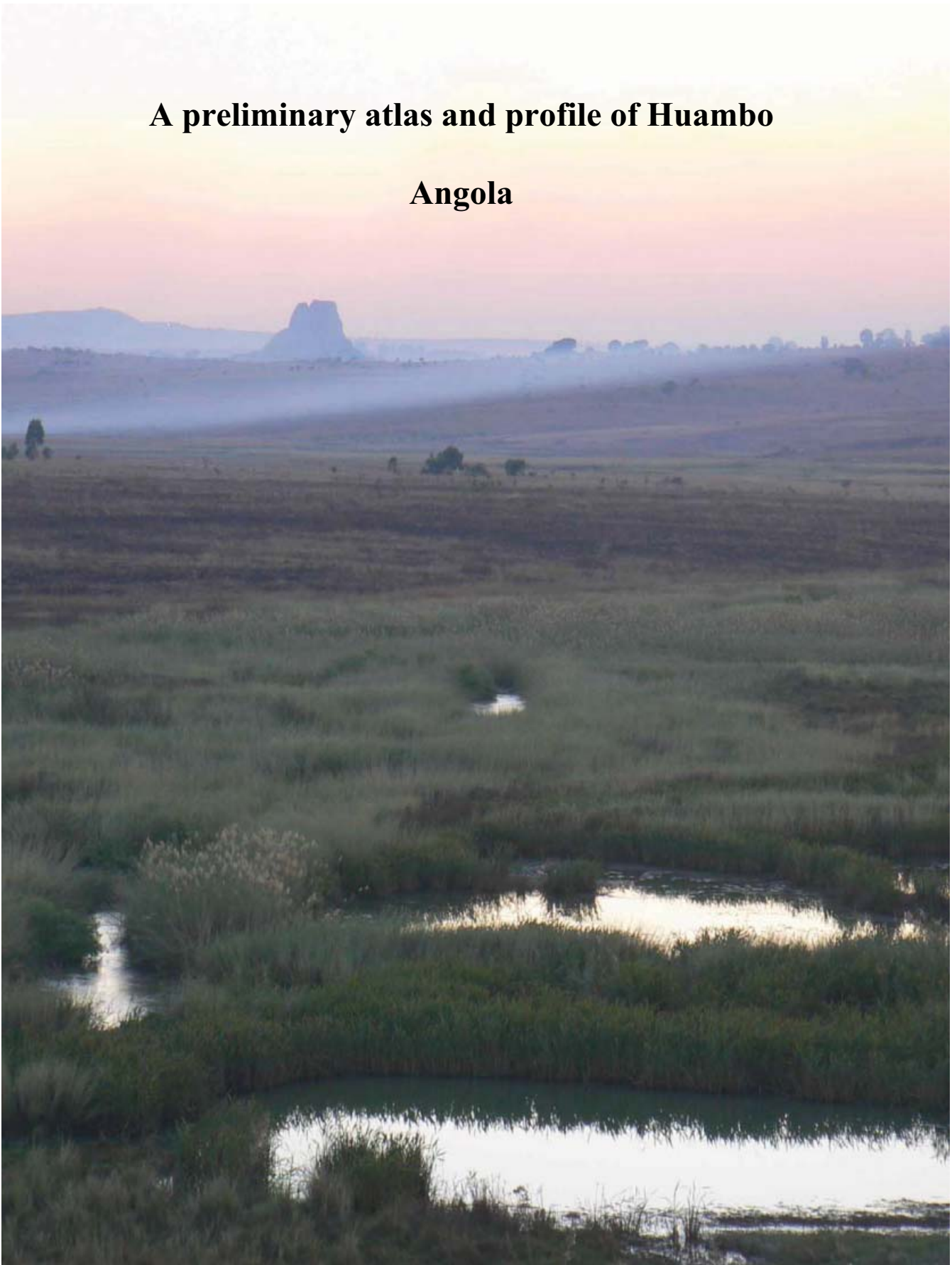


A preliminary atlas and profile of Huambo

Angola



Development Workshop, Angola

Introduction

This preliminary atlas and profile of Huambo presents a digest of information about the province. The booklet is aimed at a general readership, with the particular intention that decision-makers and other people who influence the management of Huambo and its resources will be better informed about their area of responsibility.

It is also hoped that this volume will provide a foundation upon which more information will be added in the future. Inconsistencies or inaccuracies should be corrected, and updated information incorporated when it becomes available.

Huambo is more or less at the centre of Angola (Figure 1), and covers much of the topographic zone known as the *planalto*, literally the highlands of Angola. All of the province lies above 1,300 metres above sea level (see page 5), and much of it is at altitudes greater than 1,700 metres. It is from the *planalto* that many of the major rivers of Angola flow (see page 11) because rainfall is higher than in most other areas of the country Huambo (see page 9).

