

Namibia

Total population (July 2000 estimate): 1,771,000

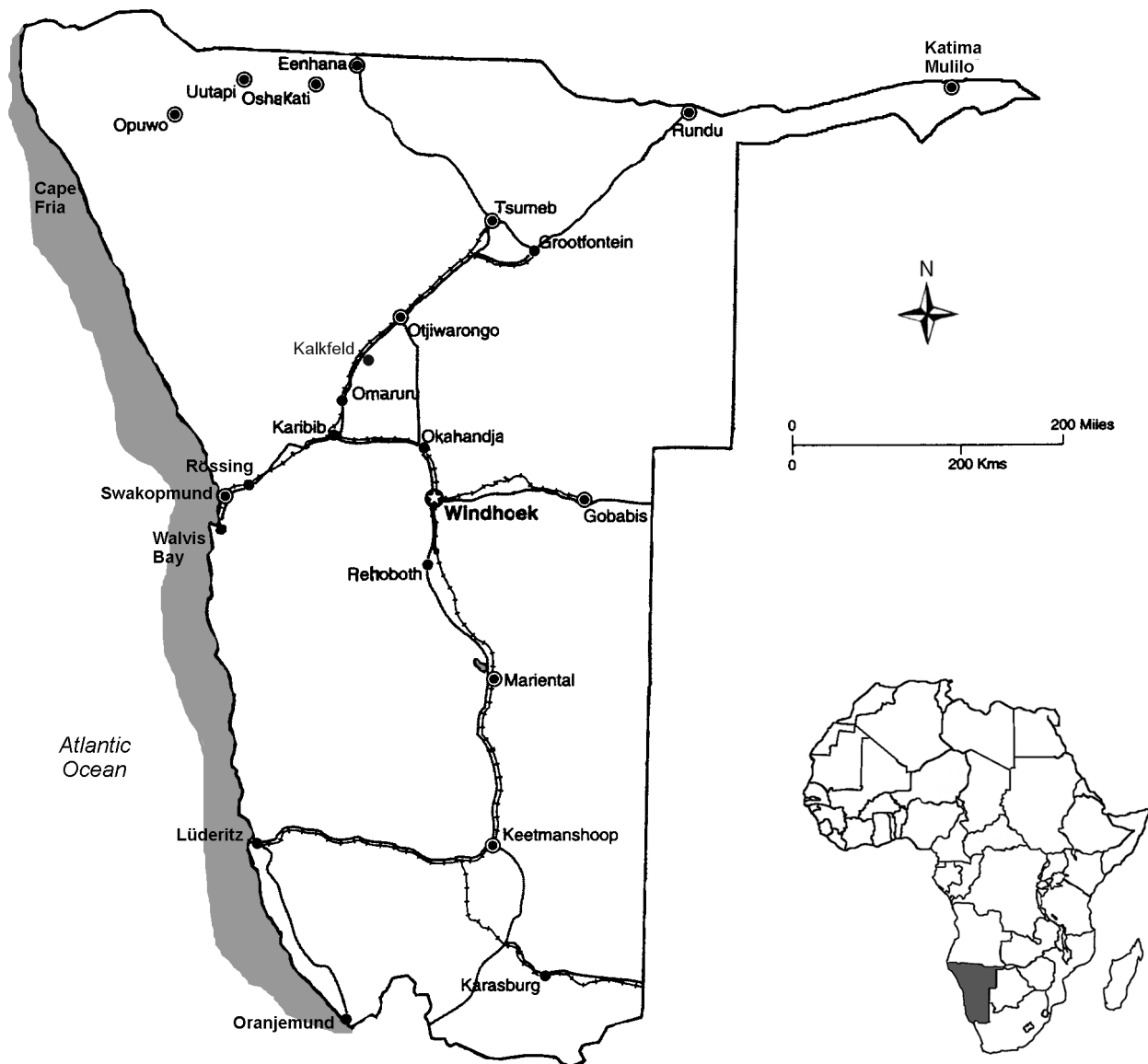
Area: 825,418 km²

Annual population growth rate (2000): 1.57 %

Life expectancy at birth (1998): 50.1 years

People not expected to survive to age 40 (1998): 33.5% of total population

GDP per capita (1998): US \$5,176



Namibia is a sparsely populated country in southwestern Africa with a long Atlantic coastline. Desert conditions prevail in a strip along the Atlantic seaboard (the Namib Desert) and throughout the eastern and north-eastern part of the country in the Kalahari Desert. The interior of Namibia consists largely of dissected plateaux and mountainous areas with a semi-arid climate. The north-central portion of Namibia bordering Angola is agriculturally more intensively used than the rest of the country. Here, in the 'Ovamboland' of Namibia, lives approximately 46% of the total population. Annual precipitation in this area reaches 450-550 mm. Crop production is largely subsistence based with millet, sorghum and maize being the main food crops.

