



2. Welcome to the Smart Province

Gauteng is the seSotho word for “Place of Gold”. Despite being the smallest of the nine provinces, Gauteng is the economic powerhouse of SA and the African continent. Lying on the elevated plateau of the interior, called the Highveld, it covers approximately 17 010 km², which represents only 1.4 % of SA’s surface area. The North-West, Limpopo, Mpumalanga and Free State Provinces border Gauteng from the west, north, east and south respectively.

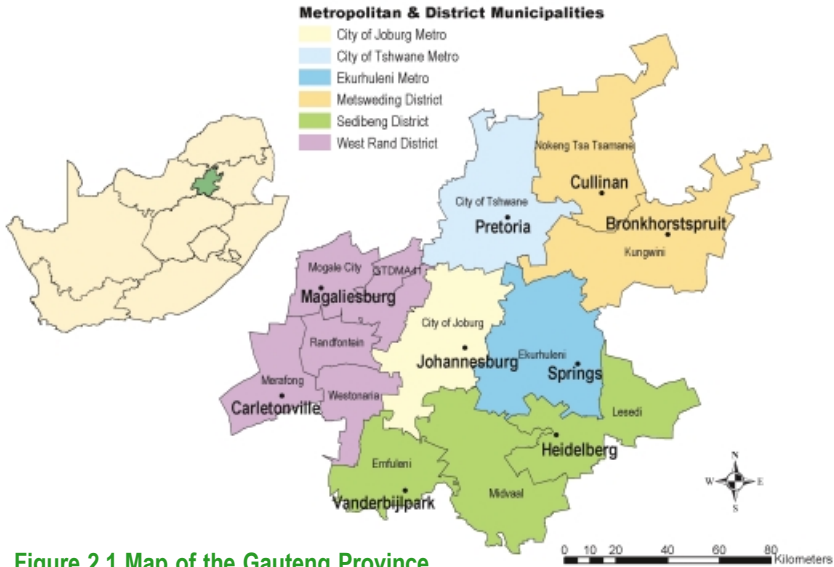


Figure 2.1 Map of the Gauteng Province

Gauteng contains three of SA’s six metropolitan municipalities, including the cities of Johannesburg, Tshwane and Ekurhuleni, and 3 district municipalities and their local municipalities, which form the remainder of the province (Figure 2.1). An additional municipality which forms the Cradle of Humankind World Heritage Site occurs within the West Rand District Municipality.





Climate

Gauteng enjoys a mild climate, characterised by warm, moist summers and cool dry winters. Most rainfall occurs from October to March, with a mean annual precipitation of 668mm (Dent *et al.*, 1989). This varies from 900mm in the central higher lying areas to 556mm in the lower lying northern and southern areas of the province.

Mean annual temperature varies from approximately 19.3°C in the north of the province to 16.0°C in the south. The eastern and central areas, however, experience a lower mean annual temperature of around 15.0°C. There is large variation between summer and winter temperatures, with Gauteng experiencing a daily mean temperature in January and July of 21.2°C and 9.8°C, respectively (Schulze, 1997).

Due to the long clear nights, little wind and dry air in Gauteng in winter, the occurrence of frost is common in the province. Gauteng experiences on average 30 days of frost per year (Schulze, 1997). Winter atmospheric conditions cause temperature inversions, which have the effect of keeping polluted air close to the surface, so that winter air quality over the Highveld is generally poor.

Geology

South Africa's mining heritage is attributed to the diversity and richness of its mineral deposits, and the geology of the Gauteng area has played a major role in its development. The present landscape is a visible manifestation of the strong relationship between past earth processes and geological features (Viljoen and Reimold, 2002).

The oldest rock formation in Gauteng is the Johannesburg Granite Dome, situated between Pretoria and Johannesburg. This formed in the Archaean period (3500 – 2500 million years ago), and forms the basement on which the younger sedimentary and volcanic rocks of the Transvaal and Witwatersrand Supergroups are deposited. A large area of Gauteng contains the Proterozoic era (2500-570 million years ago) formations of the Transvaal Supergroup, notably containing the gold-bearing "Black Reef" quartz-pebble conglomerate, which has been mined on the East and West Rands. The outcrops of conglomerate of the Witwatersrand basin (the major gold-bearing rock type), just south of the Johannesburg Dome and in the Heidelberg region, have made the area world famous. These outcrops give rise to east-west ridges on resistant quartzite.