The province of Huambo was first known as *Huambo Distrito*. Its capital city was founded in 1912 and later named Nova Lisboa in 1929. The city owes its origins to early plans by the Portuguese administration to establish a major railway station on the Benguela railway (see page 18). The capital was renamed as Huambo after Angola's independence in 1975.



Figure 1. Huambo is one of Angola's 18 provinces, and covers about 33,300 square kilometres or approximately 3% of the total surface area of the country. From north to south, Huambo extends a maximum of 260 kilometres, and is 180 kilometres at its widest point from east to west. The names of the provinces are in black and their capitals are in red lettering.



Figure 2. The provincial capital of Huambo is also the capital of Huambo município. There are nine other municípios each of which also bears the name of its capital centre.

Geology

Huambo's geological foundation gives the province altitudinal prominence that leads to its high rainfall and cooler, more agreeable climate than elsewhere. Much of the eastern half of the province is covered by sediments deposited by wind and water over the past 65 million years. The sediments belong to the Kalahari Group which covers several million square kilometres over much of the central area of Africa south of the Equator. Huambo therefore lies on the western edge of the very extensive Kalahari Basin.

Scattered amongst the Kalahari sediments, particularly in the western areas of Huambo, are outcrops and hills of granites that intruded through the earth's mantle over 2,000 million years ago. Meta-sediments (which are sedimentary rocks that have been transformed by heat and pressure into metamorphic rocks, such as quartzite) are of a similar age and comprise some large areas in the west and south-west of Huambo. These meta-sediments and granites probably also lie beneath the eastern Kalahari sediments.

Several plugs of volcanic rocks that erupted more recently are scattered across the province in a zone that runs approximately from south-west to north-east. The eruptions probably occurred about 200 to 100 million years ago.



Hills to the south and east of Ussoque are formed by metamorphic sedimentary rocks, while granite outcrops and boulders are scattered throughout the province. Many of the large granite outcrops, such as the one on the front cover of the book, are well-known land marks.



Figure 3. The major geological features and formations of Huambo.

Topography

Huambo covers much of the highest ground in Angola. This plateau – the *planalto* – drops sharply down to the coastal plain in the west but slopes more gradually and evenly away to the east (Figure 4). Some of Angola’s major rivers have cut back into the central plateau. The most notable of these is the Cuanza which has its major origins in a giant circular ‘amphitheatre’ of erosion to the east of Huambo in southern Bié.

Other rivers that have eroded back deeply into the plateau and Huambo are the Catumbela in the south-west and the Ceve in the centre and north-west (Figure 5). These two rivers drop relatively steeply to their base-level river mouths on the Atlantic coast. As a result, their flows are quite rapid, giving them considerably more erosive power than the slower-flowing Cubango, Cunene and Cutato rivers.