The main agricultural activity in the rest of the country is livestock ranching on extensive farms.

The agricultural sector of Namibia accounts for only 12% of the GDP and employs an estimated 38% of the working population. The offshore fishery is gaining in economic importance.

Economically, the mineral sector continues to be a major factor, contributing about 56% of the GDP and employing an estimated 23% of the labour force. The main mineral commodities extracted in Namibia are diamonds, followed by uranium, copper, gold and some industrial minerals including salt (Ministry of Mines and Energy 1992). By far the highest value comes from gem-quality alluvial diamonds mined offshore along the Atlantic coast.

In recent years significant natural gas reserves (3 trillion cubic feet) have been delineated in Namibia's offshore areas.

Geological outline

The geology of Namibia can be divided into several geotectonic and lithologic domains. The oldest domain belongs to the Paleoproterozoic Vaalian to lower Mokolian, followed by the Mesoproterozoic middle to upper Mokolian rocks (Republic of Namibia - Ministry of Mines and Energy 1992). The sedimentary and volcanogenic succession of the Neoproterozoic Damara Belt comprises more than 60% of Namibia's rock outcrops. This northeast - southwest striking belt is folded and metamorphosed with the metamorphic grade progressively increasing towards the axial centre of the fold belt. Granites occur in the central part of the Damara Belt (Martin 1965; Martin and Porada 1977).

A relatively undeformed syn- to post-orogenic succession of the Cambrian Nama Group covers parts of southern Namibia. The terrestrial Kalahari Beds of Tertiary to Recent age are predominantly unconsolidated aeolian sand dunes and occupy large parts of eastern Namibia.

Pan-African and early Cretaceous alkaline ring complexes and carbonatites occur along a north-east trending structural zone, a continental expression of an extensive transform fault that offsets the Mid-Atlantic ridge (Marsh 1972).

AGROMINERALS

Phosphates

Three main types of phosphates can be distinguished in Namibia:

- Phosphates associated with alkaline complexes and carbonatites,
- Phosphates of biogenic sedimentary origin,
- Phosphates in guano.

Phosphates associated with alkaline complexes and carbonatites.

Low-grade phosphates are associated with several of the alkaline and carbonatite complexes in Namibia (McManus and Schneider 1994; Pirajno 1994). These alkaline complexes are aligned along a northeast striking linear zone over a distance of approximately 370 km (Figure 2.12). An extension of this zone is found in Brazil (Marsh 1972).

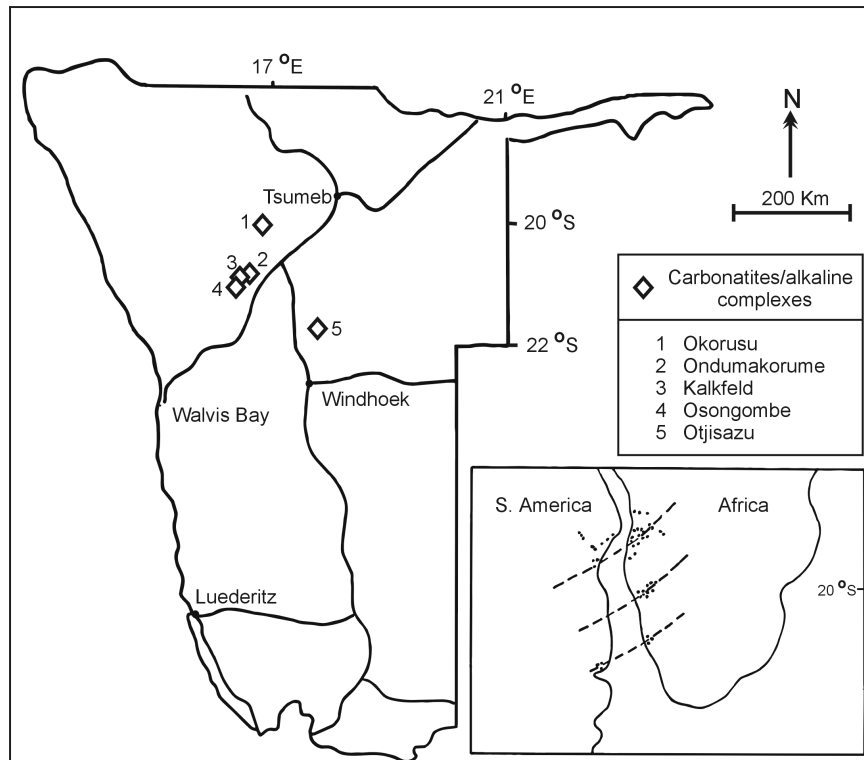


Figure 2.12: Location of carbonatites and alkaline complexes in Namibia with insert showing correlation with similar South American complexes (insert after Marsh, 1972).

