

**OVERVIEW OF ENVIRONMENTAL
ISSUES IN FORMER
"DAMARALAND"**

by JA Kamwi

Occasional Paper No. 7
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Desert Research Foundation of Namibia

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TABLE OF CONTENTS

Farm Indices	i
Introduction	2
Geographic and Physical Features	3
History	4
Natural Resources	5
Climate	9
Demography	9
Land Tenure and Agriculture	10
List of References	12
Acronyms	13
Annexes:	
A) Bibliography	14
B) Tables - summaries	27
detailed	33
C) Maps	50
D) Other items	54

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FARM INDEX

All farms that constituted the former Damaraland

No.	Name of farm	Number of farm
1.	Orusewa	1
2.	Tsawisis	2
3.	Elba	3
4.	Sorris Sorris	186
5.	Grootberg	191
6.	Kakatswa Onguati	236
7.	Brambach	271
8.	Engelbrecht	272
9.	?	274
10.	Halt	379
11.	?	381
12.	?	382
13.	Navarre	383
14.	Waterval	384
15.	Renosterwraak	385
16.	Stille Woning	386
17.	Braamfels	387
18.	?	388
19.	?	389
20.	Macaria	390
21.	Belmont	392
22.	Dieprivier	393
23.	Welbedacht	394
24.	Uitskop	395
25.	Middelplaas	396
26.	Vaalhoek	397
27.	?	398
28.	Nooitgedacht	399
29.	Delta	400
30.	Moedhou	402
31.	Omborombonga	403
32.	?	404
33.	Karsenville	405

34.	Terra Mea	406
35.	Biesiepoort	409
36.	Sebrakop	410
37.	Leeushoek	411
38.	Onverwag	412
39.	Irene	413
40.	?	478
41.	Arbeit Adelt	479
42.	Morewag	480
43.	?	481
44.	Inhoek	482
45.	Bella Vista	483
46.	Bloemhof	484
47.	Oase	486
48.	Horison	489
49.	Bergville	490
50.	Lofdal	491
51.	Braaklaagte	492
52.	?	495
53.	?	496
54.	Langberg	497
55.	Groenvlei	498
56.	Losberg	499
57.	Goedgevind	500
58.	Arbeidsgenot	501
59.	?	502
60.	Goeiehoop	503
61.	Mesopotamie	504
62.	Soutput	505
63.	Rooikop	506
64.	Boesmanpan	507
65.	?	508
66.	Rushof	509
67.	Ruimte	510
68.	Naawpoort	511
69.	Bloukrans	512
70.	Loerkop	513
71.	Bethanie	514
72.	Austerlitz	515
73.	Driekrone	516
74.	Rooiberg	517
75.	Rietkuil	518
76.	Malans Rust	519
77.	Blaaw	520
78.	Witwatersrand	521
79.	Granietkop	522
80.	?	523

81.	?	524
82.	?	525
83.	Goedgenoeg	526
84.	Vegkop	528
85.	Duineveld	529
86.	Saulstraat	530
87.	Alpha	531
88.	?	532
89.	Rendezvous	533
90.	Twyfelfontein	534
91.	?	535
92.	Estorf	600
93.	Moria	601
94.	Anker	602
95.	Deo Volento	610
96.	Dwarstrek	611
97.	?	612
98.	Emmanuel	613
99.	Condor	617
100	Atlanta	618
101	?	619
102	Keiserfontein	620
103	?	621
104	Oortrek	622
105	Waterbron	623
106	Kamdescha	624
107	Quo Vadis	625
108	De Ville	638
109	Marienhohe	639
110.	Swartskamp	640
111.	Marienphil	641
112.	West End	642
113.	Tevrede	643
114.	Leeukop	664
115.	Verpaaie	665
116.	Kuyper	666
117.	Nugas	667
118.	Suiderkruis	668
119.	Ruspoort	669
120.	Brakwater	670
121.	Freyer	671
122.	Avante	672
123.	Aandgloed	673
124.	Noute	674
125.	Eersbegin	675
126.	Tweelingskop	676
127.	Annabis	677

INTRODUCTION

'Damaraland' and 'Owamboland' were chosen by the Steering Committee for literature survey(s) and consequently for further NAPCOD work, due to the fact that desertification in these areas is progressing rapidly. The presence of other national research projects such as SARDEP, CBNRM and Communal Areas Water Supply (CAWS) is another reason why this region was chosen. Each of these programmes has a mandate to promote improved and sustainable management of natural resources and like NAPCOD have a strong social development component, supporting wise natural resource management for sustainable human development with the ultimate goal of empowering rural communities to plan, make decisions and implement their development objectives through consultative and participatory practices, training and institutional development (Briefing paper - Intersectoral cooperation for improved natural resource management and sustainable rural development).

Data from various research materials/sources, were compiled into a summarised report. The main aspects being focused on are: geography/the physical environment, history of Damaraland and its people, natural resources e.g. water, minerals, vegetation, geology, soils, demographics etc.