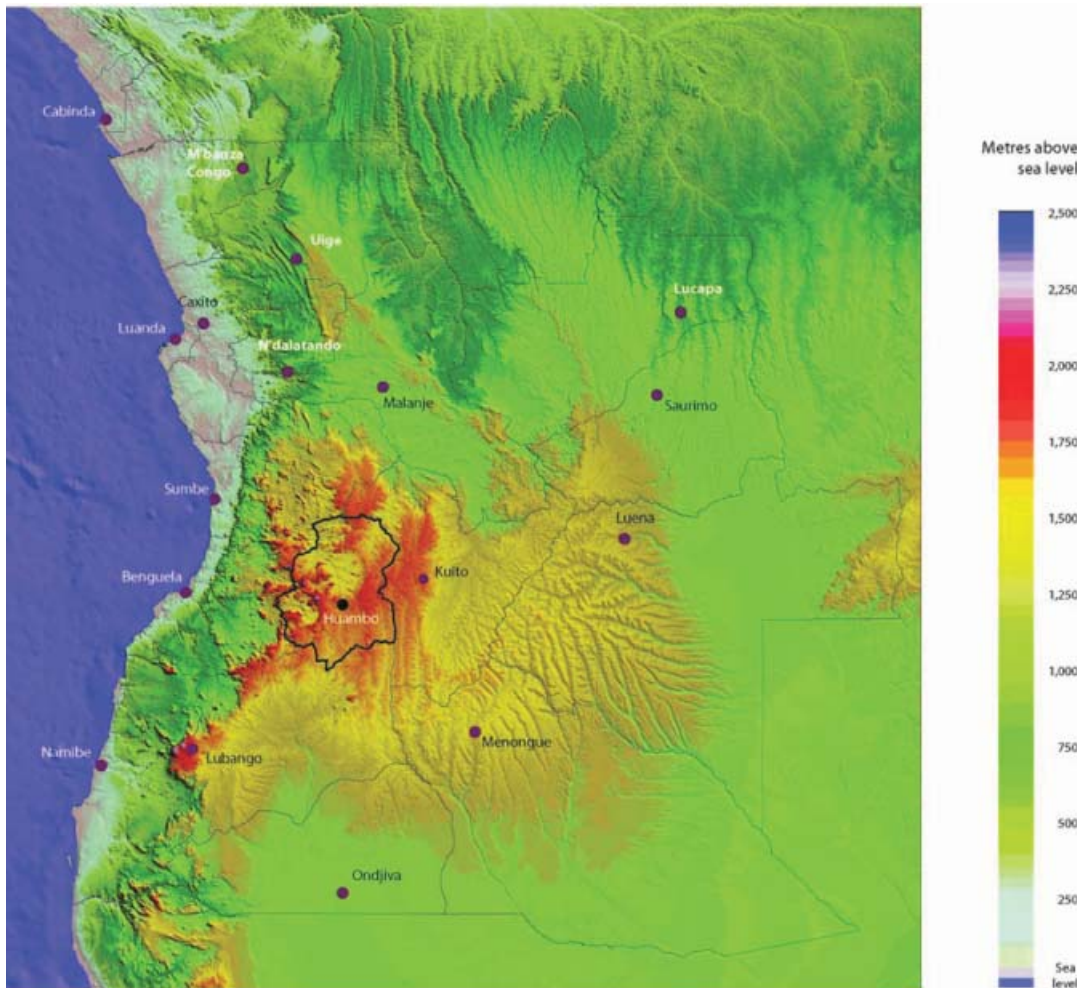


Figure 4. Angola’s topography showing the central *planalto* highlands and Huambo’s borders.

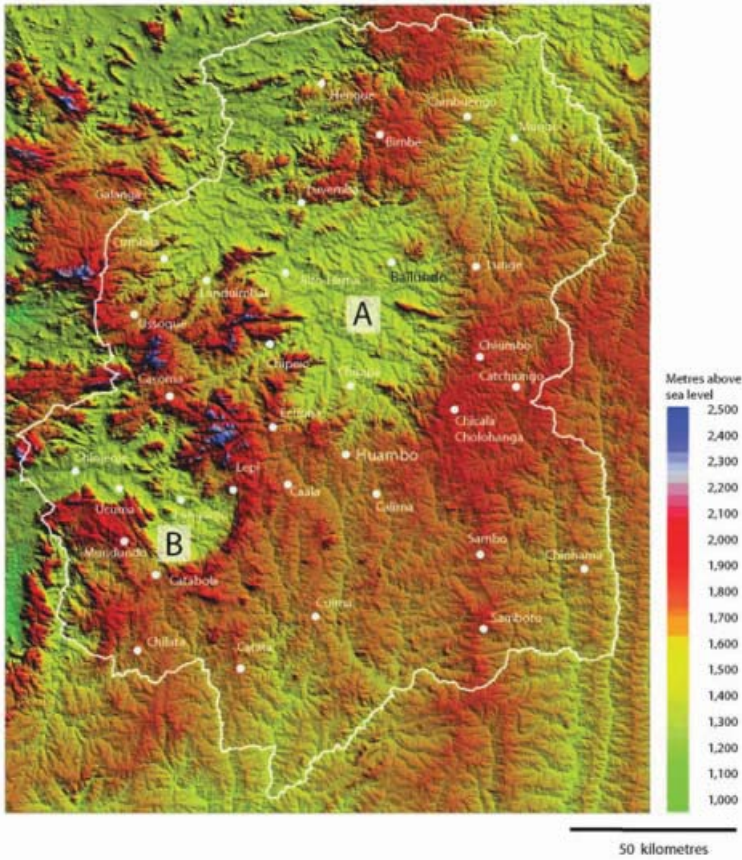


Figure 5. Huambo's topography. The catchments of the Ceve (A), and Catumbela (B) rivers have eroded back into the *planalto* to form circular depressions shaped like amphitheatres. The lowest areas in Huambo are about 1,300 metres above sea level in the valleys formed by these three rivers, while much of the rest of the province is above 1,700 metres.

