



# Minerals in Afghanistan

## Gemstones of Afghanistan

Afghanistan and gemstones have been inextricably linked for 6500 years and the country remains rich in precious and semi-precious gemstone deposits (Figure 1). Lapis lazuli, mined in the Hindu Kush since the Neolithic Period, was transported along the ancient trade routes to Mesopotamia, Ur, Egypt and India. Precious gems including emeralds, ruby and sapphires (Figure 2) are mined in Afghanistan, and semi-precious lapis lazuli, tourmaline, aquamarine, kunzite, topaz, garnets, fluorite and varieties of quartz are also worked. Afghanistan is also a source of good quality mineral specimens sought by collectors.

Gemstone mining in Afghanistan is typically an artisanal activity, carried out by people living in villages surrounding the mines. Tunnels are excavated and gems are extracted by hand using drills, dynamite and often high explosives recycled from ordnance. These techniques lead to much waste and damage to gems, and result in low yield.

Most of the gemstones mined in Afghanistan leave the country illicitly, 90–95 % of them going to Peshawar in Pakistan where they are sorted for quality.

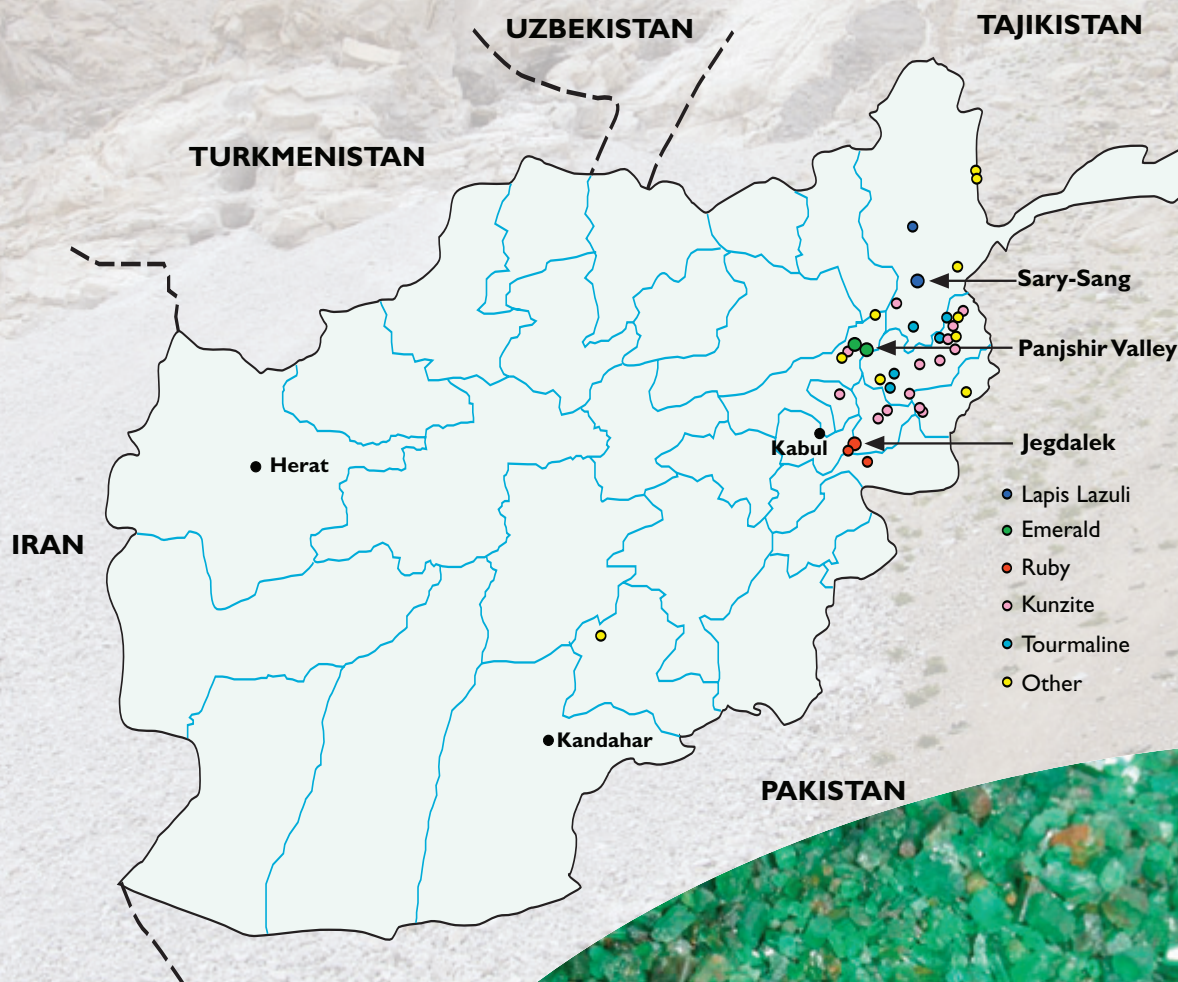


Figure 1. Location of major gemstone deposits in Afghanistan.