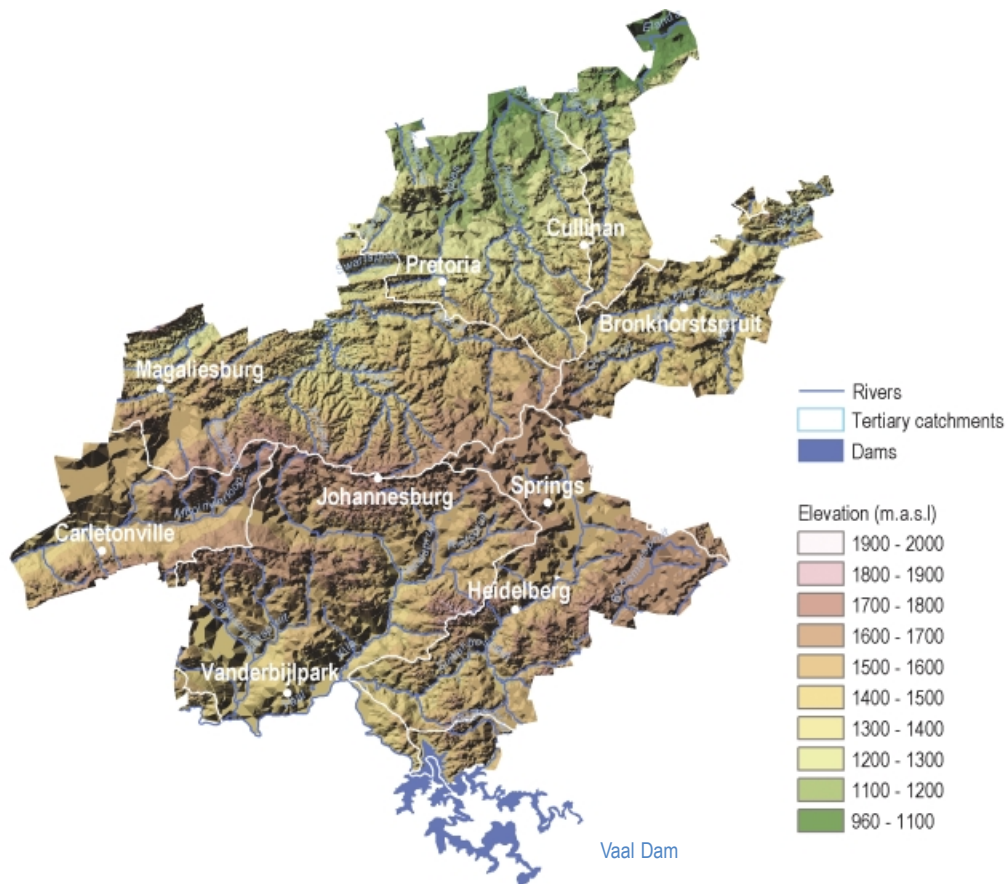
The Ventersdorp volcanic lavas outcrop in the Klipriviersberg hills south of Johannesburg and to the east and west of Heidelberg.

The dissolving carbonates of the Malmani dolomites of the Transvaal Supergroup are significant from both an archaeological and a safety perspective. The world famous fossil deposits at the Cradle of Humankind (CoH) occur within the dolomites, while sinkholes and subsidence of the dolomites occur on the East and West Rand.

The quartzites of the Pretoria Group of sediments overlying the dolomites have given rise to the picturesque Magaliesberg Mountains, characterised by faulting and displacement, which have produced spectacular gorges, for example, Tonquani gorge. The igneous intrusions of the molten rocks of the platinum rich Bushveld Complex were injected into the upper quartzites of the Magaliesberg layer.

Terrain

Gauteng covers the convergence of watersheds of the Vaal, the Crocodile, and Olifants catchments. The Klipriver, Blesbokspruit, Mooi, Rietspruit, Suikerbosrand and Natalspruit rise in the east-west band of high lying areas of Randfontein, Johannesburg and Benoni (between 1 650 and 1 750 m above sea level), and drain south to join the Vaal river. This southern area of the province is characterised by relatively moderate relief (1 450 to 1 600m above sea level (a.s.l.)) between the resistant quartzite ridges near to Suikerbosrand (approximately 1 900m a.s.l.) and the east-west ridges stretching from Walkerville to Carletonville.



