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IUCN seeks above all to work with its members to achieve development that is sustainable and that provides a lasting improvement in the quality of life for people all over the world.

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ANGOLA AT A GLANCE

Civil war raging since independence from Portugal in 1975 has transformed this West African State from a high-output economy to a country suffering malnutrition, disease and periodic famine. Even if a 1990 peace agreement holds, Angola faces major problems in rebuilding its society. With abundant natural resources, however, the development potential is great. Among the environmental problems:

- Only small relict patches of natural forest remain. Deforestation of closed broad-leaved forest has been estimated at 440km² a year. Poaching in woodlands and burning of trees is widespread
- Water shortages are common, despite abundant rivers and wetlands
- Many important species are overhunted or receive no protection though Angola's endemic species are outnumbered in Africa only by Zaïre
- The protected area system has almost completely disintegrated

CONTENTS

| | Page |
|---|------|
| PREFACE | 1 |
| FACT SHEET | 2 |
| Natural Resources | 2 |
| Demography | 2 |
| Health and Education | 3 |
| Industry and Pollution | 3 |
| Economic Indicators | 3 |
| KEY ISSUES | 4 |
| INSTITUTIONAL CONTEXT | 7 |
| Environmental Institutions | 7 |
| Environmental Policies and Standards | 8 |
| National and International Organisations | 8 |
| Legislation Concerning Natural Resources Management and Environmental Protection | 9 |
| Environmental Training Institutes and Training Capacity | 9 |
| Cultural Aspects of Resource Utilisation | 10 |
| STATE OF THE ENVIRONMENT | 11 |
| Inventory of Natural Resources | 11 |
| Industry | 20 |
| Demography and Urbanisation | 22 |
| ANALYSIS OF POLLUTION AND DEGRADATION PROCESSES | 26 |
| Water Pollution and Water Shortage | 26 |
| Soil Erosion and Degradation | 26 |
| Deforestation | 26 |
| Biodiversity | 28 |
| Marine Environment and the Coastal Zone | 29 |
| Urban Environment | 30 |
| Energy Issues | 30 |
| Industry | 31 |
| BIBLIOGRAPHY | 32 |
| NOTE ON DATA SOURCES | 36 |
| ANNEX I | 37 |
| ANNEX II | 38 |

PREFACE

This environmental overview of Angola was requested by the Commission of the European Communities — specifically the Directorate-General for Development (DG VIII A/1).

It was prepared on the basis of a desk-top study of information to hand as a briefing for CEC officials. Wherever possible the most recent figures and information were employed as sources¹.

After the introductory Fact Sheet and outline of Key Issues, the report is divided into three chapters. The first deals with institutional infrastructure, especially relating to environmental issues, together with national and international legislation and training opportunities. The second reviews the country's natural resources. The final chapter evaluates the nation's ecological heritage and considers its past, current and foreseeable environmental problems. Because the information changes so rapidly, no attempt has been made to provide a comprehensive survey of international organisations working in Angola. Instead, the reader is advised to contact the organisations themselves for an up-to-date summary of activities.

The IUCN team responsible for the preparation of this Synopsis included: Jeremy Carew-Reid, R. David Stone, Peter Hulm, Paul A. Driver, Claire Santer, John Watkin, and Brian Johnston. Additional editorial assistance was provided by Anthony J. Curnow, Adrienne Jackson, Paul E. Ress, Gamini Senevirate and Wendy Lubetkin.

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¹ A note on the data sources follows the detailed reference list. Within the text, individual sources are indicated by the number of the reference inside brackets, e.g. [24]. Metric weights and measurements are used throughout. A billion refers to 1,000,000,000.

FACT SHEET

Natural Resources

Land area: 1,246,700km²

Climate: Tropical climate. Temperature varies little with season and only slightly with altitude. Average temperature is 16°C in the highlands and 20°C in Soyo in the north

Rainfall: Rainfall increases from negligible along the south-west coast to more than 1000mm in the north-eastern third of the country, averaging nearly 2000mm in the extreme north-east and Cabinda. In the north, the rainy season lasts from October to May, two months longer than in the south

Ecological zones: Four ecological zones: arid coastal plain; moist interior plain (miombo woodlands/grasslands); isolated patches of Afromontane forest; evergreen and semi-deciduous Guineo-Congolian forest

Languages: Portuguese (official), Umbundu, Kimbundu, Kikongo, Chokwe, Kwanyama and others

Main towns: Luanda (capital) 1,800,000; Huambo (formerly Nova Lisboa) 61,885; Lobito 59,258 (1992 estimates)

Currency: 1 new kwanza = 100 lwei. Exchange rate December 1992: Kz534.64 = US\$1 and Kz848.75 = UK£1

Measures: Metric system

Land use: Cultivated arable land 3%; rangelands 19%; miombo (*Brachystegia*) woodland 64%; arid woodland/savanna 14%

Protected areas: national parks (54,660km²), strict nature reserves (17km²), special integral reserves (8280km²), partial reserves (19,200km²), regional nature parks (150km²) and forest reserves (600km²). Total 7% of land area

Agriculture: The main food crops are cassava, sweet potato and vegetables. The main cash crops are coffee, sisal, maize, bananas, oil palm, sugar and tobacco

Livestock: Cattle 3,100,000; pigs 495,000; sheep 280,000; goats 990,000; asses 5000; horses 1000 (1991 estimates)

Fisheries: Offshore 98,940 tonnes; inland 8000 tonnes (1990)

Mining: Crude petroleum 23.5 million tonnes (1990); natural gas 6 petajoules (1988); diamonds 1 million carats (1987); gypsum 20,000 tonnes (1988)

Demography

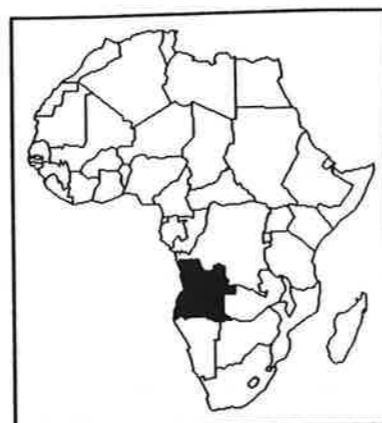
Population size: 13 million (1992 estimate)

Population growth: 2.7% per annum (1985-1990)

Projected population in 2025: 24.48 million

Age distribution: Under 15 years 44.9%; 15-65 years 52.1%; over 65 years 3.0% (1990 estimate)

Fertility rate: 6.39 (1985-1990)



Gender ratio: Female 50.8%; male 49.2% (1990)

Spatial distribution: Urban 28.3%; rural 71.7% (1990)

Urbanisation rate (% of population): 5.7% of population a year (1990)

Health and Education

Infant mortality (deaths/1000 live births): 137 (1985-1990)

Mortality of under-5s (per 1000 live births): 288 (1987)

Life expectancy: 44 years; females 46; males 42 (1990)

Access to safe drinking water (% of population): 33%; urban 75%; rural 19% (1986-1987)

Access to sanitation services (% of population): 21%; urban 25%; rural 20% (1986-1987)

Access to health service (% of population): 30% (1985-1987)

Enrolment in education: Primary 1,038,126; secondary 170,280; university 4493 (1986)

Industry and Pollution

Main industries: Construction materials, oil refining, food processing, steel, chemicals, electrical goods, cigarettes, vehicle assembly

Energy: *Types:* petroleum, thermal, hydro-electric, natural gas

Economic Indicators

GDP: US\$500 million (1989)

GDP per capita: US\$600 (1989)

GDP growth rate: 9.28% (1989)

Agricultural % of GDP: 36% (1988)

Exports at current market prices: US\$3613 million (1991)

Imports at current market prices: US\$4286 million (1991)

Total official development assistance: US\$145 million (1989)

Total external debt: US\$8775 million — of which long-term debt amounted to US\$7370 million in 1991

Sources: [1, 7, 15, 16, 17, 18, 19, 20, 21, 29, 30, 33, 34, 35, 36, 37 and 38] unless otherwise indicated

KEY ISSUES

Background

The People's Republic of Angola, covering 1,246,700km², is, after Zaïre, the largest African country south of the Sahara. It is composed of 18 provinces, one of which, Cabinda, is separated from the others by a narrow coastal strip at the mouth of the Congo belonging to Zaïre (Fig. 1). Angola is bordered to the north and east by Zaïre, to the east by Zambia, to the south by Namibia and to the west by the Atlantic Ocean. Angola's population, estimated at 13 million in 1992, is small for its size (10.4 persons/km²), and the country is overwhelmingly rural with considerable ethnic diversity.

A former colony of Portugal, independence was gained in 1975. Since then, Angola has endured prolonged civil strife that has had a profound impact on both the economy and the environment. The environmental situation in Angola cannot therefore be considered in isolation from political and financial considerations.

Key environmental issues in Angola include:

- economic deterioration and a severely damaged infrastructure;
- urbanisation and the inadequacy of water supply and sewerage systems;
- malnutrition and disease;
- the prospect of famine in the south of the country; and
- breakdown of the protected area systems and the loss of biological diversity.

The effect of civil strife

Prior to independence Angola enjoyed a high-output economy, with a rapidly expanding manufacturing sector, near self-sufficiency in agriculture, crop surpluses for export, and abundant natural resources such as petroleum and iron ore. Considerable changes took place after independence. Internal strife, which had been simmering in pre-independence times, broke out in earnest as rival nationalist factions struggled for power. The two main factions, the Popular Liberation Movement for Angola (MPLA) and the National Union for the Total Liberation of Angola (UNITA), were at war for 15 years. It was only in 1990 that a tentative agreement was reached between them, ending hostilities. Although the MPLA is the governing party, and its leader Jose dos Santos is the country's president, UNITA has continued to occupy large segments of the country. The result of the protracted conflict has been widespread destruction of the infrastructure and agricultural land, displacement of large parts of the population, and severe economic deterioration. The post-independence mass exodus of virtually the whole Portuguese community (which had monopolised the modern sector of the economy) left the country with an acute shortage of skilled labour and management resources. With the conspicuous exception of the petroleum industry, the decline in production has been of catastrophic proportions.

South African incursions

Problems have come externally as well as internally. By supporting Namibian independence from South Africa, the Angolan Government incurred Pretoria's wrath, leading to increasingly large-scale and overt attacks on Angolan territory against Namibian guerrillas.

Identified as being under Soviet influence, Angola found itself exposed to the considerable pressures of global superpower rivalry. The anti-Communist UNITA forces were given substantial American aid and South Africa was able to continue punitive action against Angola without bringing on Western disapproval.

The economy

Economic policies based on Marxist-Leninist ideology did not achieve much success, and Angola's external debt grew very rapidly after independence. In the late 1980s major reforms were announced, aimed at reducing the state sector and increasing productivity, purchasing power, the number of foreign investors and consumption. Successful co-operation between Angola and Western multinational corporations was established in the petroleum industry. They have become of crucial importance to the economy and the government's survival. The petroleum industry now accounts for 90% of the government's income, and is the one success in an otherwise bleak fiscal picture. At least 50% of petroleum revenues are spent on defence and security, however, still leaving inadequate capital for investment in rebuilding the nation's productive sectors. Angola is among the handful of countries which spend twice as much on the military as on health and education combined.

