

## MALI

*By s Special Contributor*

**T**he land-locked country of Mali, bordered by Mauritania, Algeria, Burkina Faso, Guinea, Niger, Côte d'Ivoire and Senegal, is one of the poorest in Africa. Covering 1.2 million km<sup>2</sup>, with a predominately Muslim population of around 10.4 million, the country remains reliant on foreign aid and has a poor infrastructure. External debt is approximately 75% of GDP, which totalled US\$8 billion in 1999. Economic growth for 2000/01 is forecast at 5-6%, with inflation under 3%. In September 2000, Mali qualified for additional aid from the International Monetary Fund under its Heavily Indebted Poor Countries initiative.

The mining industry in Mali continues to play an important part in the country's export earnings, which totalled approximately US\$640 million in 1999. Whilst cotton remains the country's major export, gold is still in second place. Factors such as a revised mining code and extensive geological potential have made Mali an attractive target for several mining companies. Deposits of copper, tin, bauxite, iron ore, manganese, uranium and diamonds can be found in the country, but only gold and phosphate are actually mined. Total gold production for 2000 was 30.4 t, making Mali the third biggest gold producing country in Africa, behind Ghana and South Africa.

The largest, and probably the most successful, gold mining operation is Sadiola Hill (South Africa's AngloGold and Canada's IAMGOLD hold 38% each) in the southwest of the country. Production in 2000 was 611,442 oz, 6% above budget, largely as a result of a better than expected head grade. The total cash cost for the year was US\$123/oz and the total production cost was US\$169/oz (IAMGOLD figures). Forecast production for 2001 is 522,000 oz at a total cash cost of US\$144/oz. Production is expected to remain flat until 2006, when it will

tail off as the average grade declines. Production in 2009 is forecast at 152,000 oz at a total cash cost of US\$213/oz. The reserve at Sadiola, as at December 31, 2000, stood at 32.6 Mt at a grade of 3.2 g/t, containing 3.3 Moz.

In addition, Sadex, a 50:50 joint venture between AngloGold and IAMGOLD, commenced development of the Yatela project, located 25 km north of Sadiola, in April 2000. The 2.5 Mt/y open pit will cost US\$75 million, and will produce 1.4 Moz of gold over a six-year mine life, at an average total cash cost of US\$174/oz. The first gold was stacked on the leach pads in March 2001, and commercial production was expected in June 2001. Forecast production for 2001 is 136,000 oz at a total cash cost of US\$185/oz. The current reserve, as at December 31, 2000, stands at 13.4 Mt at a grade of 3.7 g/t, containing 1.6 Moz.

AngloGold is also involved in Mali's other major gold operation, the Morila mine, after it purchased a 40% interest from Randgold Resources in June 2000 for US\$132 million. Randgold retains 40%, and the remaining 20% is held by the Government of Mali. Morila is located in southern Mali, 180 km southeast of the capital Bamako and 600 km southeast of Sadiola. Development of the US\$102 million project commenced in August 1999, and the first gold production was in the December 2000 quarter. The mine was officially opened on February 15, 2001.

Production from the open-pit, carbon-in-leach operation is forecast to average 500,000 oz/y over the present nine-year mine life. Peak output of just under 800,000 oz is expected in 2003. The processing plant is designed to handle 250,000 t/mth, although it has been performing to date at a throughput rate of 280,000 t/mth. The reserve at Morila, as at December 31, 2000, is 27.6 Mt at a grade of

5.5 g/t, containing 4.9 Moz, and the resource is 6 Moz at a grade of 4.4 g/t. Production in the first six months of operation, to March 31, 2001, was 301,043 oz at a cash operating cost of US\$72/oz, and a total cash cost of US\$89/oz.

Randgold's other major project in Mali, its 75%-owned Syama mine, was placed on care-and-maintenance in the December 2000 quarter after continuing losses. Stockpiled ore will be treated for as long as it remains economic. Production from Syama in 2000 was 168,892 oz at a total cash cost of US\$321/oz. The cost of closing the mine is estimated at US\$30 million. The reserve at Syama has been reclassified as a resource, and at December 31, 2000 this stood at 51.6 Mt at a grade of 3.2 g/t, for 5.2 Moz.

