**Spotlight on Botswana**

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Botswana is the world’s largest producer of diamonds by value. This remarkable feat has been accomplished in little over three decades with four well-developed kimberlite mines now in operation. Although there has been limited success in the discovery of significantly diamondiferous kimberlites since the early 70’s, diamond exploration in Botswana is intense and there is heightened interest by foreign investors in downstream processing.

The economic success story of sub-Saharan Africa is that of Botswana. It has had the highest average economic growth worldwide averaging 8 percent over the past thirty years. Starting off as one of the poorest countries in the world at independence in 1966, the GDP per capita for its 1.3 million inhabitants has grown to US$8,800 in 2003, the highest in Africa. Growth has largely been attributed to the diamond production of Botswana which currently represents one third of GDP and provides 85% of export earnings.

The De Beers Botswana Mining Company was formed in June 1969 as a joint venture between De Beers (85%) and the Botswana Government (15%). By the time Lethakane Mine was opened in 1975, the Government of Botswana had increased its shareholding in the company from 15 to 50 percent. In 1991, the company changed its name to Debswana Diamond Company (Pty) Ltd.

The Botswana Diamond Valuing Company (BDVC) sorts and values Debswana’s entire production from the Jwaneng, Orapa, Lethakane and Damtshaa mines, and associated diamond deposits. The company is the second largest rough diamond sorting and valuing operation in the world, after the Diamond Trading Company (DTC) in London. Botswana Diamond Valuing Company (BDVC) was established in 1972 as a joint venture between De Beers and Botswana Development Corporation to perform the preliminary sorting of diamonds from Orapa Mine, which was the only operational mine at the time. It was not until 1977 that BDVC became a wholly owned subsidiary of Debswana. The BDVC has undergone a major localisation programme and today expatriates represent less than 2% of the staff.

**Production Mines** : Jwaneng, which would become the richest diamond mine in the world, was officially opened in August 1982. The trilobate Jwaneng pipe was discovered late in 1972 in the Naledi River Valley (‘Valley of the Stars’), southern Botswana. The mine became operational in 1982, ten years after its discovery. In 2003, the mine produced 12.8 million...
carats from a blend of all three pipes, as well as some stockpiled material. This rate of recovery, combined with the high quality of the diamonds and the high grade (1.25 cpt) makes Jwaneng the richest diamond mine in the world, by value. The life of the mine is 27 years as an open pit at current production levels of 9 – 10 million tonnes per annum.

Orapa is situated 240 km west of Francistown and is a massive conventional open pit mine, with a kimberlite that had an original surface area of 113 ha. The mine began production in July 1971 and is the oldest operation run by Debswana. Orapa’s production continues to increase over the years: 16 million carats were recovered in 2003 at an average grade of 1 carat per tonne. The production was 8% higher than that budgeted due to the high recovery efficiencies of both (No.1 and No.2) plants as well as of the Completely Automated Recovery Plant (CARP).

Lethakane, which was first discovered during the sampling and evaluation process at Orapa, became Debswana’s second mine when it opened in 1975. The diamonds from the mine have the highest average quality in Botswana. Two kimberlites, DK1 and DK2 are being mined from the same pit, delivering just over 1 million carats in 2003. The expected life of mine as an open pit operation is 11 years at an average grade of 28 cpht.

Damtshaa, the fourth Debswana mine, commenced production in October 2002. The mine is located some 25 km east of Orapa, from where it and Lethakane are administered. Four kimberlite pipes (B/K1, B/K9, B/K12 and B/K 15) form the Damtshaa mine. Full production was achieved five months after the first headfeed load. In 2003, just under 300,000 carats were produced at a Debswana valuation price of near US$70/carat. The production rate for Damtshaa Mine has been irregular due to the varying grades of the different rock types in the pits. Damtshaa has been forecast to yield 5 million carats from 40 million tons of ore mined over the 31 year projected life of mine.

Processing: Improvements in mining, processing and recovery techniques have recently resulted in significant increases in Botswana’s annual diamond production. The concentrate from Orapa, Lethakane and Damtshaa is transferred to the multi-storey Completely Automated Recovery Plant (CARP) at Orapa, whereas the concentrate from Jwaneng is processed at a similar facility on site. The Jwaneng CARP is part of the Aquarium project, which reached full capacity during 2003.
and added the Fully Integrated Sort House (FISH) to handle the diamonds recovered by both CARPs. The Aquarium project was De Beers’ first fully hands-off recovery and sorting facility, utilising X-ray and laser technology.

**Geology:** Botswana is characterised by a number of domains that have been shown to be diamondiferous. The underlying geology comprises the northern part of the Kaapvaal Craton, the western part of the Zimbabwe Craton, the southeastern part of the Angola Craton and the eastern part of the Limpopo Mobile Belt make up the underlying geology of the country. All four of these geological environments are well recognised as diamond producing cratonic and intra-cratic domains. The oldest rocks in Botswana dated so far are granites from the Kaapvaal Craton in western Botswana dated at 2930 Ma. To date kimberlites within the Kaapvaal (Jwaneng), Limpopo Mobile Belt (Martin’s Drift) and Zimbabwe Craton (Orapa, Lethakane and Damtshaa) have been mined for diamonds.