Peace agreement and economic reform

The 1990 peace agreement, engineered in part by the USA and the former USSR, included a major concession by the government that the country would evolve towards a multi-party political system. Political parties were legalised in March 1991. In mid-1991 the prospects for a sustained peace appeared favourable, but some observers advised caution, since both the MPLA and UNITA believe that a military victory is possible. Elections in September 1992 gave dos Santos 49.57% of the Presidential vote, against 40% for UNITA's leader Dr Jonas Savimbi, with 53.74 of the vote in legislative election going to the MPLA. Dr Savimbi denounced the elections as rigged, but later accepted the results, according to the UN. Nevertheless, renewed fighting broke out leading to an estimated 1000 deaths in Luanda alone. In December President dos Santos announced a new cabinet giving UNITA five portfolios.

The government and UNITA representatives met in January 1993 in Addis Ababa, Ethiopia, for talks aimed at halting recent fighting which was some of the heaviest the country had ever seen, leaving tens of thousands dead and many millions homeless. The UN estimated that 1.5 million Angolans could face starvation [39].

There have been signs of improvement in some economic sectors. A market economy has been introduced, and 100 companies nationalised after independence have been returned to their original owners. Angola's admission to the IMF in 1989 improved prospects for a rescheduling of foreign debt payments. The former USSR is the principal creditor.

Development potential

Even if the peace agreement is fully implemented, recovery will be slow. The threat of famine and mass starvation remains in central and southern regions. The infrastructure has been severely damaged and the country is exhausted [1]. Economic deterioration is

widespread. Many commercial and industrial activities remain at near standstill. The quality and level of social services is poor. Salaries are too low for the vast majority of the population to afford to buy most goods. Cities are overcrowded. Water and sewage facilities are hopelessly inadequate for the swelling urban populations. Malnutrition, cholera, and malaria plague both city and rural dwellers, and are rampant in the many refugee camps. The average life span is 44 years, one of the lowest in the world. Angola's environmental protected-areas network has received almost no support, and many forests and plant and animal species are at serious risk.

On the other hand, Angola still has abundant natural resources, large mineral and oil reserves, and a population density which is one of the lowest on the continent. Most of its problems are regarded abroad as short- or medium-term, provided the country has lasting peace. For all its difficulties, the country is widely considered to be in an enviable position in the developing world.

INSTITUTIONAL CONTEXT

Environmental Institutions

From 1955 until 1972 a number of departments were involved with natural resource management. The Nature Conservation Council (NSC), established in 1955, acted as an advisory board on matters such as conservation and utilisation of soil, fauna and flora. It was composed of the Governor General (as President), heads of all government departments, and representatives from the private sector. The administration of nature conservation policy was the responsibility of the Division of Veterinary Services (game and parks), the Division of Agricultural Services (forests, inland waters and soil conservation), and the Navy (marine life). The Technical Department for Protection of Wildlife (Reparticao Tecnica de Proteccao a Fauna) within the Veterinary Services was directly responsible for wildlife conservation throughout the country, as well as for the administration of national parks, reserves and controlled hunting areas.

In September 1969 the League for the Protection and Conservation of Nature (Liga para a Proteccao e Conservacao da Natureza) was created in an attempt to speed up resource protection in the country. Following confusion as to conservation-related responsibilities, Diploma Legislativo No. 22/72, Regulamento dos Parques Nacionais of 22 February 1972 was issued, which clarified the situation and stipulated that all policy administration was the sole responsibility of the Reparticao Tecnica. The Department of Nature Conservation (DNACO) assumed the above responsibilities upon its creation in 1977 (Decree No. 43/77).

In 1989 DNACO was replaced by the Forestry Development Institute (IDF) within the Ministry of Agriculture and Rural Development (Decree No. 41/89). IDF is currently the central government agency responsible for wildlife conservation and the management of protected areas. A high priority for this Ministry is therefore the conservation and sustainable utilisation of natural resources. IDF is headed by a Director who oversees the activities of five departments: Forestry, Wildlife, Protection, Administration and Regional Centres. Within the Wildlife Department, in Luanda, there is a Head of Department, four senior managers, technicians/clerical staff (50), and guards (17). As of 1991 resources available to IDF for protected area management amounted to less than US\$20,000 per year.

Within UNITA-administered areas, the official policy of the organisation has been to implement wildlife conservation programmes through a section of its civil administration — the Wildlife Department within the Ministry of Natural Resources. The 1991 peace accord between UNITA and MPLA (see Key Issues) established that the Luanda-based government structures, including IDF, remain the official national administration until a unified structure is developed following the 1992 elections.

The Ministry of Agriculture and Rural Development (MINADER) — formerly the Ministry of Agriculture (MINAGRI) — is responsible for the planning, regulation and support of the country's primarily private agricultural sector.

Other institutions with environmental responsibilities are the National Directorate for Fisheries and Agriculture (DINOPA), the Institute for Agronomic Research and the Institute for Veterinary Research (both within the Ministry of Agriculture and Rural Development), and the national Department of Water in the Ministry of Industry [2, 9].

Environmental Policies and Standards

Current conservation initiatives include a far-ranging Elephant Conservation Plan, which contains a three-phase programme spread out over the next five years. The objectives of this programme are to: improve conservation infrastructure and protected area management; improve the capability of conservation institutions; establish monitoring and research systems for conservation management; improve environmental awareness, legislation and policy; and establish an integrated conservation and development programme.

Activities within the programme include: establishment of an effective protected areas network, including the designation of multiple-use areas; creation of a state wildlife and conservation authority; establishment of non-government conservation agencies; initiation of a national conservation strategy; and development of a national environmental policy and enactment of appropriate legislation. Many of these initiatives will require funding.

Wildlife projects proposed by the Southern African Development Coordination Conference (SADCC) with relevance to Angola include: a regional wildlife resources inventory; and infrastructure development in conservation areas [2].

National and International Organisations

Considerable financial and technical assistance has been provided to Angola in recent years. International development organisations active in this field include the World Bank, CEC, FAO, UNDP, the Arab Bank for Economic Development in Africa (BADEA), and development agencies from Spain and the former USSR. The CEC alone has allocated US\$140 million to assist with socio-economic reconstruction programmes, while the African Development Bank recently announced a grant of US\$75 million for agricultural projects. France has also announced that it will grant US\$17 million credit for the reconstruction of a mineral water source [40].

In 1992 IUCN, on behalf of the Angolan Ministry of Agriculture and Rural Development, conducted an assessment of the country's renewable resources to draw up a profile of its capacity for development and draft a strategy framework covering priority issues and potential projects in physical resource management and human resource development [30].

FAO and UNDP are currently working on a project in Tombwa, in the arid south-west, to reverse desertification through sand dune stabilisation, improve reforestation efforts along the Curoca River and supplying improved charcoal stoves to reduce fuelwood consumption [9].

The NGO community is just emerging after decades of authoritarian rule. Some are linked to churches and mainly active in charity and relief work. Others have sprung up in response

to the need of foreign donors and international NGOs for local intermediaries to channel foreign aid and relief services.

The most active and the oldest established NGO in its field is the Angolan Association for the Environment (AAA), a small organisation based in Luanda that was set up in the 1980. It promotes environmental awareness, undertakes basic research and monitoring, and acts as a lobby group for conservation action [2]. Other important national NGOs are the Movement for Rural Development and Environment (ADRA) and the Angolan Youth Ecology Association (JEA) [30].

Legislation Concerning Natural Resource Management and Environmental Protection

Angola is not party to any major international convention dealing with protected areas, nor to the (African) Convention on the Conservation of Nature and Natural Resources, which establishes several protected area categories [2].

There is no appropriate legal framework for the protection of the environment in Angola. The few laws that relate to conservation — such as the land law, forest law or national park regulations — all date from colonial times. Most lack a direct link with a monitoring or enforcement body [30].

The creation of national parks and reserves was first mentioned in a 1936 "Regulamento". Subsequently the country's first national park, Parque Nacional de Caca do Iona, was established by Portaria No. 2421 of 20 January 1937. Decree No. 40,040 of 20 January 1955 provided the first comprehensive nature conservation legislation.

Decree No. 43/77 of 5 May 1977 superseded regulations dating back to 1957. It approved the statute of the Ministry of Agriculture and provided for five categories of conservation area: national park; strict nature reserve; partial reserve; regional nature park; and special reserve. In many cases, however, these categories do not relate to standards common elsewhere. Protected areas are established under individual laws.

At present, national environmental policy and legislation is inadequate and current wildlife legislation does not cover issues such as rural community use of wildlife or the place of conservation land-use policy. Wildlife legislation is seldom enforced and in urgent need of revision. The lack of legislation for the conservation of natural monuments is also a problem. As one study notes, however, there is a positive side: no attempt has been made to degazette the protected areas already established [2].

Environmental Training Institutes and Training Capacity

There are no training institutes in the environmental sector.

Cultural Aspects of Resource Utilisation

As in many African countries which are primarily rural, awareness of the current threats to sustainability is not widespread. Some 71% of the economically active population are believed to be engaged in farming and cattle-raising, with smallholder subsistence farming by far the most common occupation. Division of work between the sexes is a traditional one, with land labour an almost exclusively male occupation, particularly clearing of vegetation and tilling. Harvesting, processing and marketing are carried out by females [1].

STATE OF THE ENVIRONMENT

Inventory of Natural Resources

Ecological zones

Angola has a tropical climate tempered locally by altitude. The Benguela current along the coastline influences and reduces rainfall in the south-west, which is arid or semi-arid. The interior uplands in the Bié, Huambo and Huíla provinces enjoy an equable climate. Along the Cuanza river, in the north-west and north-east, and in the eastern and southern provinces, there are high temperatures and heavy, seasonal rainfall.

Angola can be divided into four main ecological zones [24]:

- a narrow, arid coastal plain, extremely arid in the south-west (occupied by the Namib Desert);
- a moist interior plateau, with very extensive *Brachystegia* (miombo) woodlands and drainage-line grasslands;
- isolated patches of Afromontane forest in the west/central highlands, which is of great biogeographic interest; and
- moist evergreen and semi-deciduous Guineo-Congolian forests on the escarpments, coastal hills and deep river valleys of the northern provinces.

The country's biogeographical affinities are largely Zambebian, with Kalahari Highveld and Karroo-Namib in the south-western coastal area, a Guinea-Congolian/Zambebian regional transition zone in the north, and Guinea-Congolian elements in Cabinda Province.