The average P_2O_5 content in these alkaline and carbonatite complexes of this zone are as follows:

- Okorusu complex, in the Otjiwarongo District: 3-4% P_2O_5 ,
- Ondumakorume complex, northeast of Kalkfeld: 7% P_2O_5 ,
- Kalkfeld complex, 11 km northwest of the village of Kalkfeld: 6.7% P_2O_5 ,
- Osongombe complex, southwest of Kalkfeld: 6.5% P_2O_5 ,
- Otjisazu complex, southeast of Kalkfeld, in the Okahandja District: 3-9% P_2O_5 ,
- and smaller phosphate occurrences in other complexes (McManus and Schneider 1994).

The apatite-bearing part of the Otjisazu pyroxenite complex contains indicated reserves of at least 35 million tonnes of ore at 3-9% P_2O_5 to a depth of 30 m (Schneider and Schreuder 1992).

Sedimentary offshore phosphates

So far, no onshore sedimentary phosphates have been discovered in Namibia but there are considerable offshore deposits of pelletal phosphorite south of the of the Kunene River mouth. The resources are estimated at 174 million tonnes of sediment with P_2O_5 values varying from 1 to 4.6%, at depths of 150-250 m. The offshore phosphatic sediments between Walvis Bay and Luederitz contain 1,430 million tonnes of P_2O_5 with grades exceeding 4.6% P_2O_5 (Schneider and Schreuder 1992). However, the mining of these low-grade phosphate sediments at considerable depth of the ocean is too costly to be economically feasible.

Guano

The only phosphates mined in Namibia at present are those from guano deposits. Bird guano has been extracted since the 1800s (Hutchinson 1950) from 13 small offshore islands along the Atlantic coast. Production between 1844 and 1991 was 869,332 tonnes, averaging approximately 6,000 tonnes per year. A typical analysis of Namibia's offshore guano is 21-29% P_2O_5 and 20-40% N.

A unique development in guano 'mining' started in 1931 with the erection of artificial roosting platforms for birds along the coast of Namibia. Until 1991 the total production of guano from these platforms was 130,275 tonnes, averaging about 2,150 tonnes per year. Most of the guano 'harvested' from these artificial islands is exported to Europe.

Small tonnages of cave (bat) guano have been recovered from caves near Karibib, and from caves on a farm in the Windhoek District (Farm Arnhem 222). Leached parts of the Arnhem bat guano deposits contain only 3% P_2O_5 , while unexposed bat guano contains up to 10% P_2O_5 . Recovery of bat guano from the Arnhem deposits peaked between 1928 and 1940 and the total yield from these deposits was 2,914 tonnes (Schneider and Schreuder 1992).

Gypsum

Surficially, gypsum-enriched sands and gravel have been found in the coastal Namib belt. Several million tonnes of gypsum-bearing sands grading between 30-90% gypsum have been located close to Swakopmund and Walvis Bay coastal area (Schneider and Genis 1992a; McManus and Schneider 1994). 2,623 tonnes of gypsum was produced between 1967 and 1970 in the Tumas area, 40 km east-northeast of Walvis Bay. The grade of this hard and massive gypsum layer, 30-90 cm thick, is generally more than 90%. The total reserves in the Tumas area amount to more than 4 million tonnes (Schneider and Schreuder 1992).

Limestone/dolomite

Limestone and dolomitic limestone resources of Namibia are enormous and Gwosdz (1996) has compiled the limestone and dolomite resources of Namibia from 22 localities. The carbonates are located mainly in the metasedimentary succession of the Damara Supergroup but carbonates from carbonatites, and from calcrete crusts are also reported.

Nitrates

The coastal Namib Desert, at the east-side of the cold nutrient-rich Benguela Stream geographically and climatically resembles the Atacama Desert in Chile, the world's only nitrate-producing area. However, so far only small amounts of soda nitre ($NaNO_3$) have been found in this area.

The main occurrences of nitrates are in secondary environments where leached nitrate has been accumulated, for instance in sheltered cliffs, in talus at the foot of cliffs and in encrustations of secondary nitrate on various rocks (Schneider and Genis 1992b).

Agromineral potential

The best potential use of locally available, effective 'agrominerals' for Namibia's small crop production sector is limited to guano. In addition, exploration to find nitrate resources in the coastal zone of Namibia should be intensified. Many climatic, geographical and environmental conditions are similar to the areas of the Atacama Desert in Chile, where the largest naturally occurring nitrate deposits of the world are found and mined.

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