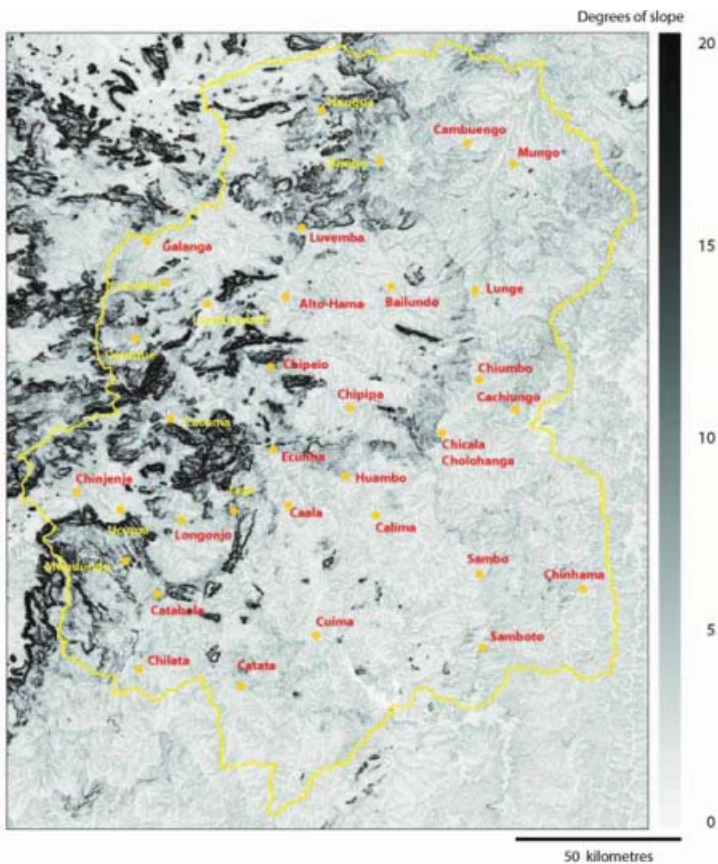


Figure 6. Topographic slopes in Huambo. The eastern and southern areas of the province consist largely of gently rolling hills between flat river valleys. The western areas, by contrast, are more rugged with relatively deeply incised valleys, tall granite inselbergs and ranges of hills. Soil erosion is thus more problematic in the west than elsewhere. For example, the northern half of the city of Huambo lies in the uppermost catchment area of the Ceve River. Run-off after heavy rain down into tributaries of the Ceve causes erosion in these areas of the city.

Soils

Two types of soils are dominant in Huambo: ferralsols on higher elevations and alluvial fluvisol soils on lower, more humid elevations, mostly along water lines. Most of the patches of alluvial soils are too narrow and localized to be mapped in Figure 7, however. The ferralsols are derived from the weathering of underlying rocks as well as Kalahari sediments deposited here long ago by both wind and water (see page 3).

The ferralsols dominate the surface area of the province but produce little in agricultural terms because the soils are permeable and therefore have a low water holding capacity. This permeability in combination with high rainfall leads to leaching with the consequent rapid loss of mineral nutrients and organic matter.



Figure 7. The major soil types in Huambo. Whilst one larger area of alluvial fluvisols in the north-west is shown, there are also very many small, narrow patches of alluvial soils along the multitude of rivers and their tributaries.

Although low nutrient and water content limits the potential of ferralsols for crop production, moderate yields can be achieved with the appropriate use of fertilizer, manure and other measures to increase the organic and mineral content of the soil. In the absence of these kinds of measures to manage the soil, maize yields on ferralsols in Huambo usually vary between only 100 and 400 kilograms per hectare.

The alluvial soils found along rivers are more productive due to their higher content of organic material and moisture. The soils therefore have a high capacity to withhold water and farmers use various irrigation techniques to control water levels during the rain and dry season. Extensive areas of alluvial soils are now cultivated in *onaka* fields (see page 24). However, some patches of alluvial soils are poorly drained and thus too wet for farming. Maize yields on alluvial soils can reach 1,000 kilograms per hectare, considerably higher than on ferralsols.



Ferralsols are also known as oxisols, and their typical reddish colour is due to high contents of iron being rusted or oxidized. Maize and manioc (cassava) are the predominant crops on these soils.

Several other soils occur in Huambo. Phaeozems are characterized by their surface layers being rich in humus or decomposed plant material. They are well-suited to crop and pasture production. The upper layers of umbrisols are dark as a result of accumulated organic matter, and these soils likewise hold potential for agriculture. By contrast, leptosols are shallow or have high contents of gravel or stone which limits their potential for farming. **Figure 7** includes an area of acrisols west of the province. These soils are rich in clay and typically occur in humid, tropical environments.

Climate

With the exception of other highland areas in the adjoining provinces, Huambo's climate is quite different from that elsewhere in the country. The principal differences are the greater rainfalls (**Figure 8**) and lower temperatures in Huambo that stem directly from the higher altitudes in the province (see page 5).

Overall temperatures average between 19 to 20°Celsius during the year, while maximum daily temperatures average between 25 and 27°Celsius, and average minimums between 11 and 13°Celsius. The southern and higher areas of the province are somewhat cooler than elsewhere. September and October are the warmest months, while June and July are the coldest. Frost occurs occasionally in July and August in low-lying valleys and depressions.