Water

Apart from the south-west, most of the country is well-watered and Angola is among the wettest countries in southern Africa. Large areas of the north receive more than 1500mm of precipitation annually, spread over a long rainy season. Much of the interior is characterised by gently undulating land between rivers with extensive swamps and marshes and, in places, groups of small endorheic lakes (those with little drainage). Twenty-six perennial rivers reach the Angolan coast, most of them comparatively short (Fig. 2). Riparian strip swamps or narrow, but often very long, floodplains, occur along some of the major rivers. The principal wetlands are associated with the more extensive lower floodplains of rivers on the Central African Plateau such as the Cunene and Cuanza in the southern and eastern parts of the country (Fig. 2).

Subsidiary streams flowing north to the Zaire River are numerous and most lie in deep, straight, parallel trench-line valleys. Over a dozen rivers occupy these characteristic valleys, and some of them unite in their lower reaches to form the three principal Angolan tributaries of the Zaire River; the Kasai, Cuilo, and Cuango rivers.

The coastal plain from Lobito northwards is traversed by many streams with floodplains and dependent lagoonal systems. Mangroves occur on the coast as far south as Lobito, and there are extensive salt marshes further south [2, 3].

Forest

No country in southern Africa has more than a few relict patches of natural forest. In Angola, the reasons include a habitat generally unsuitable for forests, the intensity of past and present-day human activities, and the prevalence of bush fires. Civil unrest too has taken its toll on the environment, such as the complete disintegration of protected area networks and widescale poaching and burning of the forests, both mentioned earlier. Nonetheless, the fragmented forests which remain harbour impressive levels of species diversity, both faunal and floral.

The Guinea forest biome in Angola is made up of the evergreen and semi-deciduous forests, which are restricted to the interior of Cabinda, and the large but discontinuous patches of forest in the districts of Zaïre, Uíge, Cuanza Norte and Cuanza Sul (Fig. 3). The evergreen forest in Cabinda is multi-storeyed with a canopy at 40-60m. It is dominated by genera such as *Gilletiodendron*, *Librevillea*, *Tetraberlinia* and *Julbernardia*. Much greater areas are covered by forests with a lower canopy of 30-40m where some of the dominant species are deciduous. In Cabinda, genera in this forest type include *Gossweilerodendron*, *Pentaclethra* and *Oxystigma*, while further south the common genera are *Celtis*, *Morus*, *Albizia*, *Bombax* and *Pterocarpus*.

An extended but fragmented series of forests and forest patches stretches along the Angolan escarpment from Dondo on the river Cuanza south to Quilenges in Huíla district. These forests range in size from a few to several thousand hectares and, following a gradient of altitude and moisture, form a continuum from dry scrub forest or thicket to tall moist rain forest. The largest and most important is the so-called "Amboim forest" immediately north of Gabela (inland from Novo redondo). At the dry extreme (receiving 400-600mm rainfall) a dense thicket of trees (10 to 20m tall) occurs, including *Ceiba pentandra*, *Bombax reflexum*, *Pteleopsis myrtifolia*, *Adansonia digitata*, *Lannea welwitschii*, *Albizia glabrescens* and numerous species of climbers. Inland of the dry thicket, on the higher slopes (400 to 1200m) that receive more rainfall (600 to 1200mm per annum), an increasingly luxuriant and tall (up to 40m) forest occurs. Here species such as *Bombax reflexum*, *Khaya acanthotheca*, *Blighia unijugata*, *Zanha golungensis*, *Piptadeniastrum africanum*, *Celtis mildbraedii* and *Spathodea campanulata* dominate a moist cloud-forest that features abundant epiphytes, but fewer lianas than the low-altitude thickets.

Montane forests are today represented by just a few isolated patches on protected slopes in the mountains of Huambo, Benguela, Cuanza Sul and Huíla districts of the Bailundu Highlands (Fig. 3). The combined area of these relicts is probably less than 2km², yet they provide sufficient habitat for fauna and floral communities to survive separated by over 2000km from their closest allies. Such sites are therefore of considerable biogeographical interest. The best examples of this forest type are in the Luimbale area, in particular on Mount Moco where at least 15 patches from 1 to 20ha have survived. The forests are mostly in deep ravines at 2000-2500m in altitude. The dominant trees, 10 to 15m high, include species of the genera *Podocarpus*, *Pittosporum*, *Olea* and *Ilex*.

The mangrove flora in Angola is richest in the northern part of the country (Fig. 3), particularly in Cabinda, decreasing in density and diversity towards the south, a reflection of the strong influence of the cold Benguela current. The dominant tree of this ecosystem is *Rhizophora racemosa*, which often reaches 20m in height, followed by *R. harrisonii*. In the north these grade into *Pandanus-Raphia* swamps dominated by *R. hookeri* and *R. palmarpinus*. Estimates of the remaining surface area of mangroves range from 700km² to 1250km². During the past 50 years, a substantial proportion of mangroves have either been cleared or are severely degraded, having been regularly cut for firewood [1, 6, 9].

Logging output steadily increased in Angola during the 1960s, from 258,000m³ in 1961 to 740,000m³ in 1969. With the onset of civil war in the 1970s, production declined to less than 200,000m³ (see Deforestation). According to FAO [23], there are no exports of logs (unprocessed or processed) from the country at present. Logging is selective; the main species exploited include *Guibourtia coleosperma*, *Marquesia macroura*, *Berlinia* spp., *Baikiaea plurijuga* and *Brachystegia spiciformis*.

FAO is preparing a Tropical Forestry Action Programme (TFAP) for Angola which should provide a framework for more specific assessments and the preparation of a management plan for the nation's timber resources.

Agriculture

After independence the agricultural sector collapsed completely and has not recovered in the warfare which followed. In 1975 Angola was self-sufficient in all major food crops and exported significant amounts of maize, sisal, coffee, rice, sugar, bananas, and palm oil [31]. Today these items are imported.

Only about 3% of Angola's total area is cultivated, yet 70% of the labour force is occupied in agriculture, primarily on small farms. There are no reliable statistics on the magnitude of the deterioration of modern agriculture following the departure of Portuguese settlers in 1974-1975, but figures for the past and present production of major crops highlight the precipitous decline in output (Table 1).

Table 1. Agricultural Production estimates ('000 tonnes) [29]

| Crop | 1973 | 1987 | 1988 | 1989 | 1990 |
|----------------|---------|---------|---------|---------|---------|
| Wheat | 32.8 | 2.3 | 2.4 | 2.4 | 3.0 |
| Rice | 53.0 | 2.4 | 2.4 | 2.8 | 3.0 |
| Maize | 853.8 | 300.0 | 270.0 | 204.0 | 180.0 |
| Sorghum | 116.4 | 58.7 | 60.0 | 63.0 | 63.0 |
| Beans | 63.7 | 41.3 | 36.0 | 36.0 | 33.0 |
| Potatoes | 59.9 | 40.0 | 40.0 | 35.0 | 34.0 |
| Sweet potatoes | 25.0 | 60.0 | 56.0 | 56.0 | 54.0 |
| Cassava | 1,408.6 | 1,450.0 | 1,460.0 | 1,470.0 | 1,600.0 |
| Cotton | 114.3 | 1.1 | 2.2 | 2.5 | |
| Coffee | 210.0 | 9.3 | 8.1 | 5.0 | 5.0 |
| Sisal | 60.2 | 1.0 | 1.0 | 1.0 | 1.0 |
| Bananas | 399.3 | 114.0 | 114.0 | 114.0 | 113.0 |
| Sugar cane | 967.4 | 110.0 | 110.0 | 110.0 | 110.0 |
| Beef | 24.5 | 3.8 | 3.7 | 3.7 | |

The main cash crop remains coffee. Before independence annual production of green coffee was more than 200,000 tonnes, with the USA the main customer. In the mid-1970s Angola was the second largest African coffee producer and the world's main supplier of *robusta* coffee. Coffee was cultivated on a variety of plantations, each using only a score of workers. The owner would combine agriculture with minor trade with local Africans. But after the departure of the Portuguese, neglect of plantations, drought, insufficient transport, excessive bureaucracy and the continuing armed conflict all contributed to reduce production to about one-tenth of pre-independence levels (see Table 1). In recent years the main buyers of Angolan coffee have been Algeria, the former East Germany, Portugal, Spain and the former USSR. The plantations (which were nationalised following independence) account for 60% of the coffee output. Most now either operate at a minimal level of productivity or are altogether deserted. In an attempt to improve the performance of the coffee sector, the government announced in 1990 that more than 100 state-owned coffee plantations would be sold to private buyers.

Annual sisal exports reached 66,719 tonnes in 1974, when Angola was Africa's second most important producer. Production has since fallen sharply. According to FAO estimates, output amounted to only 3000 tonnes per year during 1984-1986. Exports declined to very low levels, estimated at 500 tonnes in 1984, dwindling to about 200 tonnes a year in 1985-1986. Production was adversely affected by a slump in world prices as well as by the transfer from private to state ownership.

Before independence maize was ranked fifth or sixth among Angola's agricultural exports, with the harvest reaching 700,000 tonnes in 1973. By 1975 the output of cereals was declining, and from that year Angola has been a recipient of food aid. Maize was down to some 300,000 tonnes in 1980, and fell further to 250,000 tonnes in 1985. Total cereal production for the 1987 season was estimated at a post-independence 'high': 410,000 tonnes.

Nonetheless, only about half of the country's cereal requirements are produced locally, and Angola has remained heavily dependent on international food aid.

Cotton was once another promising product for Angola. At independence the main areas of cultivation were the Baixa de Cassange, in Malanje Province, and the region east of Luanda. Organised planters in Cuanza Sul province were responsible for a large increase in mechanised production, and an increasing part of the crop was processed in Angola by three textile mills. But the decline on most European-owned plantations reduced production from 104,000 tonnes in 1974 to an estimated 33,000 tonnes annually during the 1980s, according to FAO. For the first time in Angola's history cotton was imported in 1983.

Other crops of significance include sugar, cassava and bananas. Sugar was formerly controlled by three Portuguese companies operating on the plantation model. In 1973 export amounted to 9679 tonnes. Output of raw sugar decreased from 84,000 tonnes in 1972 to 17,000 tonnes in 1985, when Angola had to import about 77,000 tonnes from Cuba. The main plantations are now workers' cooperatives under Cuban management and assistance.

Cassava is currently the main Angolan crop in volume produced, and is the staple food for the majority of the population. Production was estimated at almost 1.5 million tonnes in 1988, and most of the crop was consumed in Angola. The cultivation of bananas is being increased in the lower reaches of the rivers north of Luanda and the Cuvo river, which reaches the sea north of Novo Redondo. Estimated output was 280,000 tonnes a year in the 1980s.

Because of its large area and variety of climate, Angola is one of the most promising agricultural countries in southern Africa. Commodities such as palm oil (an estimated 12,000 tonnes of palm kernels and 40,000 tonnes of palm oil were produced annually during the 1980s), coconuts, beans, tobacco, wheat, rice, millet, sorghum, tropical and temperate fruit, cocoa and groundnuts are all produced in small quantities. This indicates the potential agricultural future of Angola, provided that capital and expertise are invested and the problems of civil unrest, inadequate transport and the lack of proper marketing facilities and incentives can be overcome [1, 8].

