

Goldletter INTERNATIONAL

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Brazil re-emerging as one of South America's major gold regions



Brazil has been a major but intermittent producer of gold since its discovery in 1500. Brazil led the world in gold production during the 18th and early 19th. Centuries. From the late 19th century to the late 20th century, total mining company and garimpeiro production was small and relatively constant at about 5 to 8 tonnes per year.

The discovery of alluvial deposits in the Amazon by garimpeiros in the 1970s and the opening of 8 mines by mining companies from 1983 to 1990 fuelled a major boom in Brazil's gold production, exceeding 100 tonnes a year in 1988 and 1989. As a result, Brazil became the largest gold producer in South America and the number six gold producer in the world.

However, garimpeiro alluvial gold production decreased rapidly in the 1990s, to about 10 tonnes per year by 1990. Company production increased about tenfold from about 4 tonnes per year in 1982 to 40 tonnes in 1992. Production from 1992 to the present remained relatively stable, even though several mines were closed or were in the process of closing and now new major mines were put into production during that period.

As the second largest gold producer in Latin America (second to Peru), Brazil produced 44.9 tonnes of gold (1.44 million ounces) in 2005, equal to almost 10% of Latin America's total gold production.

Based on their production history from 1982-1999, 10 gold mines are ranked as major (7-20 tonnes) and 7 as minor (3-8 tonnes). From 1982-1999, deposits hosted in Archean rocks produced 66% of the gold in Brazil, whereas deposits in Paleoproterozoic Neoproterozoic rocks accounted for 19% and 15% respectively.

Brazilian gold production by mining companies averaged 4-6 tonnes gold per year from 1939-1982, mostly from the Iron Quadrangle. Eight new major mines were put into production from 1983-1990, of which two are in the Iron Quadrangle. During the same period, seven minor mines were brought into production, two of which are in the Iron Quadrangle.

Since 1989, gold production from mines outside the Iron Quadrangle has exceeded that from within it. From 1982-1992, gold production by companies increased almost tenfold from 4 to 40 tonnes per year.

The Quadrilátero Ferrífero (Iron Quadrangle) was the principal source of bedrock gold mining in the State of Minas Gerais until 1983 and this area accounts for about 40% of Brazil's total gold production. Gold was produced from numerous mines in the Iron Quadrangle, primarily in the northern and southeastern parts.

The Morro Velho Mine (includes Mina Velha and Mina Grande), located in the Nova Lima District about 10-km southeast of Belo Horizonte, is the oldest continually producing gold mine in the world, having commenced production in 1834 and it has a cumulative production of about 470 tonnes (15 million ounces) of gold.

Other producing major mines are São Bento, Raposos and Cuiabá. Historically, many smaller gold mines in the Iron Quadrangle are important and produced considerable gold.

Of the 10 major gold mines in Brazil, 8 are in districts that have had historical production for more than 150 years. The other 2 (Fazenda Brasileros and Igarapé Bahia) are new discoveries made in the last 25 years.

No new major gold mines have been brought into production since 1990. Two major mines were closed (Jacobina and Salamangone) and two major mines were in the process of being closed. (Morro Velho and Raposos) during the same time. However, gold production remained at about 40 tonnes per year because of increases by the other major mines.

Four major and two minor gold mines are in the northern part of the Iron Quadrangle. The major mines (Morro Velho, Raposos, Cuiabá and São Bento) and one minor mine (Corrêgo do Sítio) are hosted in the Nova Lima Group of the Archean Rio das Velhas Supergroup, which hosts the Morro Velho Mine.

The Cuiabá Deposit, about 15-km east of Belo Horizonte, is a world-class gold mine and presently the largest gold producer in the Iron Quadrangle. Cuiabá produced approximately 45 tonnes of gold from 1986 to 1999. The Raposos Mine, 5-km northeast of Morro Velho, is hosted in banded ore formation in the Nova Lima group. Rapasos produced approximately 22 tonnes of gold from 1992 to 1999.

São Bento, about 50 km east of Belo Horizonte, is the easternmost of the 4 major gold mines in the northern Iron Quadrangle. São Bento produced approximately 36 tonnes of gold from 1986 to 1999.

