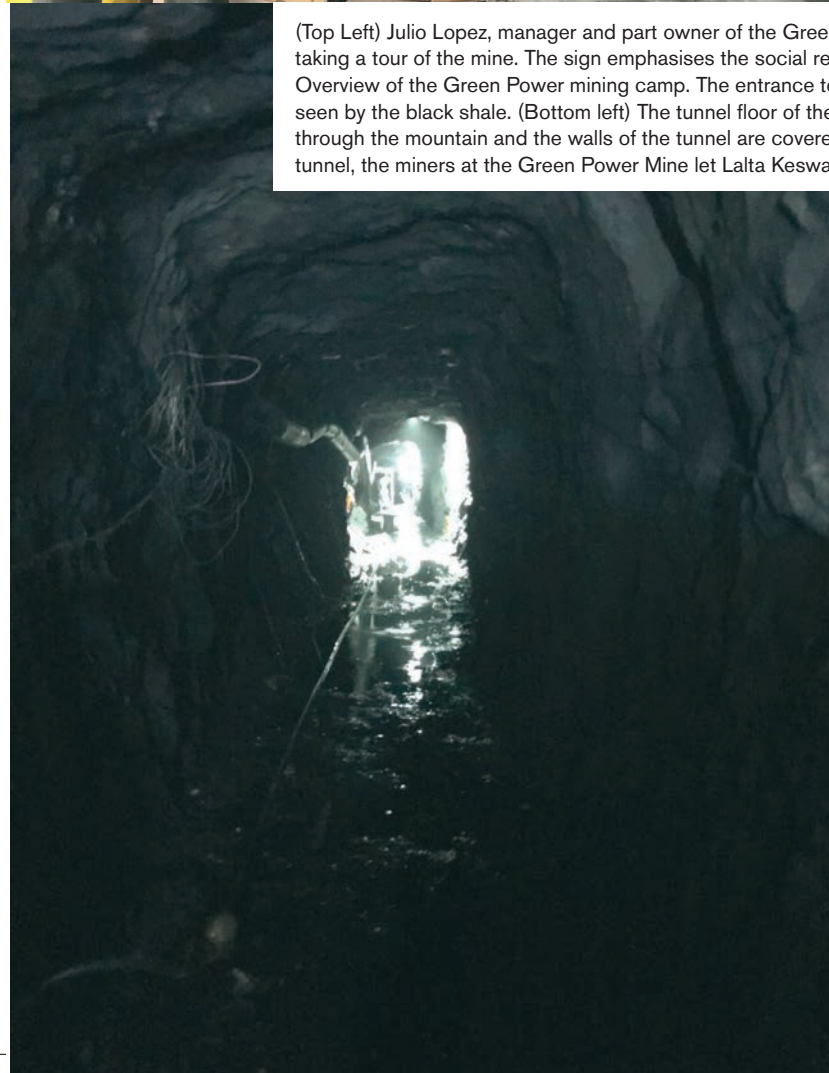
A new mine, Green Power was established by a group of individuals who came together to invest and explore for emeralds in this part of the Muzo district. They based their decision on geological surveys, which indicated good potential for the green gems in the area. The first two years were spent building the installations and tunnels, and the mine became operational about 18 months ago. So far, the miners have tunnelled more than 220 metres into the mountain, but have not yet found the green gems. Geological reports indicate that emeralds should occur in pockets at around 250 metres inside the mountain. A small-scale mine, it has nine employees who work from 7:00 am to 12:00 pm and from 1:00 pm to 5:00 pm. They are all housed at the mine in a dormitory-style setting,



Entrance to the single tunnel of the Green Power Mine.



(Top Left) Julio Lopez, manager and part owner of the Green Power Mine, invited us to lunch with the miners before taking a tour of the mine. The sign emphasises the social responsibility that the mine has undertaken. (Top Right) Overview of the Green Power mining camp. The entrance to the mine is a few hundred metres below the blue buildings, seen by the black shale. (Bottom left) The tunnel floor of the Green Power Mine is covered with rain that has seeped through the mountain and the walls of the tunnel are covered in wet black shale powder. (Bottom right) At the end of the tunnel, the miners at the Green Power Mine let Lalta Keswani try her hand at using the 20-kg jackhammer.





Miners and their ore carts on one of the lower levels. It is very strenuous work, and Cunasa gives them 10 days off for every 20 days they work. (Photo: Lalita Keswani)



After a long staircase, we reached the main 800-metre horizontal tunnel in the Cunasa mine. Notice the water on the ground and the electrical and ventilation tubes along the wall. Water is continuously pumped out of the tunnels.



In nearly all the mines in the area, water is a continuous and often serious problem because the rains drain through the mountains and accumulate in the tunnels. This also makes the black shale walls wet and powdery.

are provided meals and taken into town on their days off.

After lunch with the miners, our small group walked downhill to the mine's entrance where we put on our headlamps before stepping into the narrow tunnel. We sloshed through several centimetres of water that covered the ground. In nearly all the mines in the area, water is a continuous and often serious problem because the rains drain through the mountains and accumulate in the tunnels. This also makes the black shale walls wet and powdery. Merely touching them left thick black powder on our gloves. At the tunnel's end, we met the miners who were using jackhammers and explosives to continue lengthening the tunnel

in their quest for the green gems. A few members of our group tried their hand at manoeuvring—with difficulty—the very heavy jackhammers to blast into the tunnel wall. As our group left, I asked Julio Lopez to let me know when they strike emeralds, which should be soon, he noted.

