

SEKHUKHUNELAND

FLORISTIC WEALTH VERSUS PLATINUM AND CHROMIUM RICHES.

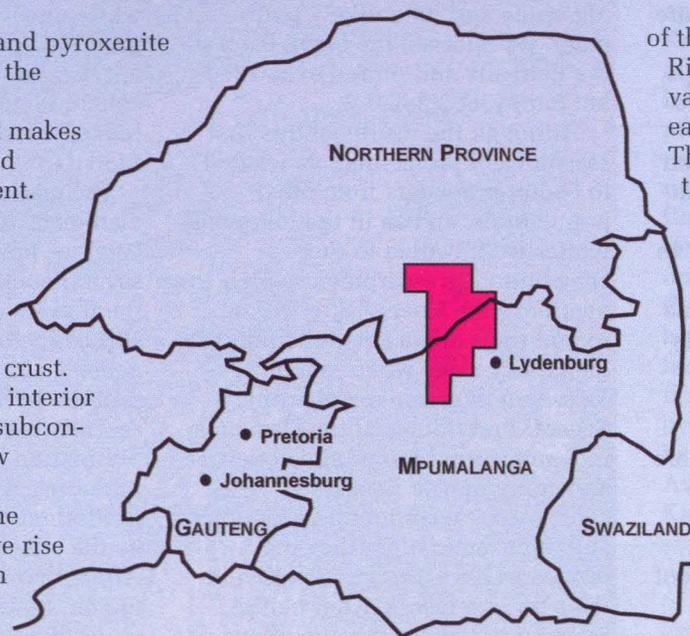
by *Stefan Siebert and Braam van Wyk, H.G.W.J. Schweickerdt Herbarium, University of Pretoria*

Undulating norite and pyroxenite hills characterize the Sekhukhuneland landscape. The rock that makes up these hills was formed during a magnificent event. A series of surges led to the emplacement of magma on the surface as a result of alternating stress and pressure conditions in the earth's crust. Lava was forced into the interior of the southern African subcontinent, with the lava flow continuously fed from a central volcanic pipe. The lava crystallized and gave rise to different layers, which have been classified as the Bushveld Complex. Today these rocks cover an area of about 66 000 km², the largest layered intrusion in the world. The Rustenburg Layered Suite is the outermost of these layers, with the eastern Rustenburg Layered Suite (Sekhukhuneland region) holding some of the highest concentrations of heavy metals such as chromium, platinum, titanium and vanadium in the world. These high concentrations of heavy metals are contained in the rocks and soils of the region.

Sekhukhuneland is a lowveld enclave surrounded by highveld and middleveld. Millions of years of erosion by the drainage systems

Sekhukhuneland is scarred by surface mining which is the most economical method used to extract and remove norite, chromium, vanadium and platinum.

Photo: A.E. van Wyk.



The Sekhukhuneland centre of plant endemism in South Africa.

Map: F. du Plessis.