Source: Topography from GDACEL; Hydrology from Water Research Commission (WR90)

Figure 2.2 Topography and hydrology in Gauteng



The Apies River begins just south of the quartzite ridges south of Pretoria and flows north to join the Pienaars River, in an area of plains and lowlands, which together flow into the Crocodile River. The Crocodile River has its source close to Roodepoort (1 750m a.s.l) in an area characterised by plains with moderate relief. The Jukskei River also joins with the Crocodile and together these flow in a northerly direction into the Limpopo River on the Botswana border.

In the north-eastern corner of Gauteng, the Elands and Wilge Rivers flow north-easterly toward the Olifants River.



Vegetation

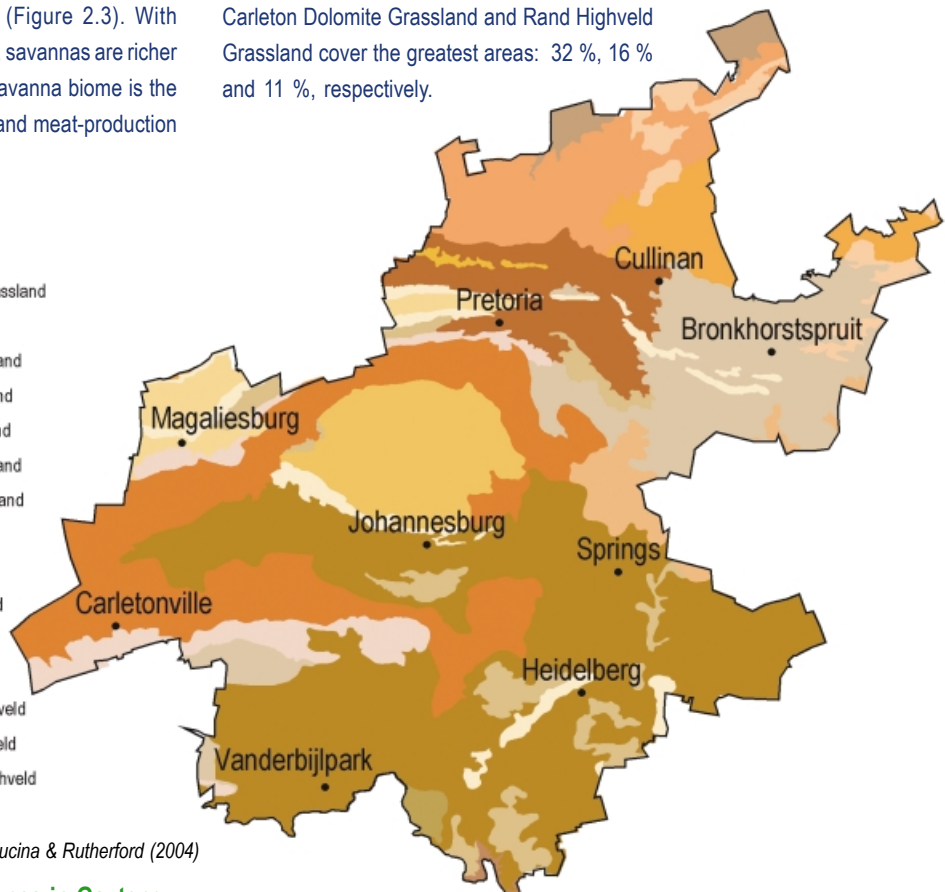
Two of SA's biomes fall within Gauteng, these being the Grassland and Savanna biomes, which comprise 71 % and 29 %, respectively, of Gauteng's surface area. In SA savannas support more than 5 700 plant species, exceeded only by the Fynbos biome. Nine different vegetation types comprise the Gauteng Savanna, of which the Central Sandy Bushveld and Marikana Thornveld are the most common, comprising 6.3 % and 5.8 % respectively (Figure 2.3). With respect to animal biodiversity, savannas are richer than any other biome. The savanna biome is the core of wildlife, eco-tourism and meat-production

industries (Bredenkamp, 2002). However, the large savanna fauna of SA are confined largely to game reserves.