Randgold acquired its interest in the mine from Broken Hill Proprietary Co. Ltd of Australia in 1996. The balance of ownership is held by the Malian Government (20%) and the International Finance Corp. (5%). The mine officially reopened at the start of 1999 after a US\$60 million investment programme that raised output from around 100,000 oz/y at the start of 1998, to 182,897 oz for 1999. This was much lower than the anticipated 270,000 oz, mainly as a result of power failures and high rainfall during the December 1999 quarter. A restructuring programme failed to sustain higher production and reduce costs, and delays in commissioning of a new power plant disrupted production further, resulting in the decision to suspend operations. Write-downs totalling US\$74.6 million were made in the company's 2000 accounts in respect of Syama. Randgold has stated that it will restart operations in the event of a sustained gold price of US\$350/oz, although it has also indicated that some third parties have expressed an interest in Syama and it is considering the options.

Meanwhile, Randgold has increased its ownership of the Loulo project in western Mali, to 80%, after purchasing a 29% interest from Normandy LaSource in March 2001.

The remaining 20% is held by the Government of Mali. The reserve at Loulo is 14.2 Mt at a grade of 3.8 g/t, containing 1.8 Moz, with an additional resource of 3.6 Moz at a grade of 3.7 g/t. Six priority targets have been identified for delineation drilling. This follows the deferral of a development decision in 1998 following a number of production and ore treatment scenarios completed under feasibility study conditions. It had previously been hoped that Loulo would begin production in 1999. Although the operation could potentially mine and process 170,000 t/mth of ore at a cash cost of US\$205/oz, Randgold feels that the returns on capital at the gold price at that time did not meet its 'hurdle' rate. In order to gain a positive development decision the gold price needs to be US\$350/oz, or another reserve, similar to the Yalea deposit at Loulo, would have to be found.

Elsewhere, the Kalana mine was privatised a few years ago and sold to Ashanti Goldfields in joint venture with JCI (Ashanti 50%, JCI 30% and Mali 20%). In 1997, Nelson Gold Corp. entered into an agreement in principle for 70% for about US\$10 million, and has been reviewing the feasibility study following the fall in gold prices. In September 1999, Nelson submitted a tender to acquire the Kalana mine plus a concession. Project finance has been estimated at US\$2.5 million.

Sodinaf (Mali) has developed the Kodiaran deposit with a reserve of 43.4 t of exploitable gold. The mine has been incorporated under the name of Wassoul'Or, with an equity of 20% being held by the government.

Oliver Gold sold a 72% interest in the Ségala project, located in the Kéniéba district, to Montreal-based SEMAFO Inc. in January 2000 for US\$4.5 million. SEMAFO also acquired a further 3% interest from other sources at the same time, taking its interest to 75%. A mining permit is already held for the property, and SEMAFO intends to request additional time to complete further drilling and

underground development prior to updating the feasibility study. The study, presented by South Africa's CMC Co., currently forecasts a mine life of ten years. The current global resource, as reported by Oliver Gold, is 15.5 Mt at a grade of 2.75 g/t containing 1.36 Moz *in situ*. During 2000, the estimate was revised internally using data from 69 diamond drill holes and 291 reverse circulation holes, and confirmed the presence of 3.3 Mt at a grade of 6.21 g/t containing 651,000 oz *in situ* in the indicated category. The deposit is continuous over 350 m of strike, is open at depth, and is up to 45 m thick. SEMAFO also holds an interest in the Samalofila concession, in southwest Mali, following its merger with fellow Canadian Prospec Mining in August 1999.

A number of Canadian juniors are active in Mali. Vancouver-based Nevsun Resources Ltd is examining options for the development of its Tabakoto gold property, which covers 16 km<sup>2</sup> in the Kéniéba region. The company has completed a prefeasibility study which envisages a 750,000 t/y underground operation, producing about 140,000 oz/y at a capital cost of US\$74 million. Nevsun considers that a 175,000 t/y high-grade underground mine could be set up as an initial stage, producing 74,000 oz/y, for a capital cost of US\$30 million. This option would have a mine life of around seven years. The deposit is estimated to contain an indicated and inferred resource of 5.9 Mt grading 7.2 g/t of gold using a cut-off grade of 3 g/t.

The company plans to update the resource estimate once the final phase of drilling, which commenced in April 2001, is complete. A total of 5,500 m of diamond drilling and 7,700 m of reverse circulation drilling is planned. The updated resource estimate, plus additional metallurgical work, will be used in a feasibility study. A mining licence for the project was issued in September 1999, and Nevsun has set up a Mali-based operating company. The company intends to engage an international engineering company to develop an operating plan for the

development of an exploration decline to access the Tabakoto mineralisation.

The company also has an 80% interest in the 200 km<sup>2</sup> Kakadian concession, 60 km north of the Tabakoto project and 20 km west of Sadiola Hill.

Vancouver-based Azco Mining has an 80% stake in the Medinandi and Dandoko gold properties. Randgold is earning a 75% interest in Azco's operating subsidiary by spending C\$2 million over the next three years on the properties. Randgold must also complete a bankable feasibility study of at least one 1 Moz deposit on the properties.