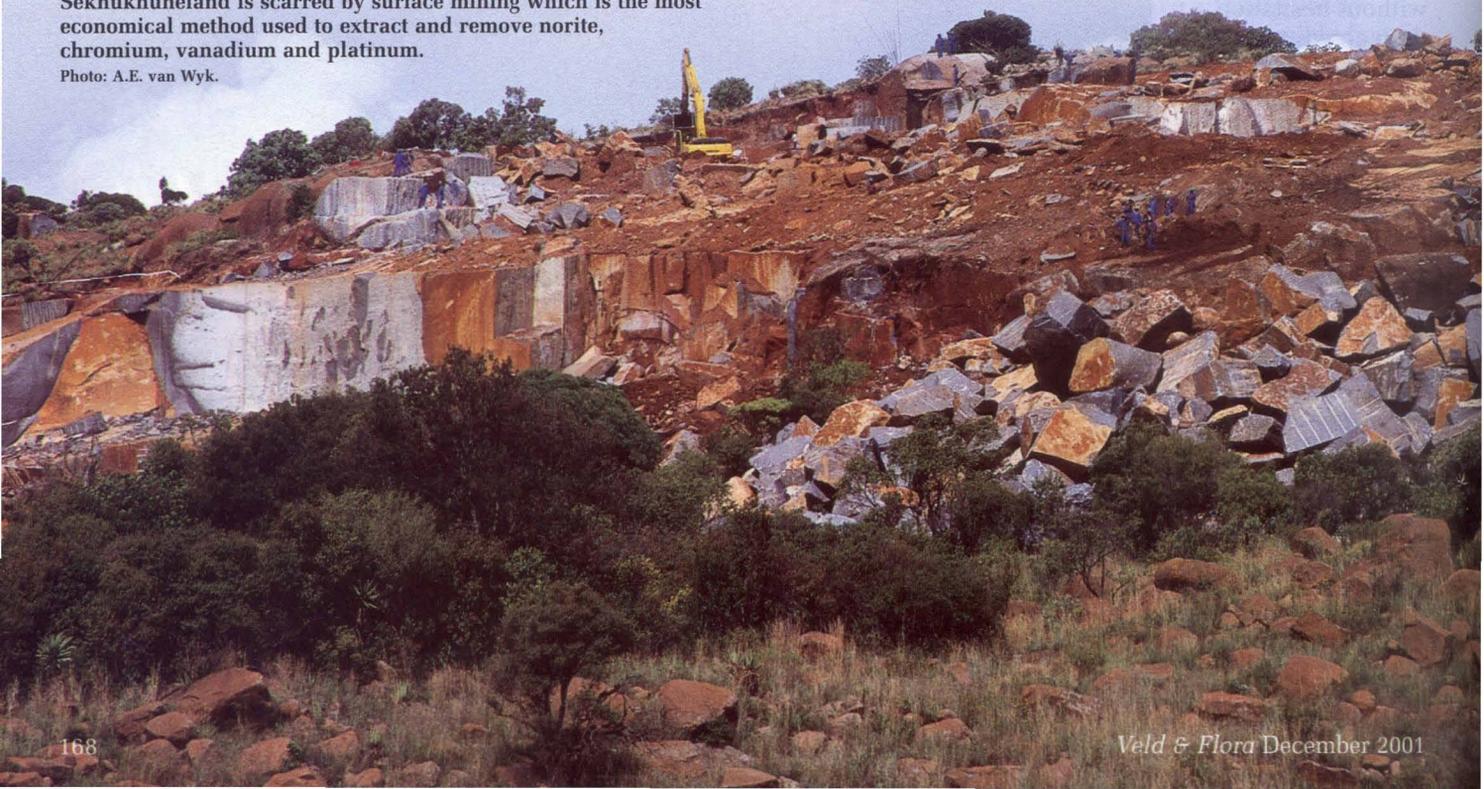
of the Steelpoort and Olifants Rivers have eroded deep, broad valleys to the west of the north-eastern Drakensberg Escarpment. These valleys are traversed by the Leolo Mountains and many sequences of undulating hills that are mostly orientated north-south (but sequences with an east-west orientation occur south of the Strydpoort Mountains).

As a result of the low gold price and the rise in the platinum and chromium prices, Sekhukhuneland is experiencing rapid development, at a pace unprecedented for this region.

Mines are shooting up like mushrooms. This is of great benefit to the local people, most of whom are poor and unemployed, but

has a detrimental effect on the rich natural flora.

Earlier unsuccessful mining activities, without any attempt at rehabilitation, resulted in extensive damage to the immediate environment, which is visible as scars on many of the hills and mountains of the region. Open casts and mine dumps must be rehabilitated under new laws, but it is the indirect effect of the mining industry that causes the biggest problems. With the mines comes a tremendous influx of people to an area already densely populated.