Figure 2. Sapphires from Afghanistan. Inset: tourmalines from Afghanistan.

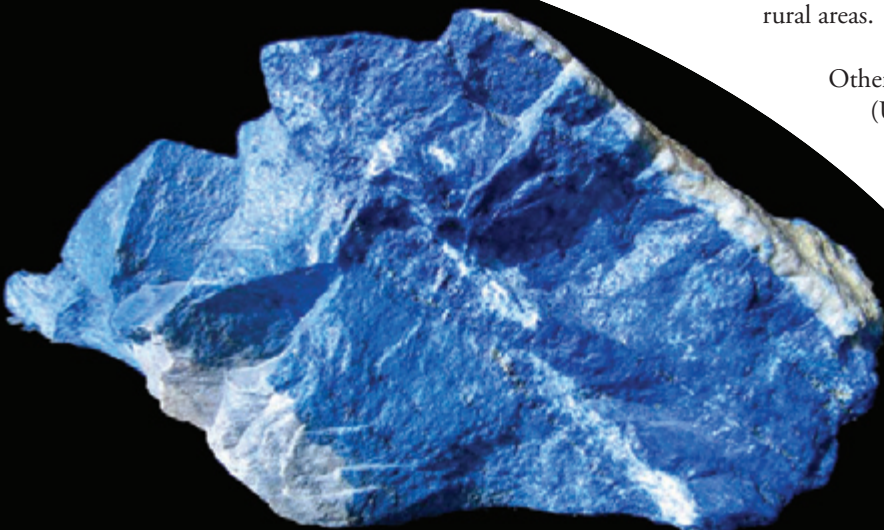
The low-value stones are cut for the domestic Pakistan market and the medium- and high-quality stones are sent around the world for accurate cutting for the western markets. This pattern of trade ensures that Afghanistan gains little value from its gemstones, and makes the value of the annual production difficult to estimate. The World Bank has valued it as US \$ 2.75 million (*Mining as a source of growth, March 2004*), and other estimates suggest a much higher figure (UNDP, 2005). It has been suggested that the potential annual value is US \$160 million

(UNDP, 2005) and this could be realised if better techniques were instituted at the mines and if all known deposits were worked.

Recent government initiatives are addressing the economic issues associated with gemstone production. A new Mining Law has been passed and regulations are being developed to provide the framework for more formal exploration and mining. Implementation of these will enable the gem trade to be legalised and this will encourage greater investment in the mines, which in turn will lead to better work practices, greater yields and less waste. The Government of Afghanistan is starting to formalise the industry by asserting its control in rural areas.

Other developments that have been highlighted (UNDP, 2005) are capacity building and education in cutting, polishing, gemmology, and the creation of quality standards and targeted marketing campaigns in order to increase the value of Afghan gemstones before they are exported.

The world trade in uncut coloured gemstones is estimated to be US \$320 m. (International Trade Centre based on COMTRADE



statistics quoted in UNDP, 2005). Afghanistan has a great opportunity to increase its share of this market, particularly because of the proximity to India, the world's largest coloured gemstones import market, and also because there is an increasing demand for higher quality gems in North America, Europe, East Asia and the Middle East.

### Gem resources in Afghanistan

There are four main gemstone producing areas: the Panjshir Valley producing emeralds, the Jegdalek area producing rubies and a range of fancy coloured and blue sapphires, Badakhshan producing the world-famous and most recognised of Afghan gems, lapis lazuli, and Nuristan producing a wide range of semi-precious gems such as tourmaline, kunzite, aquamarine, spodumene and beryl.

### Emeralds

Emeralds, a saturated green and most precious form of beryl, are found in the Panjshir Valley (known as the 'Five Lions Valley') in Parwan Province. The deposit is thought to have been discovered in the early 1970s by a young shepherd. However, this may be the deposit referred to in Pliny's 'Natural History', written in the first century AD, as smaragdus (green stones) from Bactria.

Rocks bearing emeralds occur in the Panjshir Valley at elevations of 3000–4000 m in an area 16 km long by 3 km wide. They are found in quartz-ankerite veins cutting altered gabbro. The emeralds are a rich green colour and occur in crystals up to 100 carats in weight whose clarity often rivals the more famous Columbian emeralds. Gem quality crystals are up to 10 mm to 15 mm long, 2–3 mm thick, and very rarely up to 50 mm long and 2 mm wide. Estimates of current production are speculative, but before the civil war production was said to be in the US \$ 8–10 million range (UNDP 2005).

