

CÔTE D'IVOIRE

By Bob Foster

Exploration Consultants Ltd, Henley-on-Thames, UK

Côte d'Ivoire (Ivory Coast) is one of the larger countries of West Africa with an area of some 322,000 km², and a population of about 16 million people. The political and administrative capital is Yamoussoukro but the commercial capital and leading port is the city of Abidjan. The official language is French and the former French colony, although gaining independence in 1958, still maintains close political and economic links with France.

A narrow coastal strip is backed by a forest-covered coastal plain rising inland towards a mix of plains and low hills, with a small mountainous area around Man to the west. The highest point is Mount Nimba at 1,752 m elevation. Coastal areas have wet seasons from May to July, and from October to November. In the central areas the wet seasons are March to May and July to November; the shorter wet season in the north is from June to October. The main ethnic groups are Baoule, Bete, Senoufou and Malinke. Major religions are Islam (63%), Christianity (12%) and indigenous beliefs (25%).

Following independence in 1960, Côte d'Ivoire enjoyed more than 30 years of religious and ethnic harmony, and economic progress until a military-backed coup occurred in December 1999, quickly followed by two major military rebellions, disputed elections and violence. Presidential elections to restore democracy in October 2001 led to yet more violence and a popular uprising that brought Laurent Gbagbo to power. Renewed fighting followed a troop mutiny in September 2002 - rebel forces claimed the northern half of the country but resumed implementation of the peace accord with President Gbagbo in December 2003 after a three-month stalemate. Nevertheless, ethnically-charged issues that sparked the civil war, such as land reform and grounds for nationality, remain unresolved. The central government has yet to exert control over the northern regions and tensions remain high. Several thousand French and West African troops remain in Côte d'Ivoire to maintain peace and facilitate the disarmament, demobilisation, and rehabilitation process.

Despite attempts by the government to diversify the economy, it is still largely dependent on agriculture and related activities, which engage roughly 68% of the population. The main exports are cocoa, coffee, tropical hardwoods, petroleum, cotton, bananas, pineapples, palm oil, fish and rubber-sourced latex. Oil also plays an important role, although in recent years the downstream activities have dominated through a major refinery and separate bitumen plant located in Abidjan. GDP (real growth rate) is estimated to have shrunk by 1.9% in 2003 to some US\$24.5 billion, with agriculture contributing 37%, industry 20% and services 43%. Per capita GDP was US\$1,550.

Côte d'Ivoire has considerable mineral potential, with important occurrences of gold, diamonds, iron, nickel, cobalt, copper, manganese and bauxite having been identified in the extensive Archaean and early Proterozoic rocks of the country. Like much of West Africa, however, it is gold that has been at the forefront of exploration since the introduction of a new favourable mining investment code in 1995. More recently, interest has been growing in the diamond potential of West Africa, including Côte d'Ivoire. However, civil unrest in the country resulted in the almost complete shutdown of exploration and mining activities in the country towards the end of 2002, although a number of companies were beginning to express cautious optimism about resuming operations in the first part of 2004. With the paucity of new activities on which to report, the following information relates to exploration and mining over the past two-three years, updated where possible.

The Ity mine is the country's major gold-producer, owned by French company Cogema (51%) and by the state mining company Société d'Etat pour le Développement Minier de la Côte d'Ivoire (Sodemi) with 49%. The low capital cost, high-grade open-pit, heap-leach operation commenced production in 1991. During 1999-2000, a total of 269,267 t of ore was stacked for treatment, resulting in the production of 43,410 oz of gold. Nearby additional resource potential was identified in a 14 km-long anomalous zone. Gold production increased to some 55,000 oz/y following the completion of a crushing and agglomerating plant relocation and expansion project. However, rebel attacks towards end of 2002 forced the mine to close.

The other operating mine, Angovia, opened in July 1999, is owned by CMA, a wholly-owned subsidiary of France's BRGM. The reserve was originally estimated at 2 Mt of ore averaging 4 g/t Au, giving a mine life of about six years. The Afema mine situated in the southeast of the country was put on a care-and-maintenance basis in 2001 owing to the then weak gold price. Sodemi (32%) and Eden Roc Mineral Corp of Canada jointly own Afema, which had been producing approximately 935 kg of gold annually.

Etruscan Resources was officially granted the Agbaou Permit covering an area of 529 km² and located approximately 200 km northwest of Abidjan. Previous exploration, including 18,000 m of drilling, had defined a saprolite and laterite resource of 12.3 Mt at a grade of 2.2 g/t Au (847,000 oz).