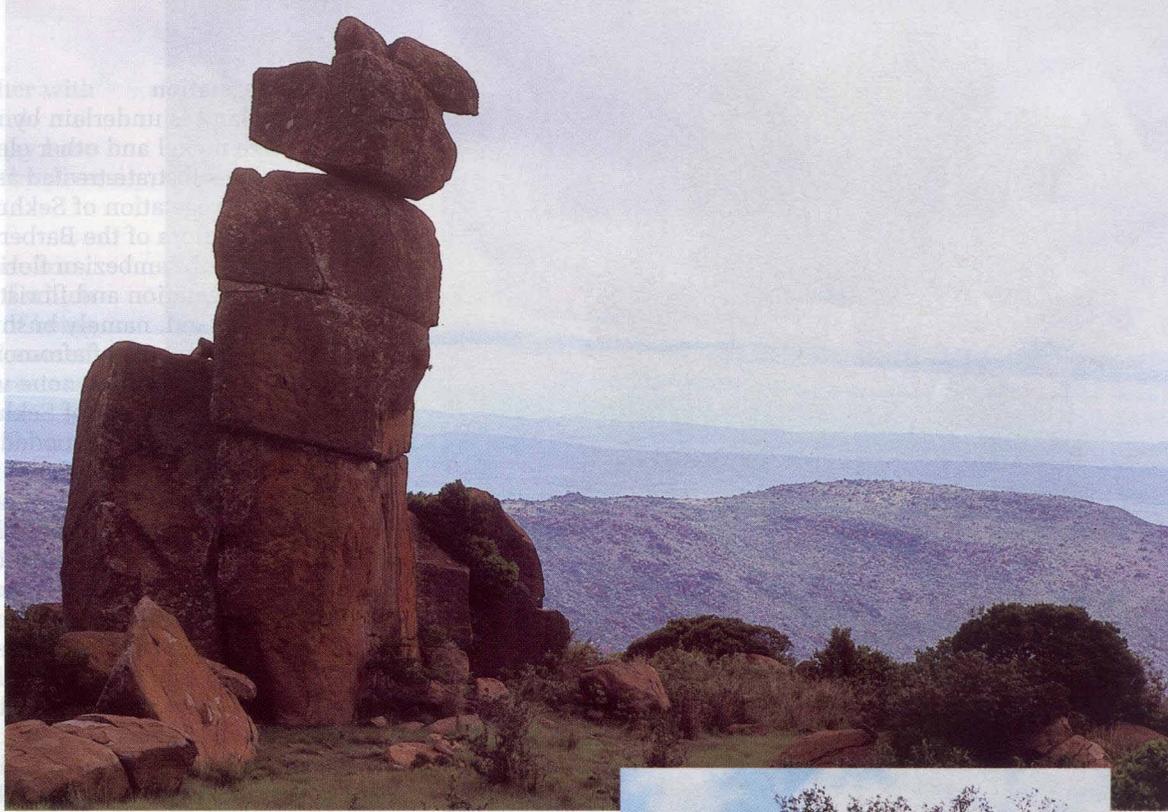


Right
The Leolo Mountains
is the largest feature
in Sekhukhuneland.
Spectacular rock
formations can be
found on the summit.

Below right
Clumps of afro-
montane forests occur
on the summit of the
Leolo Mountains.

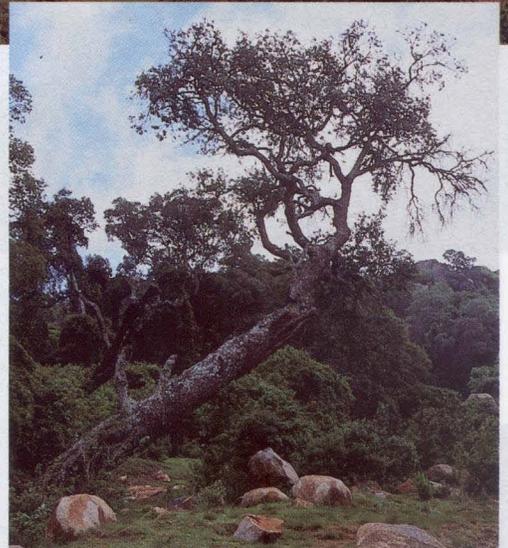
Below
The economic riches
of Sekhukhuneland
lie in its rocks, as can
be seen at the
Dwarsrivier
Monument where the
black chromium
bands in the
anorthosite rock has
been exposed by the
Dwars River.

Photos: A.E. van Wyk.



Sekhukhuneland has been the home of the Pedi, a strongly cultural people, who use to live in harmony with their environment. They have been using their natural resources sustainably for hundreds of years. Foreigners who have moved and settled in Sekhukhuneland in search of job opportunities usually do not have the same cultural respect for their new environment. This is already evident in many parts of Sekhukhuneland, where large specimens of traditionally protected trees such as *Boscia foetida*, *Schotia brachypetala*, *Catha transvaalensis* and *Acacia burkei* have been chopped down in recent years. Historically, these trees were selectively left in fields and settlements for cultural, medicinal and shade purposes.