### Ruby

Ruby, known as the 'King of Precious Stones', is a precious gemstone form of corundum. Rubies are mined at Jegdalek-Gandamak in Kabul Province (Figures 3 and 5) where they occur in a Proterozoic calcite-dolomite marble bed



Figure 3. Ruby mine, Jegdalek region.

500 to 2000 m thick within a regionally metamorphosed marble cut by Oligocene granitic intrusions. The Jegdalek mines were worked in 1637 for marble used to build the Taj Mahal, but it is uncertain whether they were mined for rubies at that time. The Jegdalek rubies range from nearly colourless to deep red and purplish red, and display strong fluorescence in ultraviolet radiation. True rubies form 15 % of the production at Jegdalek, along with pink sapphires (75 %) and blue sapphire (5 %), the remaining 5 % consists of mixed blue and red-to-pink corundum (Bowersox, 1990). Clean faceting quality rubies are rare, but those that are found are of excellent quality and are said to match those from the very best source of rubies in the world.



Figure 4. This 32.32 carat ruby pendant is featured in the 'Gems and Gemology' Quarterly Journal ('Ruby and Sapphires from Jegdalek Afghanistan' — Summer 2000, p.111). The ruby is from Jegdalek, Afghanistan. © Gary Bowersox



Figure 5. Ruby in marble, Jegdalek. Inset: Ruby rough from the mine.

### Lapis lazuli

Lapis lazuli from Badakhshan in the north of the country is still regarded as the world's premier source in terms of quantity and quality. Its name is derived from the Latin 'lapis', meaning 'stone' and the Persian 'lazzward' meaning 'blue'. It is used to make beads, boxes and other decorative articles, is often carved into figurines and is popular for men's jewellery.

Lapis lazuli rock is composed of the feldspathoid minerals lazurite, hauyne, nosean and sodalite, with other minerals including calcite and pyrite and lesser amounts of diopside, amphibole, feldspar, mica and other silicates.

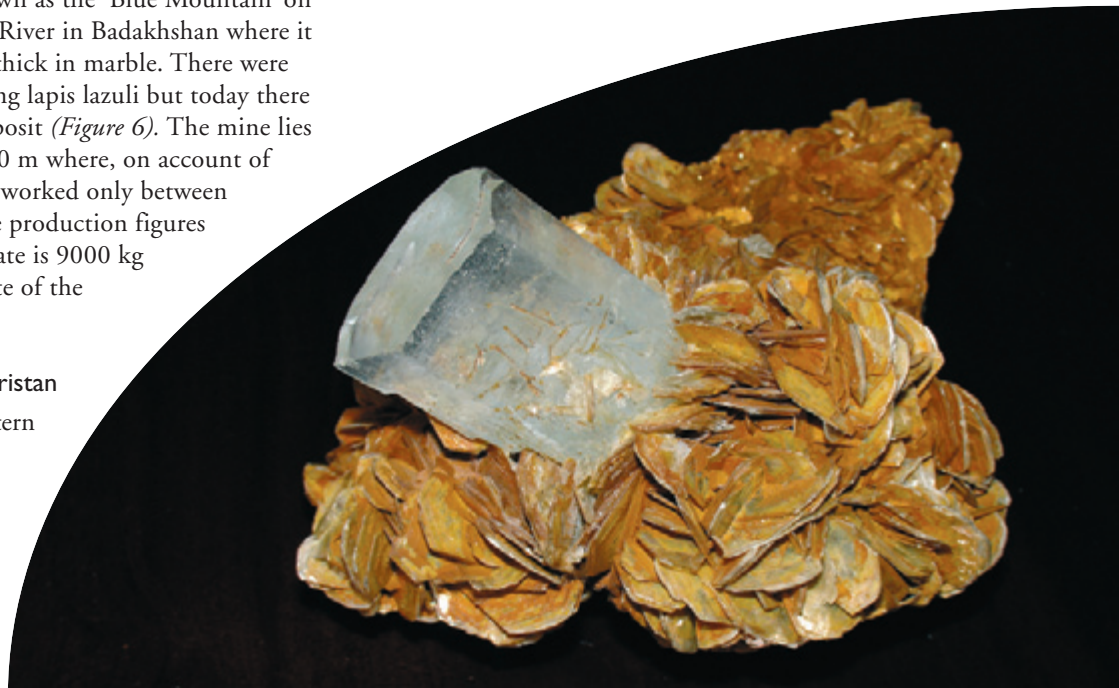
Lapis is mined in an area known as the 'Blue Mountain' on the right bank of the Kokcha River in Badakhshan where it occurs as skarn lenses 1–4 m thick in marble. There were formerly seven mines extracting lapis lazuli but today there is only one, the Sary-Sang deposit (Figure 6). The mine lies at an elevation of around 3500 m where, on account of low winter temperatures, it is worked only between June and September. Accurate production figures are not available but an estimate is 9000 kg per year. A speculative estimate of the reserves is 1300 tonnes.