Today Angola's commercial farming sector is virtually non-existent and cash crop outputs are less than 5% of the levels attained in the early 1970s [31]. The subsistence sector has fared slightly better but the estimated decline in output exceeds 70%.

Livestock

Livestock raising is concentrated in southern and central Angola owing to the prevalence of the tsetse fly and the poor quality of the natural pastures in the north. Some two-thirds of all cattle are found in Huíla province. The modern ranching sector, established by the Portuguese, was nationalised following independence and has subsequently been adversely affected by civil war and drought. Meat shortages are prevalent in all cities, and imports are indispensable. In 1973 Angola had 4.4 million head of cattle, two million goats, 1.4 million pigs and 350,000 sheep. By 1989 cattle numbers were reduced to 3.1 million, pig numbers were down by 60%, sheep by 70% and goats by half (see Fact Sheet). Even these figures

may be inflated: it is thought they do not account for the full extent of damage wrought by the civil war [1].

Fisheries

In the fishery sector, as in most other sectors in Angola, the departure of the Europeans led to a huge drop in harvests, and it is only in recent years that tonnages caught have begun to approach pre-independence levels. From an annual average of 450,000 tonnes in the early 1970s, for example, catches went down to 191,000 tonnes in 1985 and 101,000 tonnes in 1988. Most European-owned fleets had departed, and although 263 trawlers had been nationalised only 87 were operational in 1981 for lack of maintenance. In the same year the government formed a fisheries enterprise in an attempt to revive the industry, and Angola received a loan of US\$10 million from the Arab Bank for Economic Development in Africa (BADEA). A further grant of US\$9.5 million was provided by the European Community in 1984. In 1988 the former USSR agreed to strengthen cooperation with Angolan fishing boats and considered establishing a joint venture and building a fishing port in Namibe province. By 1989 the annual catch had improved sharply to 312,000 tonnes. Foreign-owned trawlers operating off the coast are a major problem. They have significantly depleted the fish reserves in Angolan waters [1, 3, 14].

During the war some of the fish-processing plants, most of which were in Namibe, were destroyed. The industry therefore had to be rebuilt from scratch. Canneries are now being rehabilitated and new cold stores built with aid from the CEC, Spain and other donors [29].

Fishing is concentrated in and off Namibe (Moçamedes), Tômbua (Porto Alexandrae), south of Moçamedes, and Benguela. The main species caught include cunene (horse mackerel) and sardinellas. The freshwater catch in 1973 amounted to 8000 tonnes, considerably less than 10% of the 1988 total catch. But subsistence fishing in freshwater systems is thought to be significant. This figure is therefore almost certainly a serious underestimate and does not reflect the central importance of fish protein in the lives of rural people.

Protected areas and wildlife

A number of existing conservation areas were first proclaimed by Portuguese colonial authorities in the 1930s in zones that were considered to be of low agricultural or economic potential. In the ensuing years little attention was given to nature protection and Angola had no national wildlife programme until the 1970s. In this decade, with a growing national interest in conservation, greater government support, improved protected areas management and the first national wildlife survey, significant efforts were made to preserve the country's natural heritage. Unfortunately this progress was halted again by the civil war which broke out in 1976.

Current legally established protected areas include six national parks and a range of other sites (Table 2; Fig. 4).

The status of protected areas throughout Angola is critical because none have had any administration or management during the past 17 years. Many of the country's most critical sites are in serious danger, with large mammal populations particularly at risk as a result of poaching. Several important habitats receive no protection at all. Forest habitats in the

mountains, along the western escarpment, and in the north are believed to be especially vulnerable. The same is probably true of certain marine habitats, although little information is available [9].

Table 2. Protected areas of Angola (excluding Forest Reserves) [24]

| Category | Number | Area (km ²) |
|-----------------------|-----------|-------------------------|
| National Park | 6 | 54,660 |
| Strict Nature Reserve | 1 | 17 |
| Strict Reserve | 1 | 8,280 |
| Partial Reserve | 4 | 19,200 |
| Regional Nature Park | 1 | 150 |
| Total | 13 | 82,307 |

In addition to the protected areas listed in Table 2 about 18 forest reserves cover some 600km², but by all accounts they have received little attention since their establishment.

Priorities in developing the protected areas network have been identified in a number of studies. These priorities include: integrating protection and management into rural development programmes; establishment of new reserves in forests and grasslands of the north, highland and western escarpment areas; enforcement of anti-poaching measures; a redefinition of the boundaries of Kisama National Park (see Fig. 4) to include both banks of the Cuanza and Longa rivers; establishment of a lowland forest reserve in the Cabinda enclave; protection of the gallery forests of Cuanza Norte and the Zaïre border; and marine habitat conservation measures [27, 28].

The entire park system has been placed on the List of Threatened Protected Areas of the World since 1988, due to disruption caused by civil war, uncontrolled poaching and the loss of infrastructure. There is a serious lack of staff, resources and support, and only Kisama National Park is "functioning", but even this site of nearly 10,000km² is managed by only one or two game rangers [24]. Overall, the country lacks even the initial resources to establish the foundations of an effective conservation system [2, 9].

Non-renewable resources

Angola is one of the richest countries in southern Africa for mineral reserves. Petroleum and diamonds in particular are of paramount importance to the economy, and Angola is the second largest exporter of hydrocarbons in sub-Saharan Africa behind Nigeria. Mineral products contributed 92% of export earnings in 1985.

The petroleum industry is the economic mainstay of the MPLA government. Petroleum extraction, refining and distribution constitute Angola's most important economic activity. Hydrocarbons accounted for more than 90% of total exports during the 1980s. The petroleum sector accounts for about 90% of State revenues and about one-third of the GDP.

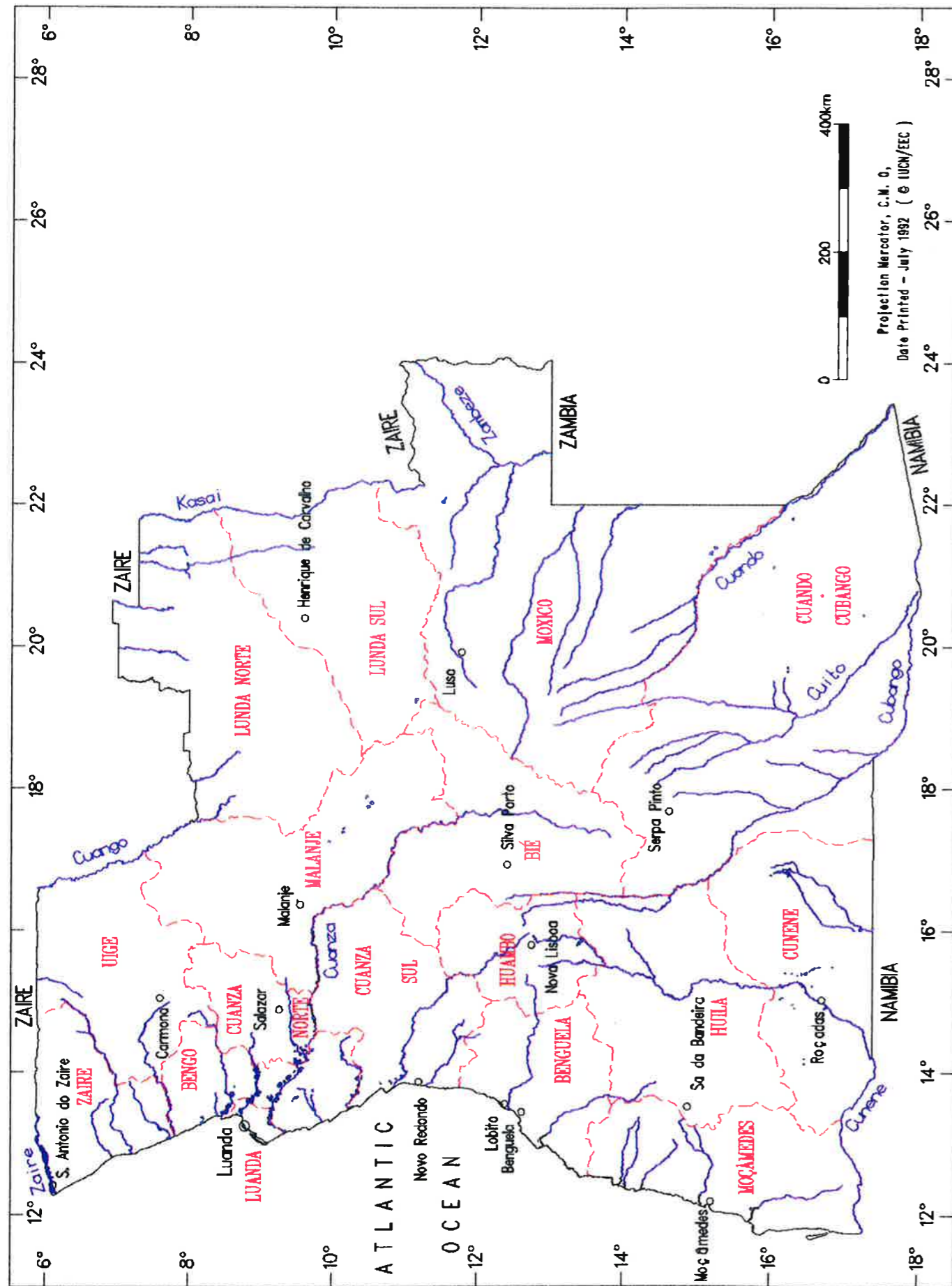


Figure 1. Administrative Boundaries, Rivers and major towns of Angola.

Angola

Total proven recoverable reserves of crude petroleum were estimated at 2100 million barrels in 1987. Reserves of natural gas were estimated at 37 billion m³ at the end of 1984.

Cabinda's offshore fields (operated by the US Chevron Corporation) remain the core of the petroleum industry but, since 1979, production from other blocks off the Angolan coast have been significant. Recent offshore finds confirm Angola's strong position in oil reserves.

Onshore production in 1990 was estimated at 33,000 barrels a day (b/d), but is stagnant and expected to decline soon, especially in the Cuanza River valley where 85% of recoverable oil has already been extracted. Further onshore exploration is being conducted, but it was a target of UNITA attacks during the civil war. Offshore petroleum production was largely protected by Cuban troops from the effects of the civil war.

Output of petroleum has risen steadily throughout the 1980s, from 155,000 b/d in late 1982 to 475,000 b/d in 1990. It was expected to exceed 500,000 b/d in 1991. The bulk of the oil is exported to the USA in its crude form but Angola refines about 30,000 b/d and exports lubricating oil, bunkering oils and heavy fuels. Production at Angola's main refinery in Luanda meets most of the national requirement. This refinery is to be upgraded and expanded. A second, small refining facility operates at Cabinda.