GEOGRAPHICAL LOCATION AND PHYSICAL FEATURES

Former 'Damaraland' is located in Southern Kunene and Northern Erongo Regions with its administrative centre in the Khorixas District and is composed of Khorixas and Sesfontein constituencies. The area is divided into 10 wards, each with a headman. It is located in northwest Namibia, with a western border comprising the Namib Desert which runs in a north-south band stretching roughly 40 km inland from the Atlantic Ocean. The northern boundary with Kaokoland follows the Hoanib River while its southern border is shared with the Karibib District and its eastern borders with the districts of: Outjo, Otjiwarongo and Omaruru (as well as boundaries of measured farms).

The size of 'Damaraland' is approximately 4,7 million hectares, with an altitude of $\pm 1500\text{m}$ above sea level. The western part is characterised by undulating landscapes, the eastern portion is mountainous and the rest of 'Damaraland' is fairly level (Adams-1990).

Rainfall is unpredictable, it decreases from $\pm 300\text{mm}$ per annum in the east to less than 100mm per annum in the west. The highest rainfall in 'Damaraland' occurs between January and March and about 50% of the land receives less than 150mm of rain per year.

The sources of water in 'Damaraland' are ephemeral rivers (which include : Omaruru, Ugab, Unjab, and Huab), and boreholes which form the major source of water for agriculture in the region. The latter's success rate is only 10%.

HISTORY

The Damaras are one of the most ancient ethnic groups, traditionally seen as the aboriginal inhabitants of Namibia (Sullivan, 1992), consisting of a number of subdivisions or haoti. These are clusters of clans and extended families which were formerly concentrated in specific areas. The long contact with the Nama arising well before the arrival of the Damara in their present territory, would if accepted, explain why no remnant of the original Damara language exists (which is thought to have been derived from several Sudanese languages (Sullivan, 1992). More recent analyses, however indicate that the Damara are derived from the Negroid hunting people who first came into contact with Khoi speakers only 2-3 millennia ago in present day Angola (Sullivan - 1992).

In pre-colonial times Damara tribes populated an extensive area of Namibia from the Kuiseb River, southeast of present day Walvis Bay, up towards the Swakop River; in the central parts from Rehoboth and Hochanas to the Khomas Highlands, west of Windhoek and especially in the area where they're presently concentrated, northeast of the Namib in the areas of Outjo, Kamanjab, Khorixas, and Brandberg (Gordes, *et al*-1993).

In the 18th century, the Damara were described as hunter-gatherers, but there is some archeological evidence that they had had small stock for centuries. The fascinating rock engravings found in both the Brandberg and the Twyfelfontein mountains depict game and wild birds, suggesting that the craftsmen who produced them were not acquainted with livestock.

The Damaras were ousted from their traditional areas by advancing Nama and Herero, the latter hunting them down and either killing them or carrying them off as slaves. In 1870 at the request of the Rhenish Missionary Society, the Herero Chief Zerowa ceded the Okombahe area to some Damara (Gordes, *et al*-1993). The newly found land was already inhabited by Khoi-Khoi people from !Am-eib known as Zwartboois. Together the two clans cultivated land in the Omaruru River, which separated the two tribes. The new settlers followed the example of the Hereros and became cattle and goat farmers (Jobst-Jan. 1995).

A serious drought forced all but a few Damaras back to the mountains and after 1880 conflicts arose between the Zwartboois and the Hereros. The latter refused to allow the return and resettling of the remaining Damaras until Chief Manasse Tjiseta relinquished the place for DM 800, after negotiations with Major Leutwein.

In 1898 as a result of famine in the Okombahe area, the reserve was extended to accommodate all Damara people. Other reserves were created such as: Otjimbingwe, Fransfontein and Sesfontein. The reserve was finally given to the Damara people in 1904 by the German authority in reward for their unwillingness to join the Hereros in their rebellion against the Germans (Jobst -Jan.1995). This area was administered from the Otjihorongo Reserve during the Union era until 1946.

In the 60s, the government bought 223 farms from European settlers and transformed 11,6 million acres (4,7 million hectares) into the communal land that comprised Damaraland following the recommendations of the Odendaal Commission of 1963-64, based on the ideology of separate development (Kambatuku-Jan.1995). The principles of the Odendaal Commission prevailed until 1990.

Today, former Damaraland is divided into 10 wards, each led by a headman who does not have the legal power to allocate land, but through whom all the applications for land are directed.

NATURAL RESOURCES:

1. VEGETATION

Classification of vegetation types was done according to the Bioclimatic Regions, the Physiographic Regions and Associated Soils Map. Although rainfall is the primary determinant of a region's vegetation, other factors should also be considered such as: variability in soil, topography and temperature. Due to the fact that rainfall decreases from west to east, there is also a variability in vegetation between the west of "Damaraland" and catchment vegetation in the east. A summary of the vegetation types of this region can be found in Table 1 and Table 2 in Appendix B, as well as Map 1 and 3 in Appendix C.