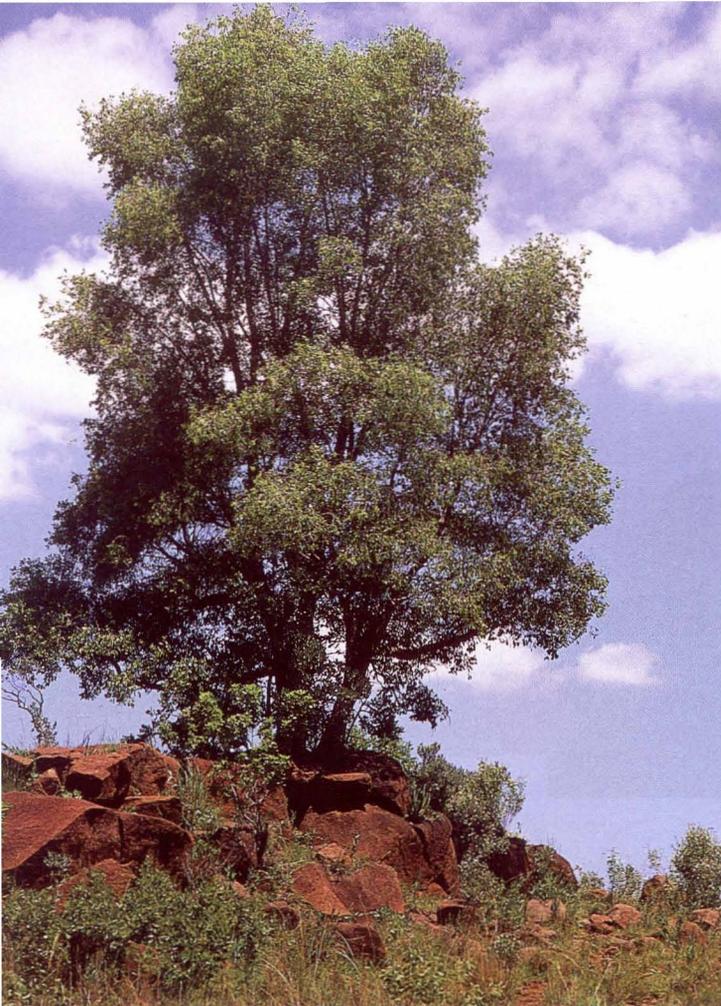
Other threats to the vegetation are the result of urban development and its associated activities, for example towers and reservoirs on hills, water pipelines, roads, housing developments, alien plants, over-utilization of wood, overgrazing, intensive collection for muti markets and pollution by smelting industries.



Climate

Situated along the north-eastern Drakensberg Escarpment, one may expect Sekhukhuneland to have a cool, moist climate. However, this is only true for the grasslands in the extreme southern parts of the region, which borders the Steenkampsberg, and for the higher plateaux of the Leolo Mountains, where the annual rainfall averages approximately 700 mm, with a mean temperature of 19 °C. The larger part of Sekhukhuneland is a semi-arid savanna that lies in the rain shadow of the Escarpment which has an average annual rainfall of 400 mm and a mean temperature of 22 °C.





Above *Catha transvaalensis* (Sekhukhune bushman's tea) is a characteristic tree of Sekhukhuneland and can be found on rocky hillsides of pyroxenite, norite, magnetite and dolomite. Below Thaba Sekhukhune forms the western boundary of the Sekhukhuneland floristic region. Note the autumn colours of *Kirkia wilmsii* in the foreground. Photos: A.E. van Wyk.

Flora and vegetation

Sekhukhuneland is underlain by ultramafic rock (rich in metals like nickel and other elements like magnesium), a substrate treated as serpentine by botanists. The vegetation of Sekhukhuneland, like the true serpentine flora of the Barberton Sequence, is predominantly of Zambezian floristic extraction. Three major vegetation and floristic regions converge in Sekhukhuneland, namely bushveld (savanna), grassland and elements of afro-montane forest. This has resulted in a transition zone with a diverse flora. The more temperate areas of Sekhukhuneland are characterized by sparsely wooded grassland and afro-montane bush clumps. Relict forest patches are found on the summit of the Leolo Mountains. The high-altitude southern and central regions of Sekhukhuneland are characterized by grasslands, which are an extension of those on the Steenkampsberg. Bushveld is dominant in all the warm dry valleys, plains and low-altitude mountain slopes and hills. The open plains are usually characterized by bushveld vegetation interspersed with numerous karroid elements.

The diversity of the plant species in Sekhukhuneland is striking. Even more remarkable are the floristic changes that can be observed over short distances – a phenomenon usually associated with the Cape Floristic Kingdom. The marked changes in altitude (1500 to 700 m) over short changes, diverse geology (shales, quartzites and sandstone to norite, pyroxenite and anorthosite), changing topography (level to undulating), varying regional climate (cool, wet to warm, dry) and complex climatic history (grassland, bushveld, forest and karroid vegetation), probably all contributed in one way or another to the present-day diversity of the Sekhukhuneland flora.