In spite of the fall in the price of petroleum, Angola's export earnings from petroleum increased over the decade to US\$2100 million in 1987. As Angola is not a member of OPEC the country is not constrained by production quotas, enabling it to maintain the value of its oil exports by increasing output when world prices are depressed. A national oil company, SONANGOL, manages all fuel production and distribution, and maintains a 51% interest in all oil companies operating in Angola.

Diamonds are the second most important mineral in Angola, with a tremendous potential for expansion. The country's kimberlite pipes are believed to rank among the world's five richest deposits of embedded diamonds, and it has been forecast that revenue from diamond sales, given the cessation of the civil war, could increase nine-fold by the mid-1990s. Diamond output has fluctuated over the years, from 1.5 million carats in 1980 down to only 200,000 carats in 1986, recovering to nearly one million carats annually in 1986 and 1987. Sales of diamonds declined from US\$221 million in 1981 to US\$15 million in 1986, but recovered to US\$180 million in 1988. Figures of diamond output are deceptive, since a significant proportion (perhaps half) of the real production is mined by UNITA, which has admitted a significant share of its resources derives from the diamond area. Recent agreements involving the mining of diamonds and other gems have been finalised between the government and the former USSR, Portugal and South Africa.

Annual iron ore output was about six million tonnes in the early 1970s, mainly from the Cassinga mines in the Huila province for which a railway spur was built to link the mines to the Namibe railway, and a new harbour was built to the north of Namibe for ore export. In 1975, however, the mines were partially destroyed in the fighting, and they have remained out of operation. The railway was also severely damaged. All Angolan iron ore production was halted during 1975-1984. Rehabilitation work on the Cassinga North mine was completed in 1986, but the depressed world market for iron ore and the insecurity of the

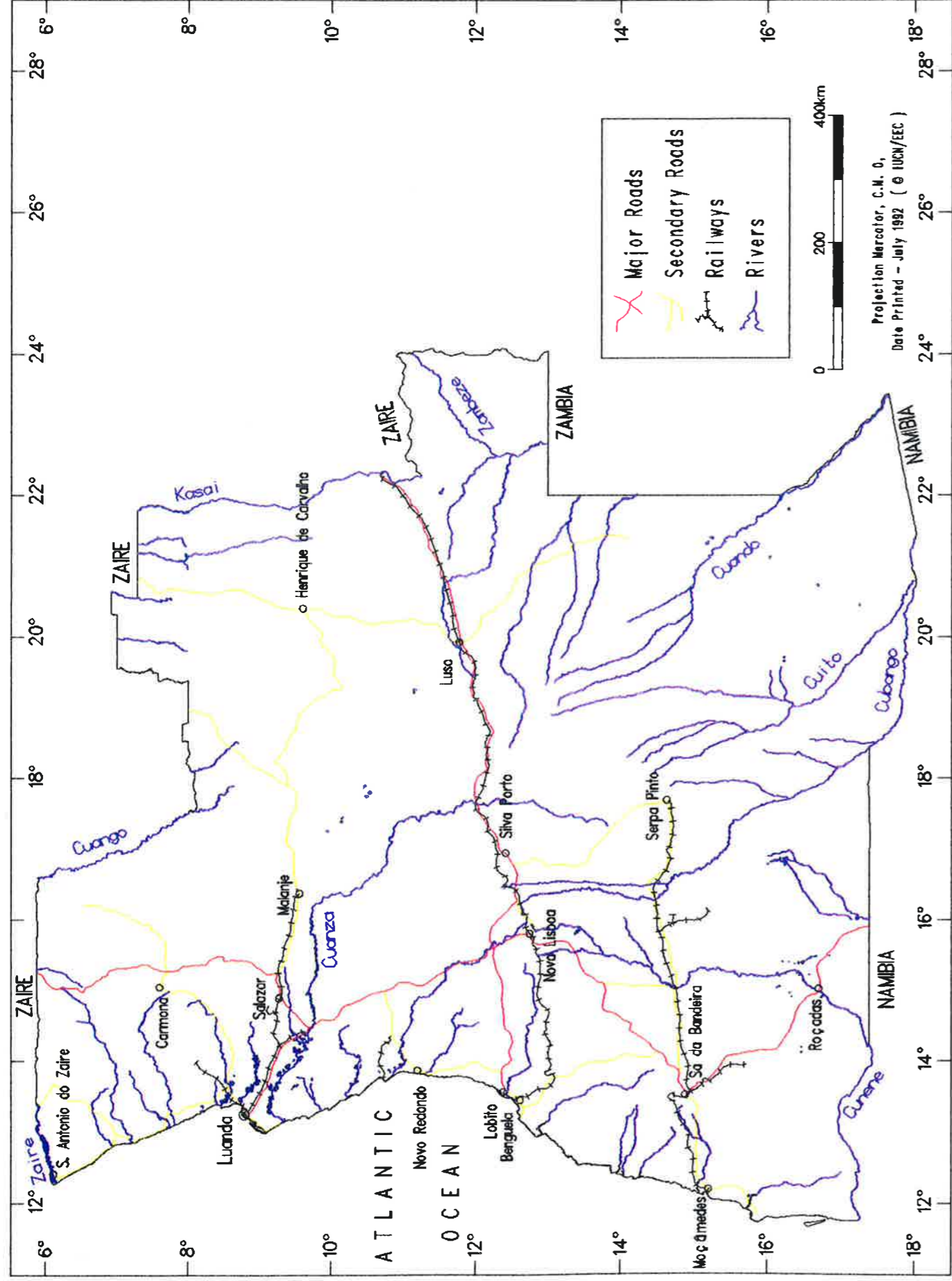


Figure 2. Major communication routes in Angola.

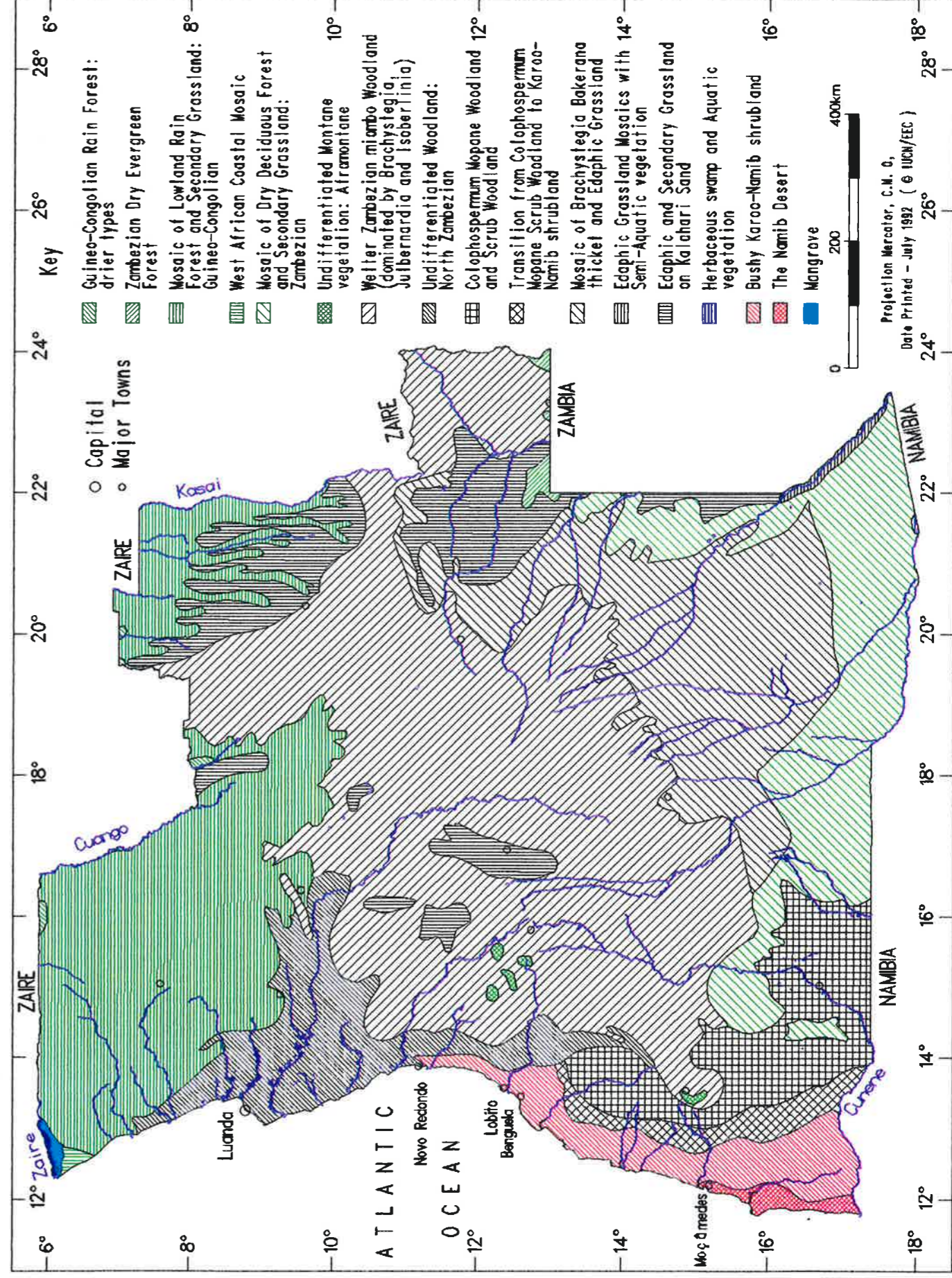


Figure 3. Vegetation pattern of Angola. See text and Annex I for further details.

country have delayed reopening. At present Angola holds considerable ore stockpiles, which await the eventual rehabilitation of rail links to the coast.

Other minerals include substantial reserves of copper, feldspar, manganese, phosphate, lead, zinc, gold, mica, bauxite, marble and black granite, talc and uranium, all of which are thought to have important economic potential, although there are no plans at present to develop them. In early 1990 a national commission was created to implement a restructuring of the minerals sector [1, 14].