On average, relative humidity varies between 60 and 70% during the year. January is the most humid month when levels range from 70 to 80%, while August is driest with average relative humidity levels of 35 to 40%.

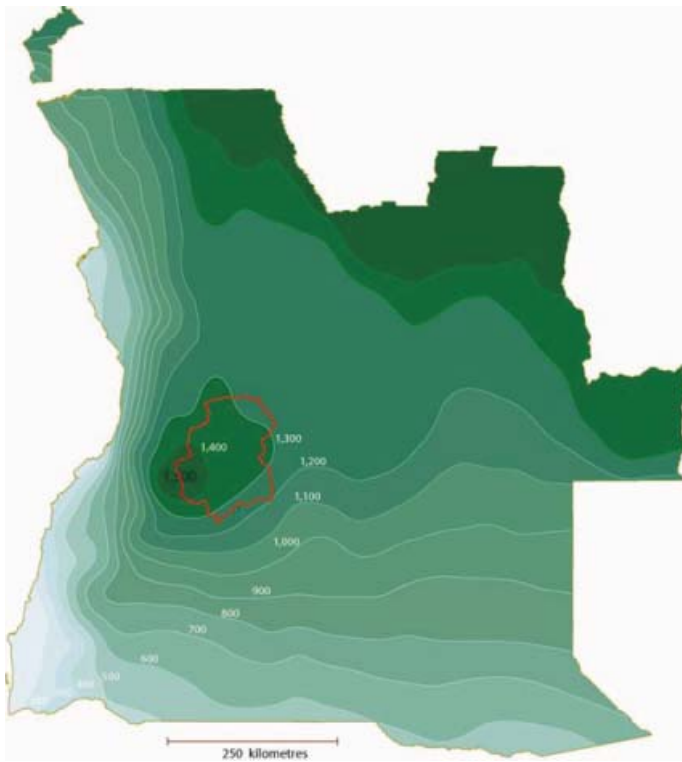


Figure 8. Average annual rainfall in Angola. Most of Huambo (shown as a red border line) receives more than 1,300 millimetres per year, while the western and highest areas of the province typically get more than 1,400 millimetres.

Most rain falls during the warmer summer months (Figure 9), particularly between October and April. Over 95% of the rain in a season falls between these months. Peak falls are in December and then in March. This is because the Inter-tropical Convergence Zone (ITCZ) moves southward in the first half of the summer and north again in late summer. The highest falls occur when the ITCZ is located roughly over Huambo in December and then again in March. About 230 to 240 millimetres of rain falls during each of these two very wet months.

Although Huambo receives more rain on average than most other areas in Angola, rainfall is often highly variable. Dry periods occur occasionally when little rain is received over extended periods, and these may cause crop and other plant growth to slow and seedlings to die if the dry conditions accompany hot weather, which is often the case. Conversely, extended periods of wet weather when rain almost every day occur from time to time, and they too can limit plant growth.

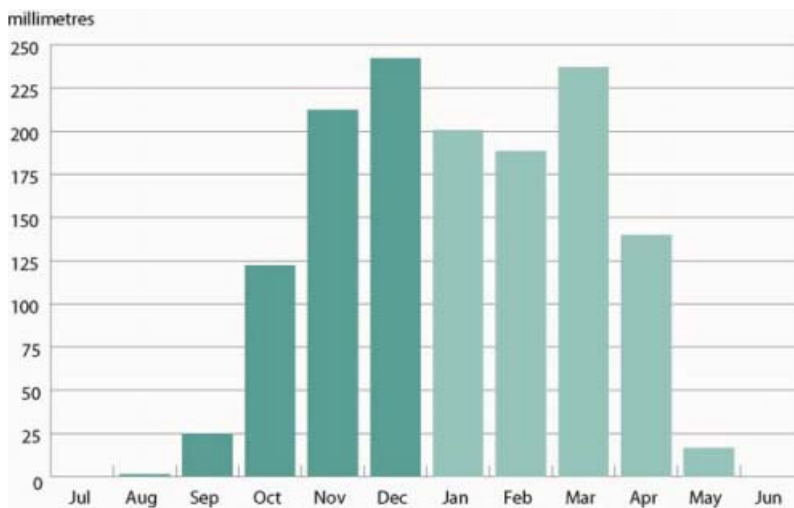


Figure 9. Average rainfall each month at the agricultural research station of Chianga, just outside the city of Huambo. Based on nearly 70 years of records (shown in Figure 10), the city receives an annual average of 1,400 millimetres.



Most rain falls during storms in the afternoon which are often accompanied by lightening. The falls may be very heavy, causing substantial run-off and erosion. This erosion gully along a road in the town of Cachiungo is 2-3 metres deep.