*sources: CTGS International, USA
US Geological Survey, USA
Ministério de Minas e Energia, Brazil
Mr. E.A. Ladeira, Brazil*

Overview of Brazil's gold producers

In February 2006, the purchase by **Yamana Gold** (YRI - TSX) of Desert Sun was announced, which has become effective on April 5. The combination of Yamana and Desert Sun has created the largest gold producer in Brazil and a leading intermediate gold producer. Estimated annualised gold production is 450,000 ounces in 2006, increasing to 700,000 ounces in 2007 and more than 800,000 ounces in 2008 from operating mines and mines under construction (includes expansion plan for the Jacobina Mine proposed by Desert Sun and excludes near development stage projects held by Yamana). Cash costs projected are US\$ 270 per ounce in 2006, with US\$ 125 and US\$ 115 per ounce projected for 2007 and 2008, respectively. Proven and probable reserves are approximately 7.6 million ounces of gold and measured and indicated reserves are 4 million ounces of gold.

Yamana is the largest holder of exploration concessions in Brazil and the addition of the 150-km Bahia Gold Belt's exploration potential will contribute to further growth.

AngloGold Ashanti's operations in Brazil comprise the wholly owned AngloGold Ashanti Mineração (formerly Morro Velho) and a 50% interest in the Mineração Serra Grande Mine.

AngloGold Ashanti Mineração has mining rights over 30,698 hectares in the state of Minas Gerais, in south-eastern Brazil. The complex is located in the municipalities of Nova Lima, Sabará and Santa Bárbara, near the city of Belo Horizonte.

With the closing of the Mina Velha underground mine in 2003 and the Engenho D'Água open-pit mine in 2004, ore is currently being sourced from the Cuiabá underground mine, (this ore is treated at the Queiroz plant) and from the Córrego do Sito heap-leach mine. Gold production in 2005 increased 4% to 250,000 ounces from 240,000 ounces in 2004 at a recoverable grade of 7.27 g/t gold. Total cash costs were \$ 169 per ounce and total production costs were \$ 226 per ounce.

Gross profit for the year was \$ 39 million. Capital expenditures were \$ 71 million, spent mainly on ongoing projects, and the Cuiabá expansion in particular.

In January 2005, the Cuiabá expansion project was approved. The Project aims to expand current production of 830,000 tonnes to 1.3 million tonnes per annum at an estimated cost of \$ 121 million. The project deepens the shaft from 11 level to 21 level and the additional infrastructure and ore reserves will increase production from 190,000 ounces to 250,000 ounces per year with two years of the project's complete to yield 1.86 million ounces in all over the additional 6 years of life.

The Serra Grande Joint Venture (50% attributable to AngloGold Ashanti) is co-owned with **Kinross Gold**. In terms of the Serra Grande Canada-based Joint Venture agreement, AngloGold Ashanti manages the operation and has the right to access a maximum of 50% of the earnings accrued and dividends paid by Serra Grande. Serra Grande controls, or has an interest in, approximately 21,096 hectares in and around the Crixás mining district in the northwestern area of the Goiás State, in central Brazil. The Serra Grande operations are located 5 kilometres from the city of Crixás.

The operation comprises two underground mines, Mina III and Mina Nova. Gold production (50% attributable) was 96,000 ounces in 2005 at a recoverable grade of 7.93 g/t gold. Total cash costs were \$ 258 per ounce in 2005, and total production costs were \$ 205 per ounce.

Adjusted operational profit (attributable) was \$ 18 million. Capital expenditure (attributable) of \$ 7 million was spent mostly on primary development, conversion of resources to reserves and mine equipment.

Eldorado Gold (ELD-TSX) operates the underground São Bento Mine in the state of Minas Gerais. The mine site covers an area of 800 hectares and consists of one mining concession, with an additional 1,205 hectares in contiguous concessions to the northeast.

In 2005, São Bento produced 64,298 ounces of gold grading 7.67 g/t at a cash operating cost of US\$ 407 per ounce. Forecast production for 2006 is 71,350 ounces at a total cash cost of \$ 405 per ounce.

Proven and probable reserves are estimated at 338,000 tonnes @ 8.75 g/t gold (95,000 ounces). Measured and indicated resource is estimated at 1.0 million tonnes @ 11.73 g/t gold (379,000 ounces).

Goldcorp's (G - TSX) Amapari Gold Project, located in Amapa State, began commercial production in January 2006. Initial development will comprise an open pit mine and heap leach plant for exploration of the oxide part of the deposit. After completion of open pit mining, Amapari will begin underground mining to extract the sulphide reserves that extend immediately below the oxide mineralization.

The Project contains 1.53 million ounces of gold in proven and probable reserves, 200,000 ounces in measured and indicated resources, and 1.11 million ounces in inferred resources of gold over an 11-year mine life.