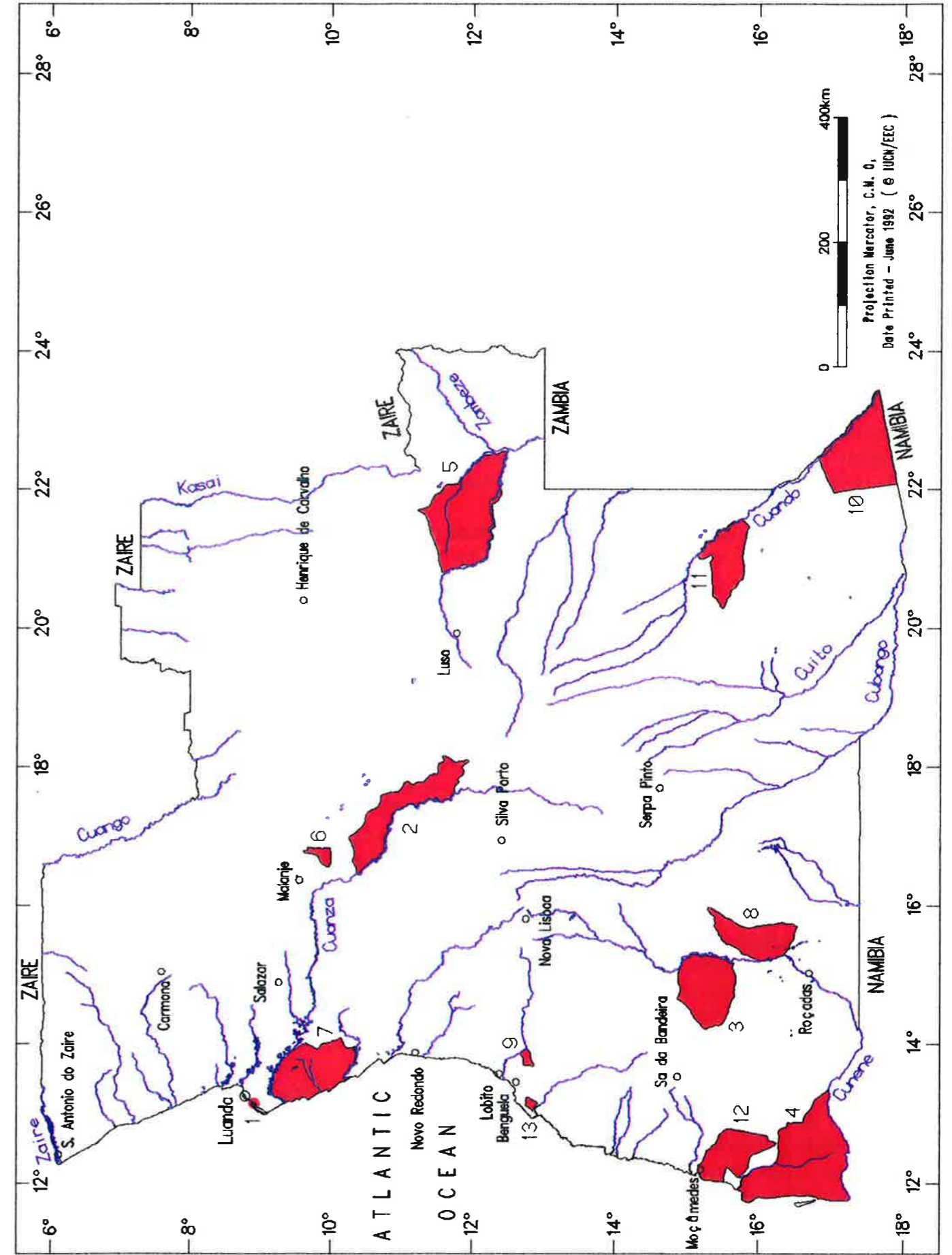


Figure 4. Protected Areas of Angola. See text and Annex II for further details.

Industry

Main industrial sectors

Angola's industrial sector (construction material production, petroleum refining, food processing, textiles, equipment for the petroleum industry, steel, chemicals, electrical goods and vehicle assembly) has dwindled in output to a fraction of pre-independence levels, largely because of the absence of essential technical and managerial skills. Abandoned Portuguese enterprises, brought under State control and ownership in 1975, did not prosper. These were finally reformed in 1988, each enterprise being granted autonomous control of management, in the hope that production would improve.

The continuing civil strife, shortages of raw materials, unreliability of power supplies and disruption of the transport infrastructure have also been contributors to the sharp reduction in industrial output. Official figures showed manufacturing output in 1985 at only 54% of its 1973 level, and the sector suffered further in the ensuing three years, when a decline in earnings from petroleum exports, caused by the sharp fall in the price of petroleum, reduced the supply of foreign exchange needed for industrial raw materials and imports of capital goods. Allocation of foreign exchange for this purpose more than doubled, however, in 1990.

The manufacturing sector is considered to have strong potential, in view of the abundance of raw materials such as petroleum and iron ore. During 1962-1970, for instance, manufacturing output expanded at an average rate of 19% per year. There are a few exceptions to the general rule of contraction in this sector since 1975. A new textile complex at Lobito was built by French industrialists in 1979 and a second plant is planned for Luanda, with an annual capacity of 18 million metres. A yard for the construction of oil equipment was built at Ambriz, north of Luanda, in 1984. In mid-1987 a loan was approved by the African Development Bank for three pharmaceutical plants, and construction of one began in 1989. In 1987 the government signed a contract with a Dutch Company for the import and assembly of trucks at a plant in Luanda. In 1988 the existing foreign investment code was replaced, giving more operating freedom to foreign companies in exchange for transfer of technical and managerial skills to Angolan personnel. The construction sector, although hampered by acute shortages of building materials, has been helped by the rehabilitation of the main cement works in Luanda (1986 output: 390,000 tonnes) and is expected to benefit greatly from the Kapanda dam project (see Energy Sources and Consumption) [1, 8].

Location of industry

By far the greatest concentration of industries is in Luanda, with its port facilities, oil refinery, cement works, truck assembly plant and a host of other enterprises. There is a small local oil refining facility in Cabinda.

Energy sources and consumption

With healthy petroleum reserves and an abundance of hydro-electric power sites, Angola is potentially self-sufficient in energy (see Energy Issues). Most of its output is of hydro-electric origin (280MW of about 430MW in 1985), and a large dam on the Cuanza River at Cambambe, with generating capacity in 1989 at 450MW, supplies many of Luanda's industries with power. A 520MW power station at Kapanda on the Cuanza, due to be

completed in 1994, is expected to increase Angola's capacity by 100% and generate around 2400 million kWh a year, well in excess of present requirements [1, 14].

Further south, Lobito and Benguela are provided with electricity by two privately owned dams, the Lomaum and Biopio, both on the Catumbela River. The Lomaum dam was badly damaged during the war, and Portuguese interests have recently provided capital for its rehabilitation. Further south, the Matala dam serving Lubango (formerly Sa da Bandeira), Namibe and Cassinga (in Huíla) is a small part of a massive Angolan-Namibian scheme to dam the Cunene River and provide Namibia, which is short of power and water, with cheap electricity and water supplies. Other dams on the Cunene include the Gove dam (south of Huambo) and a major power station at the Ruacaná Falls, south-west of Roçadas. The potential annual generating capacity for the Angolan-Namibian scheme is estimated at 1000 million kWh [1].

Demography and Urbanisation

Demographic pattern

Population distribution reflects almost 20 years of instability and does not indicate reflect the capacity of Angola's natural resource base to support its people. This imbalance between the environment and human pressure is the root of the country's most urgent environmental problems [30].

Collection of statistics on population has been extremely difficult. Torn by war, Angola has experienced large migrations of people, initially from urban areas to rural locations, and later in reverse. It is considered underpopulated, with fewer than six million inhabitants recorded during the 1970 census — 4.5 persons per km². Mid-1992 estimates suggested that the population had risen to 13,008,075 (see Table 3), an average of 10.4 persons per km², still one of the lowest densities in Africa.

The principal characteristic of the Angolan population is youth: 45% are under 15 and only 3% over 60 years.

In general, the demographic characteristics are similar to many other developing countries in that people have tended to congregate on more fertile soils along the rivers and in the coastal regions. The most populous province is Luanda, followed by Benguela, Huambo, Uíge and Huíla (see Table 3). These five provinces account for 50% of the estimated 13 million inhabitants. Namibe, situated in the most arid portion of the country, has the smallest number (99,595).

Of Bantu origin, Angola's population has considerable ethnic diversity. The largest group, the Ovimbundu, in central-western Angola, make up 30% of the population, followed by the Mbundu (near Luanda, 20%), and the Bakongo (in the north-west, 13%). Smaller groups include the Lunda and Chokwe in the east and the Kwanyama in the south. There is a sizeable mestizo (mixed race) community in urban areas.

Christianity is the dominant religion, with an estimated 4.7 million Roman Catholics and 800,000 Protestants. The rest practice traditional beliefs. Angola is a secular state with complete separation of State and church [1, 7, 14].

Excluding refugees who left the country or migrated to Luanda, there are an estimated one million persons in Angola who were forced to leave their home areas. Although estimates of displaced persons did not feature in the analysis summarised in Table 3, data from a 1983 census indicate that 48% of the capital's population came from other provinces [30]. If this proportion holds today, the number of displaced in the province of Luanda alone is approximately 737,000. So at least 1.7 million in Angola today were forced to leave their original place of residence because of civil war. Many moved to urban areas or close to towns.

Table 3. The estimated population of Angola and number of displaced persons by province [30] (mid-1992)

| Province | Total | Displaced |
|--------------|-------------------|-------------------|
| Bengo | 327,327 | 81,891 |
| Bié | 1,493,320 | 30,745 |
| Cabinda | 172,353 | 161,500 |
| Cu/Cubango | 177,789 | 28,839 |
| Cuanza Norte | 547,681 | 38,937 |
| Cuanza Sul | 1,069,381 | 190,000 |
| Cunene | 335,953 | 23,120 |
| Huambo | 1,386,370 | 94,304 |
| Huíla | 1,000,000 | 84,974 |
| Luanda | 1,538,779 | ----- |
| Lunda Norte | 558,760 | 33,175 |
| Lunda Sul | 389,864 | 14,665 |
| Malanje | 859,000 | 32,000 |
| Moxico | 337,177 | 64,424 |
| Namibe | 99,595 | 10,423 |
| Uíge | 1,323,992 | 79,733 |
| Zaire | 194,000 | 11,131 |
| Total | 13,008,075 | 1,000,764* |

(*) does not include Luanda

Population growth

Population growth in 1990 was 2.7%, in the lower third of African countries. This, combined with an already small population, bodes well for the country's economic health. According to the United Nations, the population is expected to grow to 24.5 million by the year 2025.

At present there is no official policy on population growth. The government has stressed the need for data and research in order to formulate a policy which would help meet national goals [7].

Internal and external migration

Since independence estimates have been conjectural at best. Angola saw a mass exodus of the economically dominant white population (of whom an estimated 350,000 were repatriated to Portugal) after independence. In the mid-1970s, an ethnic regrouping of African populations took place as a result of political insecurity and massacres. Ovimbundu migrants, for instance, were compelled to retreat to central Angola, and large-scale population movements also took place in the north-west. There was also a general movement from cities to rural areas, and more than 150,000 people died as the victims of strife, famine and disease in warring areas in 1974-1976.

Angola

Over 300,000 inhabitants of southern Angola have been displaced, fleeing from South African raids (see also Demographic Pattern). Refugees, both internal (an estimated 650,000) and external (92,000), have tended to group together in encampments across the country. Some of the external refugees are gradually being repatriated since South Africa stopped its raids and Namibia achieved independence. These essentially uncontrollable migration flows, caused by the war, have taken place for the past 15 years.