Revisiting Cunasa

Our final destination on this mine visit was the high-producing Cunasa Mine, owned by Esmeraldas Santa Rosa. This was my second trip to Cunasa, having visited it in 2015 after the First World Emerald Symposium. Employing about 140 workers, Cunasa is one of the largest industrialised mines in the

area. At any one time, there are 70 miners who work shifts from 6:00 am to 2:00 pm or from 2:00 pm to 10:00 pm. There is also a small staff that manages life at the camp, including the meals and accommodation.

Because safety is a priority, a security team spends the night, after the last shift, walking through the tunnels, inspecting them for water and oxygen levels. Water is a serious issue at Cunas, and pumps continually remove water from the tunnels. Each miner also must carry a portable compressed air tank, which provides air for 40 to 90 minutes in case of emergency. The employees all work 20 days

continuously, and then have 10 days off.

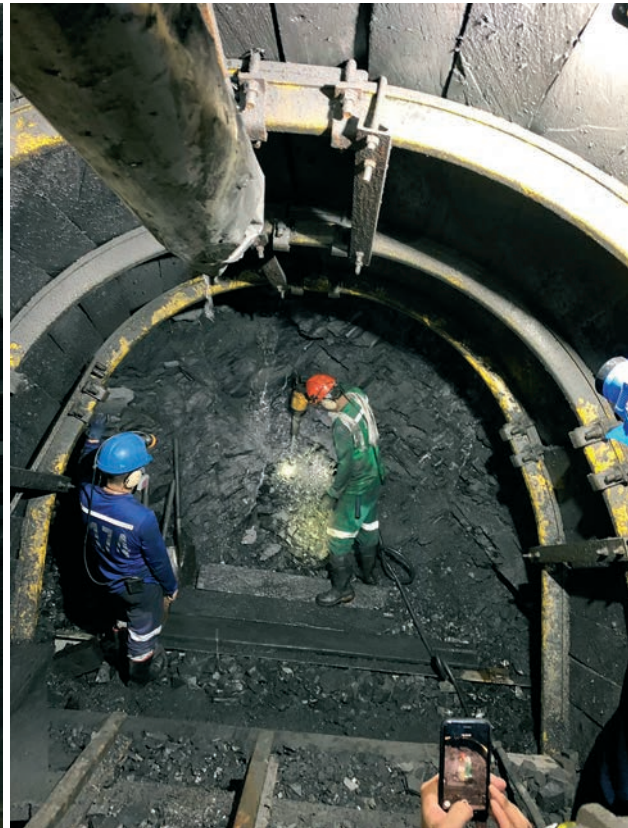
We spoke with two young women, both single mothers, who work at the mine's small snack shop for 20 straight days and then return home for 10 days to see their children, often cared for by a grandmother or other relative. While certainly not an ideal situation for these young ladies, they both declared that they were lucky to have the employment. Clearly, life in the mining areas is not easy, due to the remoteness of the emerald deposits, yet the large mines like Cunas and Coscuez provide gainful employment to the local communities where little existed before.



Because safety is a priority, a security team spends the night, after the last shift, walking through the tunnels, inspecting them for water and oxygen levels.



A central "lift" takes the miners and the ore carts down a shaft to different levels. (Photo: Ioannis Alexandris)



Miners at the active face in search of emerald deposits. (Photo: Ioannis Alexandris)



Hard hats and oxygen masks are standard equipment for the miners at the Cunas Mine.



When literally stranded in the jungle during a severe storm that caused a landslide blocking the road leading out of the area, the manager of the Cunas Mine welcomed our group back to the camp to spend the night. The next morning, his crew cleared the road so we could continue back to Bogotá.

To enter the main tunnel at Cunas, we descend a long staircase, which ends in an 800-metre horizontal tunnel covered with several inches of water. Ventilation tubes run the entire length and pumps keep the water from flooding the tunnel. At the end, a large circular shaft houses a “lift” that takes miners and ore carts up and down to other levels. At the active face, miners carefully chisel out the emeralds from the tunnel walls. The precious gems are then placed in a pouch and taken to the surface.

Like other mines in the area, Esmeraldas Santa Rosa takes corporate social responsibility seriously. Its social management plan is developed in three thematic areas: helping young people to continue studies in higher education; building lasting relationships with suppliers and distributors based on shared values; and creating alliances with local populations for sustainable social development.

Sense of Camaraderie

As we prepared to leave the Cunas camp in the late afternoon, the skies

darkened and a storm approached. Rain began to fall in sheets. Nonetheless, wanting to keep to our schedule, we started off. Alas, hardly a few kilometres later, we could go no farther. The powerful rains had caused a landslide and the narrow road leading out of the area was blocked. Water fell over the side of the mountain like a waterfall. We had no choice but to return to the camp.

In a show of solidarity and kindness, the manager of the camp, Bryan Martinez, arranged to give us dinner, and then shuffled people around in the miners’ quarters so that we could have a bed for the night. He told us that they would clear the road in the morning after the storm had passed. We were all touched by the camaraderie, support and good wishes of everyone at the camp.

After breakfast we continued our journey back to Bogotá, thankful to the camp personnel who had been so welcoming at Cunas as well as at the Green Power and Coscuez Mines, where emeralds are indeed “green” in so many ways. ■

(Photos are courtesy of Cynthia Unninayar, unless otherwise specified.)