2. GEOLOGY

The harsh climate has contributed to the land's barrenness, limiting soil development and vegetation growth and it is for this fact that the ancient landscape is visible on the surface today. The largest part of the western catchments is underlain by the Damaran Sequence, a group of rocks laid down approximately 850 to 500 million years ago. Collision of the Congo Craton and the South American continent gave rise to the Kaoko Belt, the coastal branch of the Damara Orogen, which gave rise to the mountains and folds that typify the western catchments. Other sequences include the Karoo, which were formed from the late Jurassic-Cretaceous to the early Carboniferous-Triassic periods; the Namaqua Metamorphic Complex (Mokolian 1800-1000 Ma) as well as the Khoabendus & Haib Groups - undifferentiated Precambrian Metamorphic Complexes (Vaalian > 2000 Ma to lower Mokolian 2000-1800 Ma).

The oldest rocks are granites and gneisses associated with the Kamanjab Inlier, within the Damara Orogen west of Outjo (Jacobson, *et al*-1995). For more detailed information see Map 2 in Annexe C.

3. SOILS

There are a limited number of soil series due to the low rainfall regime as well as to the relatively restricted range of parent material. Soils within the western catchments vary in association with the diverse geology of the region and increasing aridity from east to west. In general the soils throughout the region are thin and poorly developed, a characteristic common to arid climates and slow rates of weathering (Jacobson, *et al*-1995). The detailed classification of soils and the areas where they occur can be found in Map 3 in Annexe C (National Remote Sensing Centre-1974).

A) PHYSIOGRAPHIC REGIONS AND ASSOCIATED SOILS

Bioclimatic region I: Eastern Highlands

i) Physiographic Region A: North Eastern Red Plains

- gentle undulating granite plains with very broad colluvial valleys.
- ranges of low hills and granite/schist koppies.

ii) Physiographic Region B: Huab Drainage System: Plateau Section

- prominent colluvial deposits along the valley sides
- narrow alluvial deposits
- well drained light textured soils.

iii) Physiographic Region C: Huab Drainage System: Broad alluvial/colluvial valleys (Welwitschia Section) Khorixas.

- dark coloured, heavy textured, slowly permeable soils which are highly calcareous and saline at depth.
- the soils are derived from the scarp face to the Kalk Plateau.
- gently sloping colluvial deposits on the valley sides which are derived from the adjacent hills: light to medium textured, well drained red soils.

iv) Physiographic Region D: Eastern Kalk Plateau

- the Plateau represents a relict erosion surface
- calcrete plain with limited soil development.

v) Physiographic Region E: Upper Ugab Drainage System: Calcrete Valleys

- characterized by exposures of indurated calcrete within the valley sections
- the above comprises secondary deposits to that of the Kalk Plateau.

vi) Physiographic Region F: Central Ugab Drainage System: Colluvial/Alluvial Valleys

- prominent alluvial deposits with similar soil sequences which are associated with the large draining tributaries of the Huab River.

vii) Physiographic Region G: Central Schist Hill Ranges

- prominent colluvial deposits along the valley sides, and narrow alluvial deposits.
- well drained and light textured soils.

viii) Physiographic Region H: Central Granite Plains

- level to gently undulating plains with numerous bare rock koppies.

a) upland section:

- shallow gravely red loamy coarse sands with frequent granite exposures.

b) the lower valley:

- deep colluvial/alluvial soils; diffused drainage patterns.
- common calcrete outcrops.

ix) Physiographic Region J: South Eastern Plains: 1) Omatjette Section; 2) Central Section; 3) Western Kalk Plain

- gently undulating to level plains comprising a complex association of intensively folded schist of the Damara System.
- intrusive granites with the subsequent intrusions of younger granite domes, the Gross Spitzkoppe and basic and ultra basic dykes.
- dense dendritic drainage pattern on the watershed areas.
- shallow to very shallow soils deposited *in situ* on the upland sites. They are often stony and bouldery with numerous schist, granite and calcrete exposures.
- deeper soils occur along the margins and lower reaches of the drainage lines (the areas of deposition).
- increase in proportion of litholic soils, rock exposures and calcrete to the west, correlated with a decrease in rainfall.
- the region is drained by the Omaruru River which is incised into the plain and is flanked by rock outcrops and low hills.

x) Physiographic Region K: Northern Schist Hill Ranges -

- rolling to steeply rolling schist hills with occasional broad strike valleys.

Bioclimatic Region II: Transitional Zone to Eastern Highlands

i) Physiographic Region L: Western Extension to South Eastern Plains

-undulating to level plains with frequent granite and schist exposures and occasional hill features.

-a decrease in elevation to the west.

ii) Physiographic Region M: Duneveld

-this is the only area of aeolian sands in Damaraland.

-gently undulating to level sand plain with series of low parallel dunes.

-occasional calcrete exposures on interdune hollows.

iii) Physiographic Region N: Incised Huab Central Drainage Basin

-the Huab river and tributaries are deeply incised.