In early 2001, Orezone Resources signed an agreement giving it the option to earn a 51% interest in the Katela gold property, adjacent to the Sadiola mine. The 50 km<sup>2</sup> property was dropped from the Sadiola mine holdings in 1997, but Orezone believes the property was not fully tested, and intends to have test-drilled a gold anomaly by the middle of the year. It can earn its interest by expending US\$500,000 and paying C\$100,000 over a three-year period. The company can then earn the remaining 49% by expending a further US\$1 million and paying C\$100,000 over two years.

Robex Resources Inc. has three gold prospects in Mali. The Diangounte and Kata concessions are located in the Kéniéba Valley. Robex holds an 85% interest, with the balance held by N'Gary Transport. It also holds a 90% interest in the Baroya property in the Tabakoto region, adjacent to SEMAFO's Ségala property and Nevsun's Tabakoto property. At Diangounte, a field programme in 1999 delineated a major gold-bearing structure. Robex completed a C\$500,000 financing in March 2000 to undertake a further 1,000 m of reverse circulation drilling, in addition to the 5,000 m already completed, and complete a prefeasibility study.

In June 1999, Detec Resources entered into an option agreement to acquire a 60%

interest in the 50 km<sup>2</sup> Northern Niaouléni property, in the Kangaba mining district, from Mink International Resources. Under the agreement, Detec must expend US\$1.0 million on two gravity concentrators and conduct bulk sampling, leading to full production. Once the company has recovered its expenditure, its interest will be reduced to 51%. The property itself contains three known eluvial deposits and five paleo and alluvial placer deposits. Previous limited drilling by Mink has delineated potential reserves at the Libre Plateau and South Niaouléni zones of 4.5 Mt containing over 235,000 oz of gold. The alluvial gravels have an estimated reserve of 35 million m<sup>3</sup> at a grade of 0.35 g/m<sup>3</sup> of gold.

In late 1997, Raymor Industries, formerly Raymor Resources of Quebec, formed a five-year partnership with Mali's Compagnie de la Faleme (Comifa), which would undertake basic exploration work and, depending on the results, Raymor could acquire the ground, either on its own or in partnership. A drilling programme began testing more advanced prospects in 1998. Raymor has been active in Mali for several years and previously signed an agreement to acquire an 85% interest in the Yeremounde gold property, which is part of the Comifa lease, some 25 km from the town of Kéniéba. Raymor also owns 75% of the Bogodo placer gold concession.

Vancouver-based International Tournigan Corp. holds three gold concessions in western Mali: Diangounte West, Kolomba and Magoyafora.

In July 2000, the Metal Mining Agency of Japan (MMAJ) discovered two gold deposits, approximately 150 km southeast of the capital Bamako. The discoveries were made during a geological survey that the MMAJ was undertaking in Mali in conjunction with the Japan International Co-operation Agency, and followed a three-year, 11,600 m drilling programme. Further work on the deposits will be undertaken by a private Japanese company, the Overseas Minerals Resources

Development Co., which is a consortium of Japanese mining and metals companies.

De Beers is exploring for diamonds in the eastern part of the Reguibat craton, in northern Mali/southern Algeria.

In October 1999, the Malian Government bowed to requests from mining companies to decentralise its mining department, and is setting up a regional office in the main mining region of Kayes, in the west of the country. A government statement noted that the move would "bring the service in charge of mining policy close to the main exploration and exploitation region of Kayes".

In addition, the government has completed a review of its mining code, apparently making it easier for medium-size local companies to operate mines. Two new taxes have been introduced, whilst two more have been abolished, to be replaced by a single 3% "special tax on mining proceeds". The new taxes are a 10% levy on the value of shares sold in a mining operation, and a tax for granting and renewing mining permits (US\$3,200). In addition to the tax changes, the length of tenure for medium-scale mining permits has been extended. The permits of between 8 km<sup>2</sup> and 10 km<sup>2</sup>, and generally operated by Malian companies, can now be held for three years, rather than two years prior to the change. These permits may be renewed once. A new, four-year permit is to be introduced for small-scale mining operations.

Mali's Special Budget Investment project is aimed at creating a mineral inventory in the country, and it has already covered the Birimian area. The European Investment Bank has made funds available to Mali for a mineral inventory and geological mapping project for Adrar de Iforas and Gourma in the north. This project covers an area of 70,275 km<sup>2</sup> and, in 1999, a five-year geophysical and geological survey started in the Birimian area, made possible by a sum of ECU15 million made available under the SYSMIN programme.