

Importance, threats, status and conservation challenges of biodiversity in Northern Cape.

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Introduction

Biodiversity is a short term meaning the totality of life on earth, including the variability within a given species' population and the variety of ecosystems across a geographic area. This refers to genes, species (plants and animals), ecosystems, landscapes, and the ecological and evolutionary processes that allow these elements of biodiversity to persist over time.

An ecosystem is a collection of living organisms together with the physical and chemical environment with which they interact to form food webs and food chains. The functioning of a given ecosystem is driven by its constituent organisms and is best understood as a cyclical flow of energy and materials. In 1992, The United Nations Convention on Biological Diversity defined biodiversity as "the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems".

Biodiversity is unevenly distributed on Earth. Flora and fauna distribution and diversity depends on climate variables. In 2006, large numbers of the Earth's species were formally classified as rare or endangered or threatened species; moreover, many scientists have estimated that there are millions more species endangered which have not yet been formally recognized. About 40 percent of the 40,177 species assessed using the IUCN Red List criteria, are now listed as threatened species with extinction - 16,119 species (Baillie 1996).

Biodiversity in Northern Cape

South Africa has a wide range of climatic conditions and topography (e.g. coastal plains, steep escarpment, large plateau), giving rise to broad vegetation zones called biomes. These are the Fynbos, Succulent Karoo, Desert, Nama-Karoo, Grassland, Savanna, Albany Thicket, Indian Ocean Coastal Belt and Forest biomes (Mucina and Rutherford 2006) (Fig. 1). Each of these biomes supports its own collection of plant and animal species.

The Northern Cape Province consists of six biomes, Desert, Nama-Karoo, Succulent Karoo, Savanna, Fynbos and Grassland (Mucina and Rutherford 2006). Each biome represents major life ecological zones. Within these biomes, there are groups of plant communities forming vegetation types, which are habitats to various living organisms and they pose unique features that distinctly differentiate them from other biomes and vegetation types.

The arid Savanna biome stretches over the Kalahari region of South Africa, Botswana and Namibia. It is characterized by a grass layer and a distinct upper layer of woody plants. Some parts of the arid Savanna are invaded by Karoo shrubs. The environmental factors delimiting the biome are complex. However, much of the area is used for game farming.

The Nama Karoo biome occurs on the central plateau of the Northern Cape. It covers much of the interior with its hardy bushes and grasses. Many of the plant species of the Nama-Karoo occur in the savanna, grassland, Succulent Karoo and Fynbos biomes. Nama-Karoo experience summer rainfall,

varying between 100 and 520 mm per year. There is high erodibility of soils due to problems of overgrazing.

The Northern Cape's biological diversity and vast natural resources are facing challenges of biodiversity loss as a result of transformation and degradation of natural habitat. Changes of land use, development of natural habitat types into cultivation, urban and mining areas. The dominant vegetation is a grassy and dwarf shrubland. Grasses tend to be more common in depressions and on sandy soils, and less abundant on clayey soils. Grazing rapidly increases the relative abundance of shrubs. The amount and nature of the fuel load is insufficient to support frequent fires. The Brown Locust and Karoo Caterpillar exhibit eruptions under similarly favourable, local rainfall events, and attract large numbers of bird and mammal predators.

The former vast migratory herds of springbok (*Antidorcas marsupialis*) have been replaced by domestic stock, particularly sheep and goats. A rich variety of rodents and reptiles also occurs in the Nama-Karoo. The few, endemic or near-endemic bird species include the Sclaters lark (*Spizocorys sclateri*). Sheep farming is the main agricultural activity in this region. Climate change models predict that the Great Karoo will become drier and more desert-like, particularly in the west. Only in parts of the eastern Karoo will the climate still suit the vegetation of the Nama-Karoo biome.

The Desert biome is found under very harsh environmental conditions than those found in the Succulent Karoo biome and Nama-Karoo biome. Summer rainfall, where mean annual rainfall is from approximately 10 mm in the west, to 70 or 80 mm on the inland margin of the desert. Rainfall is highly variable from year to year. The vegetation of the Desert biome is characterized by dominance of annual plants (often-annual grasses). The desert plains can be covered with a sea of short annual grass after abundant rains. Whereas in normal years, the plains can appear bare with the annual plants persisting in the form of seed. Perennial plants are usually encountered in specialized habitats associated with local concentrations of water. The Desert biome

includes an abundant insect fauna which includes many tenebrionid beetles, some of which can utilize fog water.

The Succulent Karoo is found in the western parts of the Northern Cape, stretching down to the Western Cape. It is restricted to the year-round and winter rainfall areas and has the greatest summer aridity. This is the land of many spring flowers, which for a few weeks each year, draw large numbers of tourists from all over the world. Succulent plant species with thick, fleshy leaves are plentiful here, the diversity of which is unparalleled anywhere else in the world. This, together with many geophytes (plants that survive by means of bulbs tubers, in times of unfavorable climatic conditions) and annual plants, makes the Succulent Karoo unique and of international importance in terms of conservation. Examples of animals that occur here are the Bat-eared fox, *Otocyon megalotis*, Suricate, *Suricata suricatta* and the common Barking gecko, *Ptenopus garrulus*. Within the Succulent Karoo biome, the area known as the Knersvlakte is extremely rich in endemic plants. Hundred and fifty of the 1000 plant species found there occur nowhere else on Earth.