-steep rocky mountains and hills, many places forming scree slopes, which are devoid of vegetation.

-gently undulating plains and valleys occur within the region.

iv) Physiographic Region O: Valleys and Plains of Central Basalt Mountain Section

-prominent high, flat-topped mountains and steep pediment slopes extending into broad, moderately incised valleys and gently undulating plains.

v) Physiographic Region P: Hoanib Drainage Basin

-generally a mountainous region.

-high proportion of calcrete (upper reaches of the valleys).

-alluvial/colluvial deposits similar to the broad valleys near Welwitschia (Khorixas)-lower reaches of the valleys.

Bioclimatic Region III: Desert and Desert Margin

i) Physiographic Regions R & S: Intensely Folded Parallel Schist Hills and Rock Plains

-prominent bare rock outcrops.

ii) Physiographic Region T & V: Basalt Plain and Basalt Mountainous Sections.

-prominent high basalt mountains and steep pediments with scattered gently undulating to rolling pediplains extending to the north into a level basalt plain.

-sandstone deposits.

-extinct volcanoes: Doros Crater and Messum Crater.

iii) Physiographic Region W: Brandberg Mountain Massif

-prominent mountain feature: granite dome intruded into the rocks of the Karoo System.

iv) Physiographic Region X: Southern Gravel Plains

-continuation of the basalt plains into level to gently sloping plains.

-shallow residual soils.

-extensive plains with colluvial deposits.

v) Physiographic Region Y: Uplifted Tertiary Plain of the Omaruru River

-relict flood plain of the Omaruru River.

4. WATER RESOURCES

Surface Water:

a) Fountains:

There are areas in Damaraland known to have fountains with a limited potential for irrigation. These are found at: Sesfontein, Khowarib, Fransfontein, Sorob and Warmquelle. There are some which are strong enough to supply sufficient water to irrigate about 30-40 hectares of land each. These are found at Sesfontein, Khowarib and Warmquelle (Adams-1990).

b) Springs:

Springs occur throughout all the catchments and are associated with geological formations. Those springs that form streams with a high and constant flow have served as points of human settlement in areas such as Sesfontein, Twyfelfontein and Warmquelle. Today, these springs still may still be important sources of water for both small towns and regional settlements (Jacobson, *et al* -1995).

c) Pools and Streams:

These are found in ephemeral river beds and in some, water movement continues below the surface throughout the year eg.: Khowarib Schlucht in the Hoanib River.

Any change in the climate or hydrology which in turn alters flooding frequency, discharge and subsurface flow, leads to a change in the occurrence and flow of the pools and streams. There has been a loss in perennial springs and wetlands in the upper reaches of the Huab River, due to frequent drops in regional rainfall as well as construction of numerous farm dams (Jacobson, *et al* -1995).

d) Rivers:

All the rivers that flow on the western side of this region are ephemeral rivers. A detailed summary with the characteristics of these rivers is found in Annexe B.

Huab
Koigab
Uniab
Hoanib
Ugab

Groundwater:

The groundwater is characterised by alluvial aquifers which serve as good supplies of water in ephemeral rivers below their soil surface.

There are 700 water points in Southern Kunene Region, with about 40% of them being used for livestock only. The water points are mainly boreholes and wells, some of which are fitted with diesel engines, windmills or both, as well as a few with a solar pump with or without a windmill. Lately, not all of these have been in good working condition due to lack of regular maintenance, negligence by some community members and dependency on the government for repairs and diesel supplies. Valuable water is often lost through evaporation due to broken or faulty pipes, valves, tanks and livestock troughs. The watertable is falling and 5% of the boreholes are drying up each year, an increase of 3% on the situation three years ago.

Most wards have water point committees composed of community members to help their neighbours who use the water to plan and manage their water supplies.

Water Problems in Khorixas:

The population of Khorixas has grown to over 8000 people, many of whom own small and large stock. Over the years, nine of 11 wells have dried up. According to the comparative daily water use in Khorixas, people in this town use ± 700 litres of water per person per day, most of which is wasted due to broken pipes, taps and supply lines. Thus to conserve water it is only supplied for 10 hours a day (Update-DRFN, March 1996).

CLIMATE

Rainfall

Rainfall in Damaraland is unpredictable and patchy, with a very steep gradient (due to the fact that rainfall is higher inland and lower nearer the coast). Rainfall can vary as much as 50-70% above or below the mean. More than 50% of the region receives less than 150mm and the rest less than 300mm per year. Therefore the region is prone to severe droughts which are normal occurrences, resulting in heavy stock losses. The average rainfall rates per month for three different rainfall stations can be found in Annexe B, Tables 3 and 3a.

Evaporation

Mean evaporation rate is 3000mm per year, thus the mean annual evaporation, measured from open water surfaces is ± 6 times greater than mean annual rainfall in the inland waters and 100 times greater in the arid west. In this way rainwater is rapidly lost from the ecosystem and water is not available on the soil surface. Around springs where water is available, the soil is very saline due to the high salt content of the soil left behind when the moisture evaporates (Jacobson, *et al*-1995).