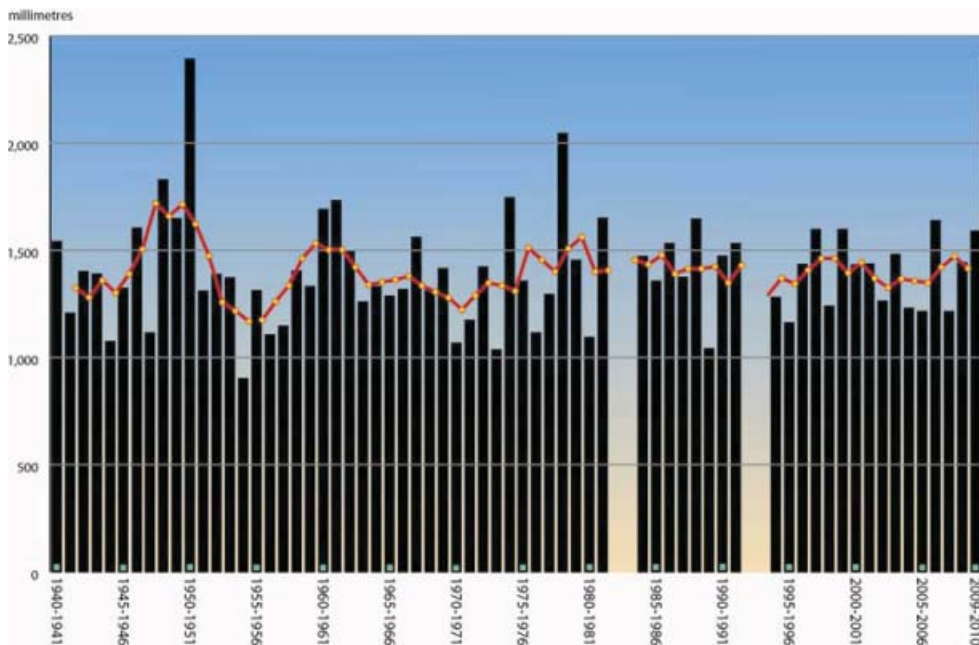


Figure 10. Seasonal totals of rain at Chianga, Huambo between 1940/1941 and 2009/2010. This impressive record is one of longest series of data available in Angola; data for only four seasons were missing over this 70-year period. The seasonal totals are for rain measured between July in one year and the end of June of the next year since rain seasons extend over the summer months.

The highest seasonal total recorded at Chianga, Huambo was in 1950/1951 when 2,393 millimetres was measured. By contrast, only 904 millimetres fell in the driest season of 1954/1955. There have been pronounced cycles of dry and wet years. For example, periods of higher rainfall occurred during late 1940s and early 1950s, the early 1960s, while the late 1960s and early 1970s were generally dry.

Rivers

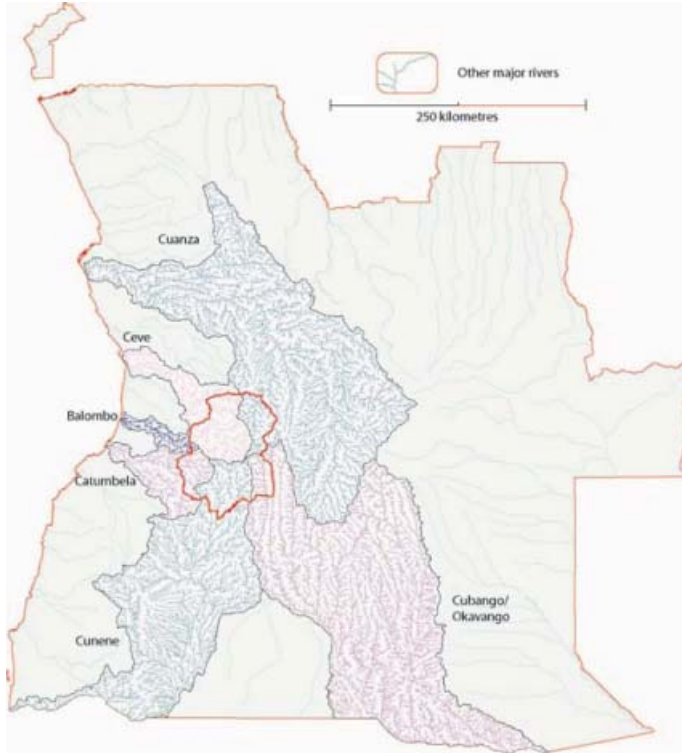


Figure 11. Six of Angola's major rivers originate largely or partially in Huambo.