The most recent population trend has been a reversal of the 1974-1976 urban-to-rural movements, with a massive exodus from strife-torn rural areas in Kongo and Mbundu regions to urban areas. This has particularly affected coastal cities, above all Luanda, which has suffered many of the ills of rapid growth [1, 7].

Extent, density and distribution of urbanisation

Angola is still an overwhelmingly rural country. Fewer than 28% of the population live in urban centres of more than 2000 inhabitants. But there is growing urbanisation (see Migration), a trend the government wishes to slow. Although there is no official spatial distribution policy, in 1984 the government began setting up a network of agricultural development stations to service the rural population with inputs, credit, transport and technical support to slow urban migration.

Luanda's former white population, more than 150,000, dwindled to little more than 30,000 in 1976 and has probably continued to decline. More than 200,000 refugees from Zaïre have settled in the capital, forming small communities of francophone Angolan citizens. Most are of Bakongo origin and have assumed positions as middle-ranking officials in Luanda, where the shortage of skills is almost as pronounced as in the provinces. In addition, many thousands of Angola's rural population have come to Luanda to escape war and drought. The growth (1.8 million in 1992) has brought with it overcrowding, food shortages, unemployment and crime.

The National Institute of Statistics (INE) estimated that the growth rate will be 5.5% for urban centres between 1990 and 2000 but only 1% for rural areas [30].

Outside the capital most urban centres are operating with reduced services, some having been partially destroyed or looted. The twin cities of Benguela and Lobito (the outlet of the Benguela railway, which has been effectively out of operation since 1975) have been particularly badly affected. Lobito harbour is still suffering from the disruption of traffic with Zaïre and Zambia. Plans to rehabilitate the Lobito corridor, which will benefit both cities, were under way in mid-1990 but there is no indication of progress since then. On the plateau, Huambo (formerly Nova Lisboa) once offered, as one observer put it, "the image of a redeemed Portugal in the tropics" [1]. It has since been deserted, severely affected by looting, and then congested with internal refugees. There was considerable rail traffic from Huambo to the eastern regions, to Shaba (Katanga) in Zaïre and to Zambia, and easy road connections with Luanda and Namibia. Security factors have curtailed these facilities to a minimum, and air lifts have become vital for Huambo.

Namibe, a fishing port, was formerly (as Moçamedes) the outlet for the Cassinga iron ore mine, which has been out of operation since 1976. Lubango has suffered from recurring

South African raids. Other centres such as Kuito and Luena (east of Luena towards the Zambian border) also suffered from the war and local disorder. On the other hand Cabinda city benefited from a boom in petroleum, while pioneer towns such as Menongue (east of Lubango) and Saurimo (east of Malanje) may eventually assume new importance as regional centres. Regions under UNITA control contain no urban centres of any significance [1, 7].

Health issues

As a result of protracted conflict and economic upheaval, health and sanitation problems are acute, with a high incidence of morbidity and mortality caused by infectious diseases, malnutrition and poor sanitation. It is estimated that at least one in five children dies before reaching the age of five. Life expectancy is only 44 years.

By early 1984 malnutrition affected some 15% of Luanda's population and by early 1991 food shortages threatened an estimated 1.8 million people. Reports show that, in addition to malnutrition, diseases such as malaria, intestinal infections, cholera and measles are prevalent. AIDS cases totalled 514 cases in September 1992, with 93 cases reported to WHO that year [32]. Only 35% of the population have easy access to safe drinking water, in spite of the country's plentiful supplies of rivers and wetlands.

The exodus of the white population at independence meant an exodus of medical personnel as well. This gap has only partly been filled by foreign physicians and health staff, especially Cubans. A Faculty of Medicine exists in Luanda and, in 1988, it had graduated some 150 physicians. As in many developing countries, however, trained personnel are quickly given additional responsibilities in administration, leaving their years of technical training unused. Most clinical work is currently being done by expatriates. There are about 9500 paramedics within the health system.

Health hazards due to contaminated water (see Water Pollution and Water Shortage) are exacerbated by the occasional flooding of rivers such as the Cavaco and Catumbela, when the floodwaters become contaminated by the open sewage systems and other human waste [30].

At the local level health workers are trained for three months in preventative medicine, although due to the absence of paramedic personnel they usually provide treatment as well.

Nutrition and immunisation programmes have been established but their reach is limited. For instance, vaccination coverage is much more extensive in Luanda than in rural areas [1, 7, 8].

ANALYSIS OF POLLUTION AND DEGRADATION PROCESSES

Water Pollution and Water Shortage

In spite of its abundant rivers and wetlands, chronic water shortages are common in Angola, especially in the more arid regions of the south-west.

A study of water supply in Benguela and Cuanza Sul provinces indicates chronic shortages there, partly a result of refugee camps [8].

Water supplies in these camps come from streams, rivers, natural or artificial ponds and bore holes but there are few examples of hand-dug, wide-diameter wells. Maintenance of pumping equipment at many bore holes is required to ensure safe water supplies. The government has been planning new dams to collect surface water.

Sewage and drainage channels are often open, while the closed systems are sometimes broken, seeping sewage and waste water into the streets and threatening to contaminate nearby wells [30].

Improved water management could, therefore, be a key to development in several sectors of the economy. There is a need to focus projects to provide urban and rural water supplies, improve sewage systems, and expand sanitation and drainage programmes. Small-scale irrigation schemes could be valuable in improving the agricultural potential of the south, which has been suffering from drought.

Soil Erosion and Degradation

There is little information available on soil erosion in Angola. Problems are likely to be associated with deforestation and intensive agricultural practices. Areas of refugee settlement are also at risk. There is a need to gather and assess data about the extent of this problem.

Deforestation

As a result of intense human activities and the prevalence of bush fires, only small relict patches of natural forest remain in Angola. In addition, civil unrest has resulted in near-complete disintegration of protected area networks and widescale poaching and burning of the forests.

The rate of deforestation for closed broad-leaved forest was estimated in 1986 at 440km² per annum out of a total of 29,000km².

The threats to the forest patches in the Angolan escarpment have not been clearly identified: undergrowth has been cleared in some regions for coffee cultivation, but much of the

formerly cultivated area has been abandoned and is now regenerating. Remaining forest sites are so small that they are permanently vulnerable to exploitation, modification and clearance. This also applies to the tiny patches of montane forest, which are severely threatened by continued extraction of timber and fuelwood by the local people.

Much of the moist forest, found primarily in Cabinda province, is now adequately conserved but it has been suggested that better laws are required to give it total protection. Remaining rainforests on private land should be given legal protection by declaring them botanical reserves.

Forests of the central coastal plain were extensively deforested during the colonial period for plantations and small-scale agriculture. The northern forests between Luanda and the Zaire Estuary have suffered less because the region is comparatively sparsely populated, although commercial exploitation for timber has been heavier [3, 6].

Exports of timber ceased at independence as exploitation schemes were being investigated [1]. Output of logs fell sharply from over 550,000m³ in 1973 to 39,750m³ in 1981. Although this activity is especially sensitive to guerilla action, log output recovered to 116,000m³ in 1984 and to 134,000m³ in 1985. In 1987 it went down again to an estimated 108,000m³ (Table 4). Logging of *Guibourtia*, *Baikiaea* and in particular *Pterocarpus angolensis* continued actively in the south-east until recently, and was exported to Namibia and South Africa to create income for UNITA [24]. In general, however, the timber industry in Angola today is almost non-existent; sawn timber has been extremely difficult to obtain in a country which during the 1970s was a substantial exporter and had an abundance of locally available construction timber.

Table 4. Roundwood removals ('000m³, excluding bark) [1]

| Category | 1985 | 1986 | 1987 (*) |
|--|--------------|--------------|--------------|
| Sawlogs, veneer logs and logs for sleepers | 134 | 108 | 108 |
| Pulpwood (*) | 140 | 140 | 140 |
| Other industrial wood (*) | 737 | 756 | 777 |
| Fuel wood (*) | 3,900 | 4,005 | 4,114 |
| Total | 4,911 | 5,009 | 5,139 |

(*) FAO estimate

Forestry plantations in the country date back to the 1930s when *Eucalyptus* plantations were established to provide fuel for the construction of the Benguela railway line. Fifty years later over 1570km² were under plantation [6]. Other softwoods were also grown near Benguela for wood pulp and paper manufacturing [1]. Following the destruction of the cellulose plant at

Alto Catumbela during the war this timber is now being used for firewood and construction materials by the local people [24].

Biodiversity

An estimated 5000 to 8000 plant species are thought to occur in Angola, of which some 1260 are endemic [24, 25]. In Africa this level of species endemism is second only to Zaïre. Most of the endemics are found in the highland and escarpment zones. A great deal of research is required to establish an inventory of Angolan flora.

With 275 mammal species recorded, Angola is one of the richest on the continent. But most of the large mammals are threatened by poaching. These include the black rhinoceros (*Diceros bicornis*) (which is thought to be nearing extinction) [9], elephant (*Loxodonta africana*), and 15 of the country's 26 species of antelope. Angola is the only country in which the giant sable antelope (*Hippotragus niger varians*) occurs. Forest primates in Angola include the chimpanzee (*Pan troglodytes*), gorilla (*Gorilla gorilla*), the endemic black-nosed monkey (*Ceropithecus ascanius atrinatus*) and a rare and distinctive subspecies of the black mangabey (*Cercocebus aterrimus opdenboschi*) which is known only from the gallery forests of northern Angola and an adjacent part of Zaïre.

Fifteen species of fruit bats have been recorded, of which four are of conservation concern: *Epomophorus angolensis* (only known from Angola and extreme northern Namibia); *E. grandis* (only known from north-east Angola and south-west Congo); *Micropteropus intermedius* (one locality in north-east Angola and three localities in south-west Zaïre); and *Pterotes anchietae*, (which is only known from west-central Angola, south-east Zaïre and northern Zambia) [9].

Other possibly threatened mammals include Ansorge's cusimanse *Crossarchus ansorgei*, found only in northern Angola and adjacent Zaïre, and the mouse *Mus callewaerti* in central Angola and south-eastern Zaïre. There is also concern over the protection of the West African manatee (*Trichechus senegalensis*).

Angola has a diverse avifauna, with 872 species recorded. Populations of the wattled crane (*Bugeranus carunculatus*) in the protected areas of southern Angola are thought to be of international significance.

The forests of the Angolan escarpment are particularly rich in species. In one study of 75 key forests for threatened birds in Africa [12] these escarpment forests were ranked 11th in importance. Rare birds species found here include the Gabela helmet shrike (*Prionops gabela*) and Gabela akalat (*Sheppardia gabela*), both restricted to the Gabela region, as well as Monteiro's bush shrike (*Malconotus monteiri*) and Pulitzer's longbill (*Macrosphenus pulitzeri*), which are also endemic to the area. No data exists on other fauna or flora, although the factors that explain the ornithological importance of the Angolan escarpment are likely to apply to speciation of other forms of life as well.