In 2001 Ashanti Goldfields Co was granted a three-year exploration permit on the Allangoua permit in the southeast of the country close to the Ghanaian border. A rotary airblast (RAB) drilling programme was undertaken, the focus being on old artisanal workings. Previous RAB drilling on the Abradine prospect showed that the mineralisation occurs in discontinuous pods with limited tonnage potential. Interest remained high, primarily due to the presence of the major Afema Shear Zone in Birimian greenstone-belt rocks but, following Ashanti's merger with AngloGold, no further action has been reported.

Exploration by Randgold Resources Ltd at the Tongon gold property on its Nielle permit in 2001 resulted in an increase in inferred resources of 1 Moz of

contained gold Au to 2.9 Moz (or 34 Mt at 2.65 g/t Au). The property was the subject of a prefeasibility study in 2002. The mineralised zone has been delineated to date over a 1.4 km strike length in one zone and over 700 m in another. They are believed to be extensions of the Syama gold belt in neighbouring Mali.

Golden Star Resources was actively exploring on the Tanda (Comoe) gold project during 2000. Golden Star had a 40% interest in the property in joint venture with North Ltd and Sodemi. However, interest appears to have waned with no activity publicly reported during 2002.

In the first half of 2001, Australian junior Equigold commenced drilling the Bonikro gold prospect, situated on the Oume permit. In late 2002, the company reported an independently assessed indicated plus inferred resource of 25.06 Mt averaging 1.6 g/t Au for 1.3 Moz of gold contained, at a cut-off grade of 0.6 g/t Au. Bonikro is 94%-owned by Equigold. The company intended to complete reserve drilling during 2003 with a view to completing a bankable feasibility study but this was put on hold owing to the troubles. However, drilling finally commenced towards the end of the year with a total programme of some 14,000 m of RC and diamond drilling planned. Better intercepts from the early drilling included 22 m at 14.86 g/t Au and 32 m at 8.14 g/t Au.

In the northern part of the country another Australian junior, Afminex, has been exploring the Korhogo and Tengrela gold prospects. Five significant gold anomalies have been identified at Tengrela, close to the Mali border, with those at Sissingue and Kanakono extending over distances of 6 km and 5.2 km respectively. About 11% of the anomalies at Sissingue are reported to exceed 300 ppb gold and highest values in the two zones are 8,641 ppb and 2,240 ppb respectively. Of the other anomalous areas, artisanal workings are present in the Katara anomaly and ancient workings have been noted in the Zinguinasso anomaly.

Golden Star Resources has several diamond exploration projects in Côte d'Ivoire, with the focus being on the Tortyia area. African Mining and Petroleum Resources plc (AMPR - a re-incarnation of African Carnegie Diamonds plc, a subsidiary of Australian Carnegie Minerals NL) has a joint venture with Sodemi (25%) covering the 1,000 km² Bobi and Toubabakou diamond prospects. The area covers several kimberlitic dykes and sills. The initial target is a 6 km stretch along the Legbo River, as well as the Bobi dyke, which could represent a potential source. Exploration in 2000 included trenching and sampling of the northwestern part of the dyke followed by diamond drilling, but there does not appear to have been any activity since mid-2000. However, AMPR stated its intention of generating cash flow by purchasing diamonds from artisanal miners and then moving to production from the alluvial deposits.

Alluvial diamond mining has an official annual output of 20,000 ct, of which 75% is said to be gemstone quality, although actual production in 2001 was

believed to be around 155,000 ct. All of the alluvial mining is sourced from the kimberlite fields at Tortiya, Seguela and Korhogo.

The largest potential mining development under evaluation during 2001 was the Biankouma-Touba nickel deposit, a joint venture between Falconbridge Ltd and Sodemi, whereby Falconbridge has the option to earn an 85% interest. The project includes four deposits (Sipilou North, Fougouesso, Moyanga and Viyala), with an indicated resource of 126.4 Mt at 1.57% Ni and 0.11% Co, and an inferred resource of 138.3 Mt at 1.39% Ni and 0.12% Co. Work during 2001 was focusing on hydrometallurgical testing. The third party originally involved in the joint venture, Trillion Resources, withdrew during 2000, and Falconbridge's option right consequently increased from 60% to 80%.

Necessary infrastructure to support this major venture would include a 500 km rail link between San Pedro on the coast and the project site at Sipilou, near Biankouma. The Canadian International Development Agency (CIDA) has reportedly awarded a grant of C\$600,000 to the government to cover the cost of a feasibility study for the railway to be undertaken by Canadian rail operator Canarail. It is anticipated that the same rail link could also be utilised to promote exploitation of the Mount Nimba low-grade (40% Fe) iron-ore deposits on the border with Liberia and Guinea.

The vast iron-ore deposits at Mount Nimba and Mount Kalayo, in the western border area, estimated at 3,000 Mt, have so far attracted little attention owing to the grade of the deposits, estimated at 40% Fe. Other commodities targeted for evaluation are bauxite resources of 1,200 Mt, manganese resources of at least 35 Mt and tantalite deposits.