Importance of biodiversity

South Africa's biodiversity provides an important basis for economic growth and development, e.g. our fishing industry, rangelands that support commercial and subsistence farming, horticultural and agricultural industry based on indigenous species, our tourism industry, aspects of our film industry, and commercial and non-commercial medicinal applications of indigenous resources.

Biodiversity plays a major role in meeting human needs directly while maintaining the ecological process upon which our survival depends. It also provides excellent conditions and drives the processes that sustain species survival, hence global economy. Some of the provisions of biodiversity include ecological, economic and cultural values to the world's community.

Biodiversity threats in the Northern Cape

Biodiversity is under threat globally. The Northern Cape is experiencing human induced threats for bio-

diversity including desertification, open-strip mining, illegal or unsustainable plant harvesting, agricultural mismanagement, alien invasive species and insufficient environmental management. It is important that to protect biodiversity to maintain a good the quality of life and standard of living. Threatened, endangered or protected species may be lost permanently from their natural habitats resulting in extinction and hence biodiversity loss.

Developments also play a major role in land use change because of draining wetlands and clearing of trees. Habitat by fragmenting and over-utilizations of natural resources. Other threats to biodiversity includes, over-harvesting of trees to make building supplies and paper products and for use as fuel, introducing harmful species into foreign ecosystems, releasing toxic pollutants and poaching, unsustainably hunting, or illegally trading wildlife. Other global factors include climate change, habitat destruction and land degradation.

Conservation challenges of biodiversity

Biodiversity is a treasure that enriches our lives and we all have to learn and care for it, in return of our

healthy environment. Though we face challenges of anthropogenic events, of which most of them are unpredictable, we have to be aware of each other's role in conservation of our biodiversity. The effective protection and use of biodiversity in our country requires our urgent attention because biodiversity conservation is a call for everyone and we can all answer it responsibly. The biodiversity loss is taking place at a quicker rate, and it seems not to be easy to predict and calculate details of what is threatening the diversity and abundance of Earth's species.

Many species and ecosystems will disappear over the next century; therefore a sound strategy must be initiated to increase existing protected land and strategically adding new protected areas. We must make efforts to preserve, conserve and manage biodiversity. Protection of biodiversity requires a network of national parks and reserves, located where appropriate ecosystem functionality and representatives exists and is protected from exploitation. National parks and nature reserves can be effective, providing protection to area's wildlife and prevent resource extraction.

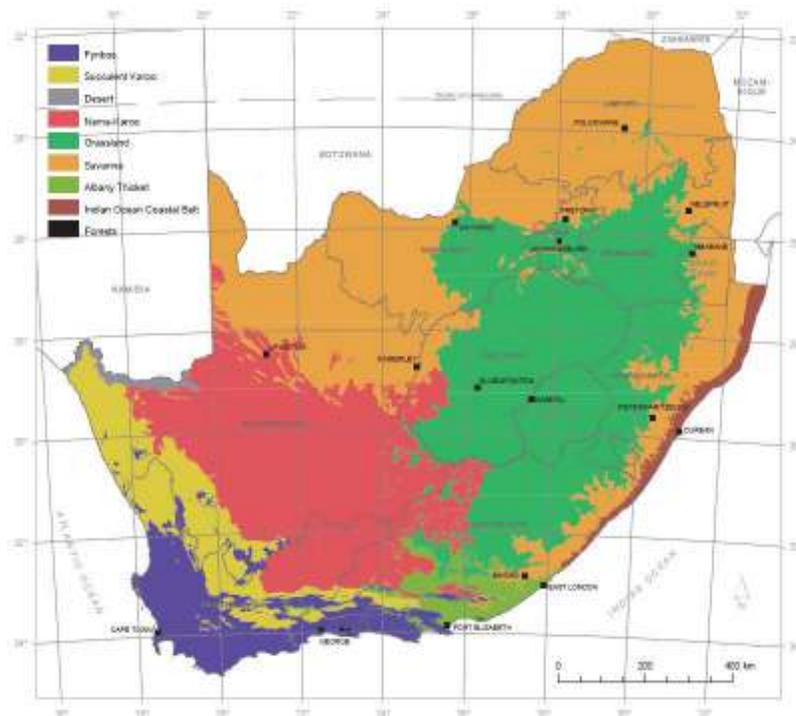


Figure 1. Distribution of different biomes in South Africa. Savanna, Nama-Karoo, Succulent Karoo, Fynbos, Grassland and Desert are the main biomes of the Northern Cape (adapted from Mucina and Rutherford 2006).



Figure 2. Some of biodiversity constituents of the Northern Cape, in this picture, *Acacia erioloba*, Eiland, Rolfontein floodplains, Vanderkloof Dam in Dornkloof Nature Reserve, Vaal river in Schmitsdrift, Medicinal plant in Kuruman, Tortoises, Gemsbok, Meerkat in Kalahari, Riverine Rabbit, Springbok and Flamingo birds in Kamfers Dam.

Because we share the world with many other species of plants and animals, we must consider the consequences of our actions. Over the past several decades, increasing human activity has rapidly destroyed or polluted many ecological habitats throughout the world. By educating people about the consequences of our actions, we can all gain a better understanding of how to preserve the natural biomes of the earth. Although areas that have already been destroyed will probably never regain their original forms, conservation can help to keep them from deteriorating further. Biodiversity is no longer an issue confined to conservation biologists or wildlife sup-

porters only. It is important to farmers, indigenous people, human rights and global trade.

References

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