The Grassland biome is one of the most threatened in SA, as a large percentage is irreversibly transformed, while only 25 % is formally conserved (Bredenkamp, 2002). Gauteng grasslands consist of eight different vegetation types, of which the Soweto Highveld Grassland, Carleton Dolomite Grassland and Rand Highveld Grassland cover the greatest areas: 32 %, 16 % and 11 %, respectively.

Vegetation Type

-  Rand Highveld Grassland
-  Carletonville Dolomite Grassland
-  Egoli Granite Grassland
-  Frankfort Highveld Grassland
-  Eastern Highveld Grassland
-  Soweto Highveld Grassland
-  Central Free State Grassland
-  Waterberg Summit Grassland
-  Central Sandy Bushveld
-  Moot Plains Bushveld
-  Springbokvlakte Thornveld
-  Marikana Thornveld
-  Norite Koppies Bushveld
-  Gold Reef Mountain Bushveld
-  Andesite Mountain Bushveld
-  Loskopdam Mountain Bushveld
-  Shale Mountain Bushveld



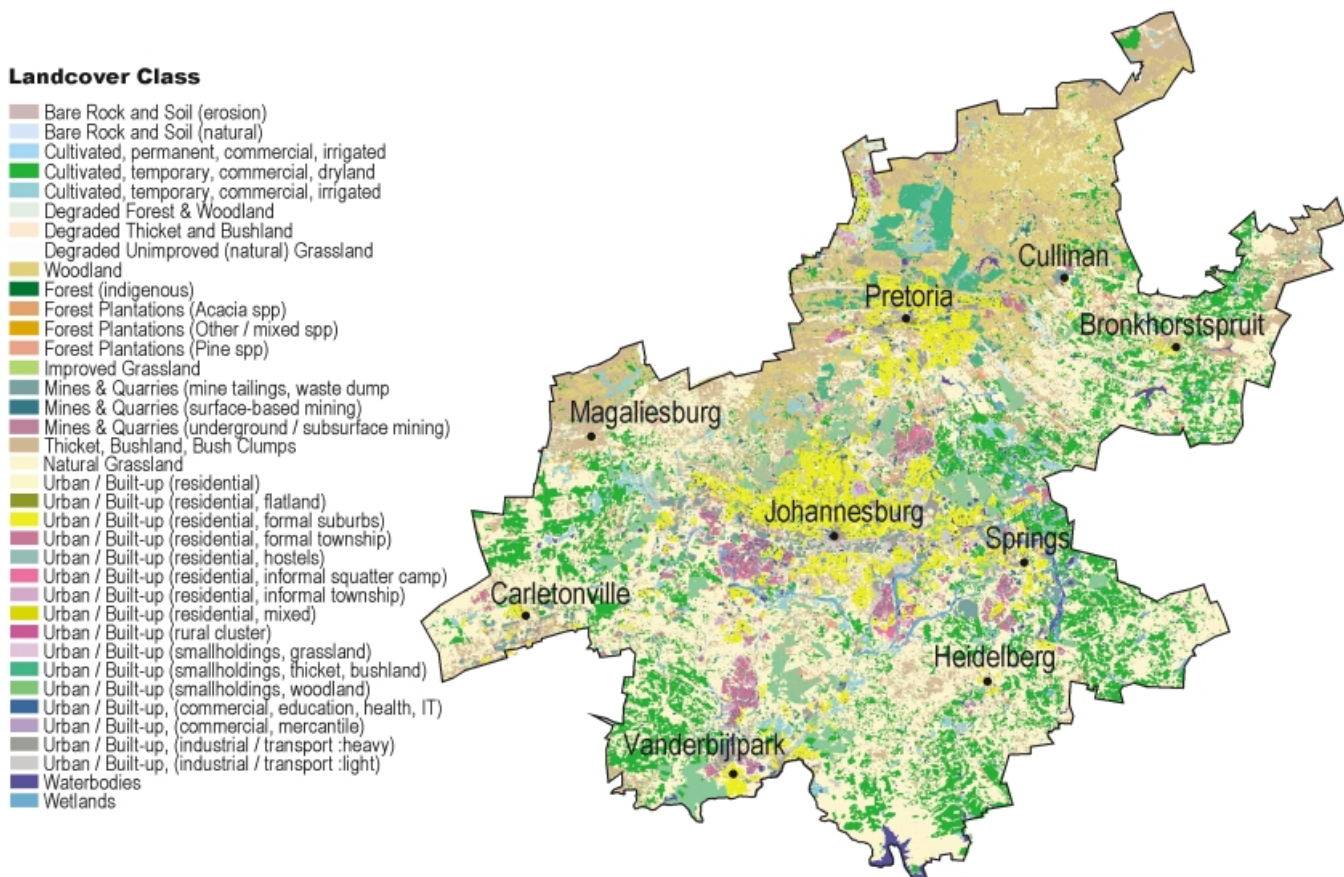
Source: NBI Vegetation Map: Mucina & Rutherford (2004)