The seclusion of the 'basin' by the high ground



encompassing it, together with the heavy-metal rich and relatively toxic soils, may have served as stimulus for the diversification of plant life in this 8 000 km² area.

Approximately fifty endemic plant species, several of which are still in the process of being formally described and named, and several rare and threatened species occur here.

The diversity of the flora is well illustrated by the distribution of trees in the region. Broad, arid valleys that traverse Sekhukhuneland are characterized by thornveld dominated by *Acacia grandicornuta*, *A. mellifera* and *A. tortilis*. Other prominent trees include *Albizia anthelmintica* and *Dichrostachys cinerea*. Trees typical of these arid habitats are *Boscia foetida* subsp. *rehmanniana*, *Cadaba termitaria*, *Commiphora pyracanthoides* and *Sesamothamnus lugardii*. The sequences of dry mountain slopes and hills in Sekhukhuneland are dominated by *Combretum apiculatum*, *Commiphora mollis*, *Grewia flava*, *Kirkia wilmsii* and *Sterculia rogersii*, with foothills characterized by *Acacia senegal* var. *leiorhachis*, *A. nigrescens*, *A. nilotica*, *Boscia albitrunca* and *Terminalia prunioides*. Patches of eroded, heavy-metal soils occur throughout the study area and are recognizable by a range of small trees/shrubs, notably *Brachylaena ilicifolia*, *Bolusanthus speciosus*, *Euclea linearis*, *Euclea* sp. *nova*, *Ozoroa sphaerocarpa* and *Rhus keetii*.

Other prominent and abundant woody species of these vegetation anomalies include *Combretum hereroense*, *Grewia vernicosa*, *Rhigozum obovatum*, *Tinnea rhodesiana* and *Vitex obovata* subsp. *wilmsii*. On the southern aspects and higher altitudes of mountains and hills there are stands of woodland with afro-montane elements such as *Apodytes dimidiata*, *Andrachne ovalis*, *Gymnosporia mossambicencis*, *Ilex mitis*, *Kiggelaria africana*, *Maytenus undata* and *Prunus africana*. Rocky outcrops are common and widespread throughout the region. Common tree species on these outcrops include *Catha transvaalensis*, *Combretum molle*, *Halleria lucida*, *Olea capensis* and *Vangueria infausta*. Other prominent species are *Acacia ataxacantha*, *Aloe castanea*, *Commiphora marlothii*, *Euphorbia sekhukhuniensis*, *Hippobromus pauciflorus* and *Rhoicissus tridentata*.

Although the grasslands in the south are very poor in trees, they are characterized by *Protea caffra* and the woody *Elephantorrhiza elephantina*, a new species of *Rhoicissus* and *Rhus wilmsii*. Other less



Above Fourteen succulent *Euphorbia* species occur in Sekhukhuneland, of which the endemic *Euphorbia sekhukhuniensis* (*getlane* in the Pedi vernacular) occurs the most frequently.

Below *Jamesbrittenia macrantha* is a spectacular endemic wildflower in Sekhukhuneland which is especially common in disturbed road reserves. Photos: A.E. van Wyk.



frequently occurring trees/shrubs are *Acacia caffra*, *Cussonia transvaalensis*, *Euclea crispa*, *Rhus leptodictya* and *Vitex obovata* subsp. *wilmsii*. The alien invasive tree *Acacia dealbata* is a major problem in these grasslands. Wetlands and rivers in the region also have their own set of associated trees of which *Salix mucronata* is probably the most obvious. Other woody species include *Acacia karroo*, *Nuxia gracilis* and *Rhamnus prinoides*.

Species of special concern

All these different tree associations occur over short distances and all of them can be found within a kilometre radius in the central part of Sekhukhuneland. The various plant communities are interspersed and no two communities have the same species composition as a result of the diverse habitat and the specific preference of the different taxa concerned.

Many endemic woody species are associated with these different habitats such as the trees/shrubs *Catha transvaalensis*, *Elephantorrhiza praetermissa* and *Rhus batophylla*, as well as the large succulents *Euphorbia barnardii* and *E. sekukuniensis*. Also endemic to the region are the shrubby *Asparagus sekukhuniensis* and *Rhoicissus sekukhuniensis*, the yellow flowering geophyte *Zantedeschia jucunda* and cryptic cream-flowered geophyte *Stylochiton* sp. nova, the succulent *Plectranthus venteri*, the spectacular purple-flowered *Jamesbrittenia macrantha* and the red-flowered *Hibiscus barnardii*.