Huambo can claim to supply much of Angola's water, particularly to areas that lie downstream of the six rivers that drain the province: the Cutato (which is a major tributary of the Cuanza), Cubango, Cunene, Catumbela, Balombo and Ceve Rivers. The Cubango and its other tributaries later becomes the Okavango River which flows through Namibia and into the world famous Okavango Delta in Botswana. The Ceve is sometimes called the Cuvo River. The Cutato is often confused with the Cutato Nganguela which flows into the Cubango.

The Cunene River forms the border between Namibia and Angola downstream of the Ruacana waterfall, and has its mouth at Foz du Cunene on the Atlantic coastline. The mouths of the other west-flowing rivers are as follows on the Atlantic coast: Catumbela at Benguela, Balombo north of Lobito, Ceve at Port Amboim and the Cuanza just south of Luanda.

As described earlier on page 5, flows of the Cunene and Cubango are slow and often meandering, while those of the Ceve and Catumbela are more aggressive and erosive. The same is true of the other west flowing Balombo River shown in [Figure 11](#).

The only two significant dams in the province are both on the Cunene River. One is the Cuando dam, which was built just east of Huambo to provide electricity to the city. The much larger Gove dam further south is now being rehabilitated to become a major supplier of electricity for Huambo & Bié provinces.

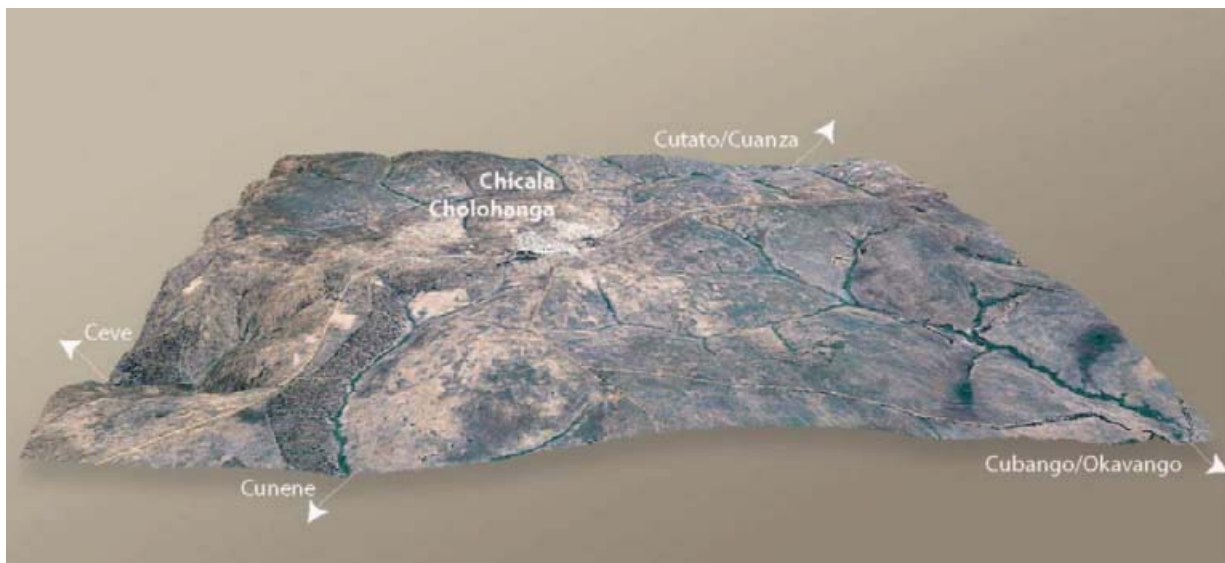


Rivers and tributaries in the eastern zones of Huambo often lie in flattish valleys, which are cultivated in small rectangular fields called *onakas*. Several pale coloured rain-fed dry land fields are below the swathe of greener *onaka* fields.

While the tributaries of all rivers in the province have a dendritic pattern (like the angled branches of a tree), those of the Cubango and the Cutato Nganguela join the main river at more perpendicular angles in what is called a trellis drainage. Trellis drainages are unusual and the reasons for this difference remain unknown.



Figure 12. The major tributaries and courses of the six rivers that drain Huambo, as well as the Cuando dam near Huambo city and Ngove dam in the south. Both dams are on the Cunene River.



Remarkably, four of Huambo's major rivers have their sources at the small town of Chicala Cholohanga. Note the deeply incised valley at the source of the Ceve, compared with the gently sloping valleys in which the Cunene, Cubango and a major branch of the Cuanza have their sources. The main road and railway line from Huambo to Chicala Cholohanga and Cachiungo runs along the watershed between the Cubango and northerly Cutato sub-catchment of the Cuanza.