**Exploration:** The diamond exploration activities in Botswana have heated up significantly since 2000. New technology in the form of airborne gravity has increased the ability to observe kimberlite targets through the almost ubiquitous cover of the Kalahari Formation sediments. Low level, high density aeromagnetic surveys have increased the ability of some companies to detect kimberlites in areas previously explored. A re-assessment of the physical properties of the mantle and experience from kimberlite discoveries in adjacent countries has also initiated new exploration programmes. Some exploration activities are centred around the re-evaluation of kimberlites previously discovered by De Beers in the Orapa and Martin’s Drift areas.

The sand cover and extensive indicator mineral dispersion over Botswana remain enormously challenging to exploration activities. *Kalahari Diamonds* is conducting diamond exploration in the extensive sand covered cratonic areas of Botswana utilizing BHP Billiton’s airborne *Falcon* gravity gradiometer system.

![The Jwaneng mine incorporates two pipes and is the world’s richest mine. The mine should remain in production till 2030. PHOTOGRAPH: De Beers Group](image)
Kukama Mining and Exploration was formed in 1999 by Mark Scowcroft and Leon Daniels to re-evaluate kimberlites discovered by De Beers in the Orapa area and to look for alluvial deposits expected to have eroded from the Orapa kimberlite field during the Miocene. Kukama was subsequently vended into African Diamonds. Drilling programmes conducted during the past fifteen months have identified palaeo-river channels buried under the Kalahari Formation in the vicinity predicted for the ‘missing’ Orapa alluvials. Drilling results from a selected number of kimberlites in the Orapa field have produced diamonds. These projects have now been joint ventured with De Beers.

De Beers has refocused on the Orapa and Jwaneng area utilizing low-level high-density aeromagnetic surveys. It has been rumoured that they have been successful in discovering additional kimberlites in the Jwaneng area and have been successful in discovering additional kimberlites in the Orapa area.

A 1000 sq km area of the under-explored license north of the Orapa mine is currently being surveyed using the airborne Bell Geospace system. Twenty nine known kimberlites on the joint venture licenses are being explored with detailed ground geophysics, which so far indicate that some of the kimberlites may be larger than previously believed.

DiamonEx Limited is currently re-evaluating the five Martin’s Drift kimberlites which were trial mined by De Beers until 1999. DiamonEx believes that this project can be made financially profitable using a combination of new information on the vertical extent of the kimberlites, additional grade and diamond-value information, and by implementing strict security procedures. The company believes these mines failed under their original stewardship because of theft, plant inefficiencies and inaccurate geological assumptions.

In the northwest of the country Tsodilo Resources from Canada has had some success in kimberlite discoveries in 2003 with the identification of the A12 and A37 kimberlites. Drilling results, coupled with gravity data indicate a major body of crater sediments covering an overall area of at least 80 to 100 hectares and A37 could be the second or third largest kimberlite discovered in Botswana.

A number of large companies are involved in diamond exploration in Botswana. Besides De Beers, Rio Tinto is still active, but have moved their exploration office to South Africa. While numerous junior companies including Motapa Diamonds, and Tawana Resources have entered the diamond exploration fields of Botswana.

Prospecting terms: Exploration and mining in Botswana is governed by the Mines and Minerals Act (17) of 1999. The Act requires that applicants for prospecting licences (made to the Director of the Geological Survey) show technical capability and financial means to undertake the work programme submitted. Prospecting licenses can cover a maximum area of 1000 square kilometres.

A map showing granted prospecting licences.
and can be issued for an initial period of three years. After the initial period, a minimum of 50% of the total exploration area must be relinquished. The remainder can be renewed for a further two-year period. At the end of that two year period 50% of the remaining area must be relinquished and the remaining area (25% of the original prospecting area) may be renewed for a final two years. If good cause can be shown a Retention Permit can be issued for a maximum period of three years. Mining licences are applied for to the Department of Mines. These are issued according to the expected life of mine and for a maximum period of 25 years. Government participation in mining licences is negotiated on a full participation basis. Diamonds attract a Government royalty of 10% at mine gate value.

Cutting and Polishing: In 1992 a state-of-the-art diamond cutting and polishing facility, with both automated and manual equipment, was established in Molepole by Lazare Kaplan International. The factory employed 500 local women at the time. Five years later the factory was sold to Schachter and Namdar. Diarough has recently established a polishing factory in Serowe, while Belgium’s Eurostar Group are constructing a new diamond cutting and polishing factory in Gaborone. The factory, which will be completed in early 2006 will include a training centre and employ 1,000 people.

The Leviev Group of Companies is reported to have expressed interest in investing US$10 million into the Botswana cutting industry and jewellery manufacturing industry with a plan to employ at least 10,000 people initially. Their intention is to cut Botswana’s rough diamonds currently sold almost entirely to De Beers’ Diamond Trading Company (DTC) in London. Leviev is reported to be seeking access about 10 per cent of Botswana’s rough diamond production for the company’s downstream activities.

Botswana is expected to maintain its leading position on the diamond producing table and the business of diamond exploration in Botswana is likely to remain active for some time in the future. New technology and evolved old exploration techniques are constantly being applied to find that elusive crater of diamonds in a country that has provided the economic platform with political stability to attract diamond hunters to an elephant country. Participation by greater numbers of foreign concerns, particularly in the area of cutting and polishing and even jewellery fabrication can also be expected to strengthen over the coming decade.

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