Most of these species are considered rare and endangered

the success, if any, of these operations will only be apparent in the long term.

In addition to the wealth of endemics, twenty-six of the 1 800 species that occur in Sekhukhuland have provisionally met the new IUCN criteria as part of the assessments made during the Southern African Plant Red Data List Project. On a national level, three were assessed as 'critically endangered', namely *Nemesia zimbabwensis*, *Stylochiton* sp. nova and *Tulbaghia* sp. nova (probably a new genus), three as 'endangered', namely *Aneilema longirrhizum*, *Raphionacme chimanimaniana* and *Zantedeschia pentlandii*, and a further twenty as 'vulnerable'.

Jamesbrittenia macrantha, *Orthosiphon fruticosus*, *Phyllanthus* sp. nova and *Polygala* sp. nova. Other interesting plant species that share this specialized habitat with the endemics are from arid regions in the Northern Province, Northern Cape and North West Province and include *Gnidia polycephala*, *Jamesbrittenia atropurpurea*, *Nuxia gracilis*, *Plinthus rehmannii*, *Pterothrix spinescens*, *Phyllanthus parvulus* var. *garipensis*, *Rhigozum obovatum*, *Rhus keetii*, *Sesamothamnus lugardii* and *Stipagrostis hirtigluma* subsp. *patula*. Very few alien plants occur in these dongas, an indication that this habitat type is a natural feature of the region.



Left *Zantedeschia pentlandii* is near-endemic to Sekhukhuland and endemic to the mountainous areas of the Roosenekal-Dullstroom region. Right The unfamiliar *Hibiscus barnardii* is an endemic of the undulating hills of Sekhukhuland.

Photos: A.E. van Wyk.

because of the impending development in the area. These taxa are currently known only from specific localities in Sekhukhuland, most of which are in close proximity to the mining and residential development in the region. Many other plant species endemic to the northern provinces of South Africa, and particularly near-endemics shared between the north-eastern Drakensberg Escarpment and Sekhukhuland, are under the same threat. Organized plant rescue operations at proposed development sites have led to the re-location of large numbers of these taxa (notably succulents) to various botanical gardens in South Africa. However

Other plant species of particular concern are the taxa restricted to the vegetation anomalies in the region. These species are either endemic to Sekhukhuland or are abundant in other arid regions hundreds of kilometres away. These vegetation anomalies are usually naturally eroded systems and were first reported in the literature and studied around 1950. Owing to the general attitude towards erosion, these natural dongas are used as dumping sites by industries in the region. However, extensive field work has shown that these areas are inhabited by a unique flora that include endemics such as *Catha transvaalensis*, *Rhus batophylla* and *R. sekukhuniensis* and

Conservation

Currently there is one conservation area in the northern region of Sekhukhuland, near the town of Mecklenburg. Potlake is a 2 800 ha nature reserve of mountain bushveld between the Olifants River and the Burgersfort-Pietersburg road. Although prolonged settlement in the past has left its mark on parts of the Potlake Nature Reserve, its mountain and foothills of serpentinized harzburgite harbour a wide variety of plant species, including a few undescribed ones. However, many more conservation areas are needed to protect the diverse habitats of the region. In an economically productive development zone this is seldom

Right Yellow arums flower profusely and contribute to a mosaic of green, brown and yellow which covers the hillsides in December. *Zantedeschia jucunda* with its white-speckled leaves, is endemic to Sekhukhuneland.

Photo: A.E. van Wyk.

possible without compromise.

The most positive scenario at present is the fact that mining companies are at least trying to rehabilitate disturbed sites. However, what has been lost can never be regained. What is really needed is a comprehensive development plan for the whole region. Environmental Impact Assessment consultants and conservation authorities alike have recommended it, but no real action plan has been developed. Uncontrolled mining, agricultural and residential development of the area will result in the irreplaceable loss of Sekhukhuneland's unique plant species and habitat. As a signatory to the Convention on Biological Diversity and as a country that has geared itself for ecotourism, South Africa should take note of its dwindling natural areas and the lack of conservation measures to sustainably protect its biodiversity. ♡

Further reading:

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About the authors

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