### Semi-precious gems from Nuristan

Nuristan is a region on the eastern side of Afghanistan bordering Pakistan and with high mountains incised by numerous steep-sided valleys. The region is

notable for pegmatites, a late-stage crystallisation from molten rock, comprising one of the largest pegmatite fields in the world which hosts a wide variety of minerals and gems commonly of exceptional size and quality.

Gem-quality tourmalines up to 150 mm long and 40 mm wide occur in a wide range of colours. Pink is common though pale blue, indigo blue (indicolite), green, and emerald green are found. In addition, rare bi-coloured stones of green-pink and blue-green are much sought after. The crystals are beautifully formed, elongate with a distinctive 'rounded triangular' cross-section.



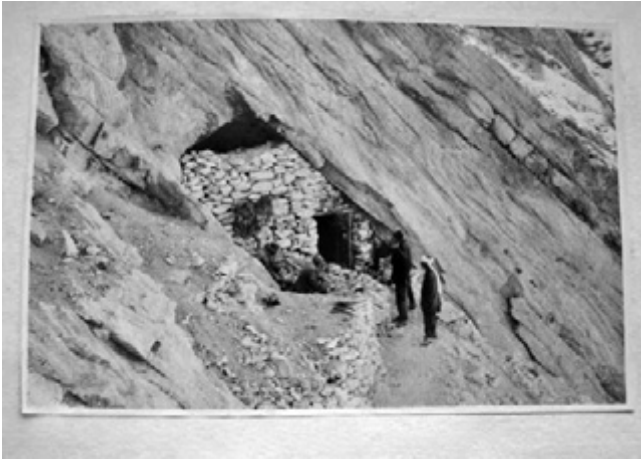


Figure 6. Old photograph of the lapis lazuli mine at Sary-Sang, Badakhshan.

Afghanistan is a major world supplier of spodumene, especially the well-known pink variety kunzite. Along with other varieties of spodumene, kunzite locally occurs in crystals of great size. These are prismatic and stout, and specimens one metre in length have been found, though generally they range from 30 to 400 mm. Spodumene is found in a number of colour varieties including pink, violet, green (hiddenite), blue, colourless and yellowish-green. Well-cut and high clarity stones with more saturated colours command the best prices and are highly sought after.

Aquamarine, a name derived from the Latin for 'sea water', is a light blue-greenish variety of beryl that has been mined near the village of Konar in Nuristan since the mid 1980s. Mined from a pegmatite, it occurs in crystals up to 75 mm long, which are often of very clear gem quality. Much larger non-gem quality crystals can be found also. A rarer pale pink to deep rose variety of beryl called morganite has been mined in small quantities at Mawi in Nuristan.

#### Other gem and mineral occurrences

Blue sapphire has recently been reported from Wardak Province west of Kabul. Cut stones over two carats are known though not in any great quantity.

A range of garnets is known to occur. For example spessartite garnet is known at Pachighram in Nangahar province, and dark red almandines also from Pachighram are widespread in Proterozoic schists. In 2002, dealers reported spessartites from mines in pegmatite at Darre Pech in Kunar where they are extracted along with kunzite. They are yellow-orange in colour and stones up to 1.68 carats in weight are reported. Another variety from the same locality is orange-red to dark red almandine-spessartites up to 1.28 carats in weight.

Since 2002 Afghanistan has become a significant source of gem-quality hessonite (grossular garnet) from Munjagal in Kunar Province and Kantiwow in Nuristan Province. The hessonite varies from yellowish orange to red-orange, and the combined production from these localities is 7000 kg/year.

Kandahar fluorite (Figure 7) is a well-known collector's gemstone that comes in a range of colours. Particularly attractive and sought after are the blue and sea-green varieties.

The mineral specimen market is significant as good quality mineral specimens can attract large prices. Many specimens from Afghanistan can be found at gem and mineral shows and for sale on the Internet.

#### Summary

Afghanistan is a country very rich in gemstones but at the bottom of the value chain. With improvements in national security, recent changes to the legal framework for mining and the Afghan Government's strategy for legitimising the mining sector, the prospects for investment and improved yields are very good. With the new development of value added cutting and polishing centres, and Kabul gradually emerging as a centre for gem trade, Afghanistan now has the potential to develop further a major internationally recognised gemstone industry.

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Figure 7. Fluorite from Kandahar.

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*Figure 8. A 375 carat Afghan aquamarine named 'Sea Spray', sculptured by Bart Curren. Valued at \$52,300.*

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