Vegetation

Vegetation in Huambo consists largely of four types, each characterised by different communities of plant species and vegetation structure:

- Highland forests
- Swampy Grasslands
- Dry grasslands
- Woodlands

These vegetation types are too scattered and patchy to map effectively for purposes of showing their spread and distribution across the whole province in this atlas. Their distributions and structure are also heavily affected by frequent intense fires, the cutting of trees for charcoal, and the clearing of fields.

Highland Forests

These forests (more technically known as Afromontane forests) are restricted to small patches, usually of less than 20 hectares, in valleys above 2,000 metres above sea level. The edges of the forest patches are often sharply defined because younger, smaller trees and shrubs are burnt back by fires that are so prevalent in the surrounding grasslands. The fires therefore severely limit the extent of these forests, as do the clearing of forest for crops and the harvesting of firewood and building material



Highland forests, such as these on the slopes of Mount Moco, are shrinking as a result of frequent fire and clearing for crop cultivation. It is a major concern that none of these unique habitat patches are protected by legislation or conservation management in Angola.



Most of the forest patches are in the highest areas of western Huambo and to the north on highlands in Cuanza Sul province. Many of the tree and other plant species in these forests are only found in similar cool and wet highlands elsewhere in Africa, for example in East Africa, Malawi and South Africa. As a result of this isolation, several birds and other animals occur only in these Angolan highland forests. They are thus endemic to Angola, and the country therefore has a special responsibility for their conservation. More information on the conservation value of the forests is available at <http://www.mountmoco.org>.

Swampy Grasslands

Together with the Dry Grasslands, Swampy Grasslands dominate the eastern half of the province where slopes are shallow (see [Figure 6](#)) and river flows are slow. The Swampy Grasslands are most obvious in valleys that have flattish bottoms where the alluvial soils remain saturated with water for much of the year. The plant cover consists largely of various species of grasses, sedges and reeds, while a few small shrubs and trees also grow in these wet soils. Many of the flat valleys are cultivated (see the photograph on page 12). The majority of Swampy Grasslands are burnt each year by the same fires that burn the Dry Grasslands.



The soils beneath Swampy Grasslands are wet and saturated for most of the year. Broad areas of these grasslands occur on the margins of large rivers, such as the Cutato Nganguela of the left. Many of the tiny headwater valleys of the tributaries likewise have saturated soils and Swampy Grasslands. The one on the right is the source of the Cubango/Okavango River at Chicala Cholohanga (see page 13).

Dry Grasslands

The predominant feature separating Dry from Swampy Grasslands are the well-drained soils on the higher and drier areas. These are the ferralsol soils that characterise much of the *planalto*. A variety of grass species are present as well as scattered shrubs and small trees. All these plants are regularly burnt back and down hot fires that rage across the Dry Grasslands almost every year. More information on the Dry and Swampy Grasslands can be found at www.nationalgeographic.com/wildworld/profiles/terrestrial/at/at1001.html.



Dry Grasslands dominate landscapes with gentle slopes and are maintained by very hot fires that prevent the growth of trees or other woody plants. Woodlands are more usual in the deeper, better drained valleys associated with the west-flowing rivers. The grasslands on the left are around the town of Ussoque while the woodlands on the right are in the uppermost headwaters of the Ceve River.

Woodlands

While patches of Woodlands are encountered everywhere, they are more extensive and prevalent in the western areas where slopes are steeper and soils are better drained. The majority of trees are broad-leaved and deciduous and dominated by trees belonging to the genera *Brachystegia*, *Julbernardia*, and *Isoberlinia*. These trees largely only occur in a belt of woodland known as Miombo which stretches over much of southern Africa from Angola eastwards across large areas of Zambia, Malawi, Zimbabwe and Mozambique.

Grass cover among and under the trees is usually sparse and short, especially where the tree canopy is comparatively dense. Trees in any one area tend to be of a similar height, which is usually between 5 and 10 metres in different places. The trees come into leaf before the first rains, and the new leaves of some species are spectacular in their bright reddish, greenish or yellowish colours. More information on Miombo woodlands in Angola is available at www.worldwildlife.org/wildworld/profiles/terrestrial/at/at0701_full.html



Woodland covered large areas of Huambo before they were cleared for crops and for wood to fuel trains on the Benguela railway. More recently, a growing charcoal industry has led to trees being felled for charcoal to be sold in cities. Places cleared for charcoal now consist largely of shrubs and young trees. An example of what Huambo used to look like is to be seen at the Institute of Agronomic Investigation at Chianga near Huambo. The dense canopy of trees in the photograph on the left contrasts with the surrounding areas that have been cleared for crops and the grasslands that are regularly burnt. Fires that penetrate these tall, dense woodlands shown on the right are often not particularly intense because there is relatively little dry grass to fuel the fires.