Rare birds that occur in the montane forests include the Swierstra's francolin (*Francolinus swierstrai*), the Fernando Pó swift (*Apus sladenias*) and the black-chinned weaver (*Ploceus nigriementum*). All are a high priority for specialist conservation measures. Of the 30 bird species collected in the montane forests of Mount Moco seven are also found in relict montane forests elsewhere.

The Nile (*Crocodyus niloticus*), slender-snouted (*C. cataphractus*) and dwarf crocodile (*Osteolaemus tetraspis*) have all been severely over-hunted for their hides, and conservation of these species is a high priority. Four species of marine turtle — the loggerhead (*Caretta caretta*), green (*Chelonia mydas*), olive ridley (*Lepidochelys olivacea*) and leatherback (*Dermochelys coriacea*) — are also extensively hunted, especially in the nesting season. About 20 species of amphibians are endemic to Angola, and most of these have only been recorded on one occasion. Of the freshwater fishes, two threatened species are known: the ocellated spiny-eel (*Afromasculatus vanderwaali*) (occurring at Caiundo on the Okavango River); and the broad-headed catfish (*Clariallabes platyprosopos*), which has been recorded from Namatuntu on the Okavango River. Two rare dragonfly species, *Aciogrion rarum* and *Monardithemis flava*, are known only from Angola and neighbouring northern Zambia. The rare African giant swallowtail butterfly (*Papilio antimachus*) occurs in the forests of northern Angola, where its habitat is currently unprotected.

Angola's protected areas have been afforded, at best, only minimal protection since they were established, and the most critical sites are in serious danger of being compromised. Large mammals are particularly at risk because of poaching. Improved management and security in all areas, with particular emphasis on large mammal habitats, are immediately necessary. There is a further need to integrate protection and management activities into rural development programmes wherever possible. Visitor facilities established in protected areas could generate revenue to finance further training, anti-poaching measures and rural development programmes. International assistance for staff training and finance should also be sought.

New reserves need to be established in forest and grassland areas in the north, highland and western escarpment regions. These should focus on conserving the diversity of species of endemic plants and birds and also address the needs of a number of rare and threatened species [2, 3, 6, 9, 12].

Marine Environment and the Coastal Zone

Angola's coastline, 11,650km, is mostly of soft marine sediments. There are large areas of mangroves (700km²) at the mouths of several rivers, and extensive salt marshes. The largest section of protected coastline is in Iona National Park (see Fig. 4), along the southern coast. Marine habitat conservation measures have been identified as a priority need in developing the protected areas network [2]. This is especially important in view of the shortage of data about these ecosystems.

A substantial proportion of tidal forest has been cleared or is severely disturbed, being regularly cut for firewood. *Raphia* leaves are widely used for thatching and the plants are tapped in various ways for their sap which ferments to become palm 'wine' and is often illicitly distilled. *Uapaca* wood is a preferred material for making charcoal [3].

The offshore oil industry has significant effect on the coastal and marine environment. The Cabinda Gulf Oil Company (Cabgoc) has a good safety record, however, and operates an environmental awareness programme for employees, together with a plan for dealing with oil spills [22].

Urban Environment

The urban environment in Angola has suffered from rapid growth without accompanying facilities such as water, sewage, or even proper shelter to reduce serious overcrowding, disease, and malnutrition. Although some housing programmes have been initiated in large cities, acute shortages of materials have limited most construction to shanty building, resulting in unzoned urban growth [1].

Much of the problem stems from the large number of refugees who have come flooding into the cities, particularly Luanda, from the rural areas. The capital's population is estimated to have increased by 300% since 1975 to approximately 1.8 million, and there has been little new construction or maintenance of existing buildings. Large apartment blocks in the centre of the city, which seem superficially to be quite adequate for habitation, are in many cases "vertical shantytowns" with inadequate or no water or sanitary facilities, and are populated by families with no cash income or goods to barter [8]. Power supply in Luanda, although it suffers from fluctuations and occasional breakdowns, is generally dependable. But water supplies are not sufficient. The sewage system is woefully inadequate for the city's needs and is frequently in a state of disrepair. Recent years have seen several outbreaks of cholera.

Energy Issues

Energy production in Angola is dominated by oil, with 23.5 million tonnes produced in 1990 [26], a substantial increase from 14.4 million tonnes in 1986 [14]. There are significant reserves of natural gas, but about 60% of the production is flared.

Disruption of the transport network by war and the lack of domestic processing facilities to transform crude petroleum into usable fuels have resulted in timber being the only available energy source for most of the population, even though Angola possesses the second largest petroleum industry in sub-Saharan Africa.

Angola has vast biomass reserves. The estimated sustained yield exceeds 150 million tonnes per year [30]. Woodfuel remains important in domestic uses, amounting to 9.8 million m³ in 1990 [26]. This demand contributes to deforestation in some regions, as constant extraction does not allow for regrowth of trees and shrubs.

Installed electricity-generating capacity was estimated at about 430MW in 1985 and is set to double with completion next year of the Kapanda hydro-electric project (see Energy Sources and Consumption) [14].

Industry

There is little information on the extent of industrial pollution in Angola. The extraction of oil, diamonds, quartz and iron ore is certain to give rise to pollution of water, air and land. The production of oil in Cabinda Province is said to have a reasonably good environmental record [22]. There may also be a legacy of pollution associated with the pre-independence industries such as petroleum refining, chemicals, metals and construction materials.

Although poorly described, water pollution as a result of industrial activity is also a problem. The industrial complex in Lobito-Benguela includes both heavy and light industry as well as food and fish-processing plants. There is no control over the discharge of effluents from these plants. The textile factory (Afrotextil), the biggest in Africa, discharges waste directly into the Cavaco River. Other light and cottage industries also discharge waste into open or adjacent water courses [30]. No information is available on the level or type of pollution by these effluents. It should be noted, however, that the present level of industrial output is below potential and some factories are even temporarily closed. It is to be expected, therefore, that industrial pollution will increase as industries resume operation and increase output [30].

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NOTE ON DATA SOURCES

Every effort has been made to ensure that the information in this Environmental Synopsis is as detailed and accurate as possible. Many reports are, themselves, the result of a review of existing data and some issues may therefore be open to different interpretations. Wherever possible, original data sources have been used as a reference or, failing that, data have been checked against several other sources.

A number of publications are recommended for further in-depth reading on a particular topic. These include the regular country reports of the Economist Intelligence Unit [29] which provide a well-balanced review of the political (historical and present) and economic situations as does the Europa Handbook [1]. A wide selection of useful statistical data are to be found in [1, 7, 13, 14, 15, 16, 17, 18, 19, 20, 21, 29, 32, 33, 34, 35, 36, 37, and 38]. Information on biodiversity, deforestation and wildlife issues have been obtained from a number of publications [2, 3, 6, 9, 12, 23, 25, 27, 28 and 30]. Demographic, health and similar data have been taken from a wide range of sources within the United Nations (such as WHO and UNICEF).

One of the prime objectives of this overview has been to highlight gaps in current information in the hope that government and development agencies alike will take the need for fuller information into consideration when planning and implementing future projects.

ANNEX I

Vegetation pattern of Angola (See also Fig. 3)

No vegetation map was made available to this project. The data shown here do not present the actual vegetation cover in Angola but are potential vegetation patterns digitised from White, F. (1983) *The Vegetation of Africa* prepared for UNESCO. Conservation areas were taken from a Russian map *Angola* (1987) at a scale of 1:2,500,000 and from an unsourced map compiled in 1982 at a scale of 1:6,000,000.

Digitised data are held at the *WCMC Biodiversity Map Library*, WCMC, 219 Huntingdon Road, Cambridge, CB3 0DL, UK.

ANNEX II

Protected Areas of Angola (See also Fig. 4)

| Map Reference | Name |
|---------------|--|
| 1 | Ilheu dos Passaros Strict Nature Reserve |
| 2 | Luando Strict Nature Reserve |
| 3 | Bikuar National Park |
| 4 | Iona National Park |
| 5 | Kameia National Park |
| 6 | Kangandala National Park |
| 7 | Kisama National Park |
| 8 | Mupa National Park |
| 9 | Bufalo Partial Reserve |
| 10 | Luiana Partial Reserve |
| 11 | Mavinga Partial Reserve |
| 12 | Moçamedes Partial Reserve |
| 13 | Chimalavera Regional Nature Park |

ACRONYMS

| | |
|---------|---|
| AAA | Associação Angolana do Ambiente (Angolan Association for the Environment) |
| ADRA | Accao para o Desenvolvimento Rural e Ambiente (Movement for Rural and Environmental Development) |
| BADEA | Arab Bank for Economic Development in Africa |
| CIDA | Canadian International Development Agency |
| DINOPA | National Directorate for Fisheries and Agriculture |
| DNACO | Direcção Nacional de Conservação da Natureza (National Directorate for Nature Conservation) |
| CEC | Commission of the European Communities |
| FAO | Food and Agriculture Organization of the United Nations |
| GDP | Gross Domestic Product |
| GNP | Gross National Product |
| ha | hectare(s) |
| IDF | Instituto de Desenvolvimento Florestal (Institute for Forest Development) |
| IMF | International Monetary Fund |
| INE | Instituto Nacional de Estatística (National Institute of Statistics) |
| IUCN | The World Conservation Union |
| JEA | Juventude ecológica Angolana (Angolan Youth Ecology Association) |
| km | kilometre(s) |
| kWh | kilowatt-hour(s) |
| MINADER | Ministry of Agriculture and Rural Development |
| MINAGRI | Ministry of Agriculture (pre 1991) |
| MPLA | Movimento Popular de Libertação de Angola (Popular Movement for the Liberation of Angola) |
| MW | Megawatt(s) |
| NGO | non-governmental organisation |
| NSC | Nature Conservation Council |
| OPEC | Organization of Petroleum Exporting Countries |
| SADCC | Southern African Development Coordination Conference |
| SIDA | Swedish International Development Agency |
| TFAP | Tropical Forestry Action Programme |
| UNDP | United Nations Development Programme |
| UNEP | United Nations Environment Programme |
| UNITA | União Nacional para a Independência Total de Angola (National Union for Total Independence of Angola) |

Titles in this series of Environmental Synopses include:

| | |
|--------------------------|-----------------------|
| Angola | Liberia |
| Barbados | Malawi |
| Belize | Malaysia |
| Bénin | Mauritania |
| Bolivia | Mauritius |
| Burkina Faso | Mozambique |
| Burundi | Namibia |
| Central African Republic | Niger |
| Colombia | Nigeria |
| Comoros | Peru |
| Congo | Rwanda |
| Côte d'Ivoire | São Tomé and Príncipe |
| Dominican Republic | Sierra Leone |
| Djibouti | Solomon Islands |
| Equatorial Guinea | Somalia |
| Ethiopia | Swaziland |
| Fiji | Togo |
| Gabon | Vanuatu |
| Jamaica | Western Samoa |
| Lesotho | Zaire |