DEMOGRAPHY

Population of Damaraland

The total population of Damaraland is 32 986 of which 66% are Damara speaking, 18% Herero speaking and 7% Owambo speaking. In the 1981 census, the Damara population in the designated communal area was about 24 200 and at the time of the national elections in 1989 it had increased to an estimated 31 400 (Office of the Prime Minister-1991), today it is close to 33 000 (see Table 4 in Annexe B). This is mainly due to the settlement process of many displaced labourers from commercial farming areas and towns into 'Damaraland', a process which is continuing.

Socio-Economics

Most Herero speakers live in and around the old Otjohorong reserve and others in the northern area around and south of Sesfontein.

Livestock farming is the main occupation of most people in this area, over 2,200 individuals are registered as farmers for purposes of veterinary control and drought relief (Rohde-1995). Average aggregate herds consist of 12 cattle and 72 small stock (goats and sheep). Herd sizes between individuals and localities vary because areas with better grazing such as Grootberg have an average herd size of 26 cattle and 82 small stock, whereas in more crowded and areas with poor grazing (Okombahe) herds of 2 cattle and 43 small stock are found.

Women farmers and head of households comprise about 30% of all registered farmers and they are more numerous in densely populated areas such as Okombahe, larger farm settlements and ward centres. Thus it is clear that women in Damaraland are not discriminated against even though in general they tend to have smaller herds than men.

Pensioners are also part and parcel of the farming community. In this region they often own/maintain small herds as well as aid in the raising of young children until they reach school going age. Income from livestock i.e. cash return is ± N\$ 1,200 per year, including milk production and basically provides subsistence incomes. For most people, money for other commodities and expenses comes from other sources of income or help from relatives.

The main hindrance to the success of livestock farming is poor rainfall, whose gradient falls steeply from an average of 250mm in the east to 50mm on the Namib border. The rain is also unpredictable, patchy and varies as much as 50-70% above or below the mean. Thus farmers are forced to move where the rain has fallen or to where water is readily available. In previous years, water availability for both human and livestock consumption was dependent on natural springs, rainfed pools and riverbed wells but today they have to make do with groundwater from deep bore-holes that make use of a windmill or a diesel pump, or both.

The formal sector of wage employment, consists of about 2,100 people including teachers, civil servants and administrators. Remittances from migrant workers and urban family members must also constitute a significant element in Damaraland's economy. Most farmers in Damaraland are 'absentee' or 'weekend farmers', who work elsewhere and whose investments in livestock brings much needed capital in the region. For more on the occupations and literacy levels of people in Damaraland see Table 5 in Annexe B.

LAND TENURE AND AGRICULTURE

Land tenure in Damaraland is communal although 1 862 800 ha or 43% of the total area consists of surveyed and fenced farms which were added to the Damara communal area in terms of the Odendaal Commission (Adams-1990). This land is owned by the government and the boreholes with the windmills, engines and other equipment were provided by the government. Until recently in some isolated cases, the Water Unit of the Department of Rural Water Supply provided free maintenance work (drilling of boreholes, building dams and windmills) and supplied diesel for the borehole engines. The farms are fenced off in units by the government and are utilised communally. Some people have raised the issue of upgrading and selling off these farms to individual farmers, but lack of capital is hampering this move.

Most of the land in Damaraland, about 87% falls within the desert or semi-desert agro-ecological region. The dominant agricultural activity is extensive stock farming. Due to low rainfall in the area, only 217 24 ha comprising 30 farms or 5% of the area is best suited for extensive small stock and game farming in the west. The eastern side of this region is feasible for extensive cattle ranching on farms of 5,000 to 7,000 ha. In 1989, 33 071 head of cattle and 180 993 head of small stock were counted in this area or a total of 63 237 stock units (Adams-1990). Farmers are expected to pay grazing fees for each livestock unit owned, in 1989/90 it was 5 cents for goats and sheep and 60 cents for cattle per month. SARDEP, with other national research projects, is trying to encourage farmers to lower their stock numbers to prevent the rapid and continuous deterioration of the land.

Large hectares of land in the western part of Damaraland are not utilised for agricultural purposes because of the lack of water. The rate of overgrazing and ecological degradation is quite high as a result of the concentration of a large number of livestock around existing waterholes. This has caused erosion and a reduction in the carrying capacity of the land, which in the '70s was around 84 000 large stock units.

Limited potential for irrigation exists around strong fountains in Sesfontein, Kowarib, Warmquelle, Fransfontein, and Sorob. The first three supply enough water to irrigate about 30-40 hectares of land each (Adams-1990).

Livestock

A summary of domestic animals found in the above region can be found in Annexe B, Table 6. In Annexe C- there is a table and a map that shows areas that are most likely to be appropriate for livestock production.