Figure 2.3 Vegetation Types in Gauteng

Land and Soils

Gauteng is the most urbanised province in SA, with 17 % of its land area classified as being in 'urban' land uses (Figure 2.4). Surveys and analyses of the remaining areas indicate complex soil and land capability patterns, due to the complex geology. The deep, well drained, apedal soils of the Hutton type give rise to the 23.1 % of the province with arable potential. Another 25.3 % is deemed "marginally" arable, with the remainder suitable for grazing and wildlife. The soils of the province are dominated by plinthic, duplex and hydromorphic soils, which all carry

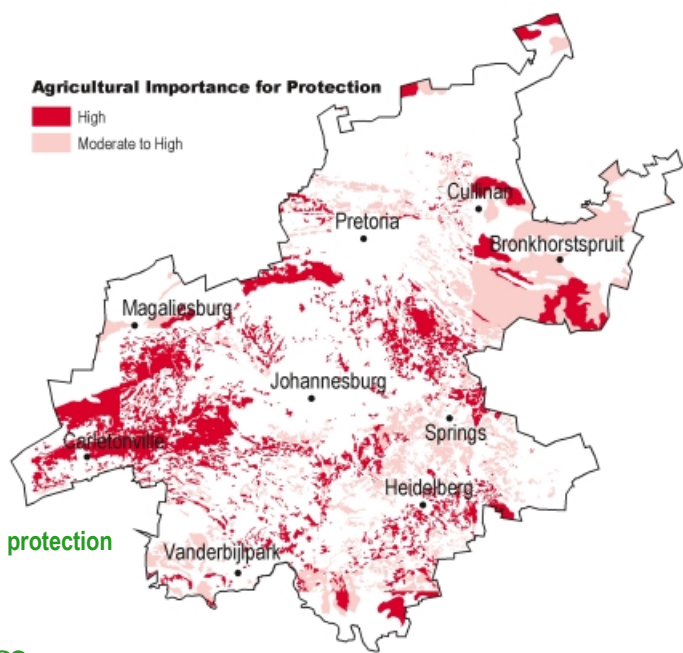
limitations for agricultural crop production. Further analysis of the potential for irrigation-fed crop production reveals that over 50 % of the province is not suitable for irrigated crops, but the analysis yields a map of areas to be protected for agricultural use, areas which comprise 19% of the land area of the province (GPG, 2002) (Figure 2.5). The large blocks of good potential agricultural land lie in the south-west, between Carletonville and Magaliesburg, in the south-east, around Heidelberg, and in the north-west of the province, south of Bronkhorstspuit.



Source: National Landcover 2000 (CSIR and ARC)

Figure 2.4 Landcover in Gauteng in 2002





Source: Gauteng Agricultural Potential Atlas (GDACE)

Figure 2.5 Agricultural importance: areas for protection

Population and Economics

Gauteng is home to approximately 8.8 million people, which represents nearly 20 % of SA's population (Statistics South Africa (StatsSA), 2002). There is a diverse array of cultures in the province with the major languages spoken being isiZulu, Afrikaans, seSotho and English. Other languages commonly spoken include Portuguese, Italian, Greek and various Asian languages. Approximately 5.4 % of the population was not born in SA, most of who originate from Southern African Development Community (SADC) countries.

Gauteng is SA's economic powerhouse, and

economic growth and output in the province outstrips the rest of the country and indeed leads the whole African continent (GEDA, 2004). The economy grew at an average of 3.3 % per year from 1995 to 2002, which is above the national average of 2.7 %, and slightly below other developing countries. Its contribution to the national Gross Domestic Product (GDP) grew from 32,6 % in 1995 to 33,9 % in 2002.

The Gauteng economy is diverse, ranging from a thriving informal sector including street vendors, to a high-tech manufacturing and industrial sector.

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