Wildlife

Wildlife populations exist with at least four tourism concessions basing their trade on wildlife and spectacular scenery. Increasing pressure on the environment caused by increasing human population's demand for agricultural and water development may be contributing to long-term degradation of critical wildlife habitats. Wildlife in this region includes: elephants, rhinos, giraffes, baboons, black faced impalas and ostriches (although of late some have been domesticated). Very little game was to be found in "Damaraland's" agricultural area (due to the erection of the redline fence in 1974. Only an estimated 918 head of game of 6, 841 were found in the agricultural area (Lindeque-1988).

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ACRONYMS:

CAWS	Communal Areas Water Supply
CBNRM	Community Based Natural Resource Management
DEA	Directorate of Environmental Affairs
DERU	Desert Ecological Research Unit
DRFN	Desert Research Foundation of Namibia
DWA	Department of Water Affairs
EEAN	Environmental Evaluation Associates of Namibia (Pty) Ltd.
NAPCOD	Namibia's Programme to Combat Desertification
NEPRU	Namibian Economic Policy Research Unit
SARDEP	Sustainable Animal and Range Development Programme
SDP	Summer Desertification Programme
SIDA	Swedish International Development Agency
SSD	Social Sciences Division of the University of Namibia

BIBLIOGRAPHY OF DAMARALAND

Annexe A

DAMARALAND BIBLIOGRAPHY:

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TABLES

Annexe B

Bioclimatic Region	Indicator	Dominant Vegetation & Physiognomic Forms	Vegetation Communities & Map Symbols	Average Annual Rainfall (mm)
Eastern Highlands Suitable for permanent utilisation by livestock	Mopane	<i>Colophospermum mopane</i> with <i>Terminalia prunioides</i> . <i>Acacia</i> spp. or <i>Commiphora</i> spp.	Woodland to shrubland: persistent grass communities: high proportion of annual grasses. Map symbols: A, B, C, D & E. Map symbols: F, G, H & J.	150 - 300
	Acacia	<i>Acacia</i> spp. Tall open woodland to dwarf shrubland.		
Transitional Zone to Eastern Highlands Suitable for migratory utilisation by livestock	Shrubland to Dwarf shrubland.	<i>Commiphora</i> spp. with <i>Colophospermum mopane</i> and <i>Euphorbia gregaria</i> .	Shrubland to dwarf shrubland; predominantly annual grasses; periodic high mortality of perennial grasses during drought periods. Map symbols: K, L & M.	100 - 150
	Grassland	<i>Stipagrostis</i> spp. Annual and ephemeral grasslands.	Map symbols: N and part of O	
Desert and Desert Margin Unsuitable for livestock production	Dwarf shrubland	<i>Calciosperma capitata</i> with <i>Commiphora</i> spp. and <i>Aloe</i> spp.	Desert dwarf shrubland. Ephemeral grass communities. Map symbols: P and part of O.	Less than 100
	Succulent desert communities	Succulent species and dwarf shrubs in drainage lines.	Map symbols: Q, R & S	

TABLE 1 – BIOCLIMATIC REGIONS AND THEIR VEGETATION TYPES
(National Remote Sensing Unit – 1974)

Catchment-northwest Namibia

Catchment	Catchment Area (km ²)	Elevation Range (m)	River Length (km)	Common Riparian Vegetation	Precipitation Range (mm)	Area with Rainfall >100mm (%)	Area with Rainfall >300mm (%)	Catchment Vegetation Types
Hoanib	17 200	0-1821	270	ana tree	0-325	72	12	Northern Namib-13%
				leadwood				Mopane Savannah
				<i>mopane</i>				87%
				<i>Salvadora</i>				
				<i>Tamarix</i>				
				camelthorn				
Uniab	4 500	0-1635	110	<i>mopane</i>	0-125	2.3	0	Northern Namib-26%
				<i>Salvadora</i>				Mopane Savannah
				<i>Tamarix</i>				74%
				palm				
				<i>Cyperus</i>				
				<i>Phragmites</i>				
Koigab	2 400	0-1571	130	<i>mopane</i>	0-100	2	0	Northern Namib-50%
				<i>Euclea</i>				Mopane Savannah
				<i>Tamarix</i>				50%
				<i>Salvadora</i>				
				<i>Salsola</i>				
Huab	14 800	0-1597	300	ana tree	0-345	80	13	Central Namib-20%
				<i>Tamarix</i>				Mopane Savannah
				camelthorn				80%
				<i>Salvadora</i>				
				<i>mopane</i>				
				leadwood				
				<i>Cyperus</i>				
				<i>Phragmites</i>				
<i>Euclea</i>								
Ugab	28 400	0-1865	450	ana tree	0-535	85	49	Northern Namib-3%
				<i>Tamarix</i>				Semi-desert/Savannah
				camelthorn				Transition-17%
				<i>Salvadora</i>				Mopane Savannah
				<i>mopane</i>				37%
				leadwood				Thornbush Savannah
				<i>Euclea</i>				9%
				<i>Cyperus</i>				Mountainous Savannah
				<i>Phragmites</i>				and Karstveld-34%

TABLE 2 - CATCHMENTS OF NORTHERN NAMIBIA'S EPHEMERAL RIVERS (P JACOBSON et al - 1995)

Year	Station Name	Climate Number	Latitude Longitude	Average Rainfall (per month and number of days it rained)											
				May/ day	Jun/ day	Jul/ day	Aug/ day	Sept/ day	Oct/ day	Nov/ day	Dec/ day	Jan/ day	Feb/ day	Mar/ day	Apr/ day
1940-81	Fransfontein	959/013	20 13 15 01	4.5/1	2/0	1.3/0	0.6/0	1/0	6.6/1	16.3/3	24/3	52.3/5	69.2/6	71.3/6	31.3/3
1955-93	Khorixas	958/833-9	20 23 14 58	1.2/0	0.5/0	0/0	0.1/0	2.6/0	3/1	14.8/2	13.2/2	47/5	51.4/5	65/6	20.9/2
1956-86	Sesfontein	1047/248	19 08 13 39	1.6/0	0.2/0	0/0	0/0	0/0	1.2/0	6/1	2.0/0	24.8/2	20.4/2	37.9/3	12.9/1

TABLE 3 RAINFALL IN THE "DAMARALAND" DISTRICT, RECORDED FROM DIFFERENT WEATHER STATIONS
(Weather Bureau, Windhoek, April 1996)

Station Name	Latitude	Longitude	Minimum Rainfall	Maximum Rainfall	Total Average	
					Months	Days
Fransfontein	20 13	15 01	20.5mm	525mm	276.3	27
Khorixas	20 23	14 58	19mm	499.9mm	218.7	23
Sesfontein	19 08	13 39	0.0mm	259.5mm	95.4	8

TABLE 3a. CONTINUATION OF ABOVE

Sex	AGE GROUPS								LITERACY (10 YEARS +)		
	Total	<1	1-4	5-14	15-44	45-64	65+	NS	Literate	Non Literate	NS
Total	32 986	985	3 736	8 474	14 322	3 546	1 890	33	18 399	5 533	39
M	16 744	510	1 850	4 227	7 470	1 790	871	26	9 542	2 685	25
F	16 242	475	1 886	4 247	6 852	1 756	1 019	7	8 857	2 848	14

TABLE 4 POPULATION OF "DAMARALAND" - SUMMARY
(NPC - 1991 Population and Housing Census, Report C)

Sex	SCHOOL ATTENDANCE (6 - 19 YEARS)				ACTIVITY STATUS (15 YEARS +)				EMPLOYED BY INDUSTRY (15 YRS +)			
	None	In School	Left School	NS	Employed	Unemployed	Not econ. Active	NS	Agric. Fisheries	Mining	Other	NS
Total	864	9 449	1 203	5	7 274	3 725	8 751	41	3 082	876	3 292	23
M	511	4 724	659	4	5 005	1 682	3 448	22	2 388	835	1 769	13
F	353	4 725	544	1	2 269	2 043	5 303	19	694	41	1 524	10

TABLE 5 SOCIO-ECONOMY OF "DAMARALAND"
(NPC - 1991 Population and Housing Census, Report C)

DOMESTIC ANIMAL CENSUS

YEAR	CATTLE	SHEEP	GOATS	HORSES	DONKEYS/ MULES	PIGS	POULTRY	DOGS
1972/1973	28034	18540	160292	2142	5508	75	5531	2823
1974/1975	40834	16872	146749	1850	5451	80	9645	1729
1975/1976	45385	15428	151927	1308	4708	90	8648	2862
1976/1977	48470	21741	149077	1006	4592	57	13302	2928
1977/1978	53207	28311	148475	1861	6525	90	10978	3058
1978/1979	54020	30615	113366	-	-	55	11593	2880
1979/1980	56705	29909	120611	1715	5156	70	9400	1678
1981	6932	12986	73214	1267	4139	67	7364	1716
1982	8732	13346	62685	1022	4271	102	37702	2288
1983	9697	15304	53332	534	3536	115	6161	1613
1984	18626	20753	92214	893	4199	176	7526	3376
1985	16783	142890	86277	698	2429	116	6479	2825
1986	21396	22857	115375	616	3768	453	8584	2676
1987	20444	28250	99314	796	5511	229	7016	2482
1988 June	24058	19526	112809	599	3982	261	6890	3032
1988 Dec.	31075	18724	42604	898	3816	128	9288	2431
1989 June	26329	22198	137739	540	4451	353	9556	3000
1989 Dec.	30204	19227	127423	705	3724	282	9196	3154
1990 June	38953	23269	144812	994	5029	105	10774	2966
1990 Dec.	29578	30289	157865	1013	5286	126	13084	3252
1991 July	28535	14980	116963	2660	3998	116	9925	2629
1991 Dec.	25960	22525	133975	831	3802	76	9973	2559
1992 July	34912	18884	99535	510	6300	101	2840	2113
1992 Dec.	27786	21042	117013	962	3891	154	5443	2308
1993 June	35607	15914	93475	916	30	194	8357	3919
1993 Dec.	24170	17633	116710	864	3876	128	11167	2559
1994 July	19237	15693	95392	786	3657	18	8483	2218
1994 Dec.	12183	12933	91949	706	3657	199	7075	2796
1995 June	18000	6641	39899	794	2264	103	5411	1533
1995 Dec.	15411	8334	59709	902	3633	276	12718	2412
TABLE 6- "DAMARALAND" DISTRICT DOMESTIC ANIMAL CENSUS								
(DEPARTMENT OF VETERINARY SCIENCE, WINDHOEK-1996)								

Questionnaire - Damara Farms

Table 7 Questionnaires on Damaraland farms: 1990/1991 (Ministry of Environment and Tourism)																
Farm/Post	# of Posts	Farmer's name	Prev. farmed at/# of years; # of yrs on present farm	# of people /hhold.	#windm. in use	#dies. pumps in use	# dams in use	#nat. springs on farm	livest.: 90--91	livest. 2yrs b/4	goats	sheep	cattle	don-keys	horses	mules
DeRiet#63a	2	M. Dawids	Otjihavera/8 months 16 years	15 people	1	1	1	0	30		0	0	10	0	0	0
									100		0	40	12	0	0	
DeRiet#63b	2	M. Dawids	Otjihavera/8 months 16 years	15 hholds	1	1	0	0	26		0		15	0	0	
									37		0	0	18	0	0	
DeRiet#63c	2	J. Lucas	Otjihavera/9 months 16 years	15 people	1	1	1	0	30		0	0	4	0	0	
									15		0	1	2	0	0	
DeRiet#63d	2	Mr. K. Adams	Otjihavera/9 months 16 years	14 hholds	1	1	1	1	6		0	0	6	6	0	
									15		0	0	8	0	0	
DeRiet#63e	1	Mr. S. Waterboer	Otjihavera/6 months 17 years	15 people	1	1	1	0	30		0	0	6	0	0	
									30		0	0	6	0	0	
DeRiet#63f	2	Mr. W. Dawids	Otjihavera/9 months 16 years	15 people	1	1	1	0	10		0	0	0	0	0	
									100		0	0	0	0	0	
DeRiet#63g	2	Mr. P. Loeriesfontein	Otjihavera/8 months 16 years	15 hholds	1	1	1	0	27		0	10	6	0	0	
									27		0	10	6	0	0	
DeRiet#63h	2	Mr. J. H. H. Cloete		15 hholds	1	1	1	0	44		0	3	0	0	0	
			16 years						90		0	2	0	0	0	
DeRiet#63i	3	Mr. M. Bezuidenhout	Otjihavera 15 years	15 hholds	1	1	1	0	42		0	0	0	0	0	
									23		0	0	0	0	0	

Questionnaire - Damara Farms

DeRiet#63j	2	Mr.M.Kapenda	17 hholds	1	1	1	1	30	0	0	0	0	0
			17 years					40-45	0	0	0	0	0
DeRiet#63k	2	Mr.N.Bezuidenhout	DeRiet/10 years	1	0	1	1	119	0	9	8	1	0
			7 years					150	0	4	0	6	0
DeRiet#63l	3	Mr.N.Adams	Otjihavera/8 months	2	0	1	0	200	0	25	9	0	0
			17 years					250	0	13	15	0	0
DeRiet#63m	2	Mr.Gert Vries	Otjihavera/8 months	15	1	1	0	5	0	0	0	0	0
			16 years					6	0	0	0	0	0
Lofdal#79	2	Mr.Pieter Freeman	Versteendewaud/1 year	2	0	1	2	0	300	225	0	0	0
			12 years					500	370	0	0	0	0
DeoVolento #12a	2	Mr.Sebulon Uwiteb	Arbeidsgenot/1 year	6	1	1	2	1	150	56	72	10	5
			22 years					200	10	4	16	5	1
DeoVolento #12b	2	Mr.Harry van Wyk	Arbeidsgenot/1 year	4	1	1	0	1	30	0	14	10	0
			22 years					60	50	24	15	4	6
Bergville #78a	4	Mr.Julius Araeb	50 yrs	1	1	2	0	172	4	31	5	0	0
			21 years					371	0	101	10	0	0
Bergville #78b		Mr.Martin Touseb	Nuriab/2 years	1	1	1	0	180	135	20	3	0	0
			21 years					250	150	20	3	0	0
Bergville #78c post 2		Mr.Alfred Awaseb	Bergville/ 1 year	1	0	1	0	120	21	9	7	1	0
			9 years					80	11	4	2	0	0
Vrede#82a	1	Mr.Frekie Dawids	DeRiet/15 years	2	1	0	1	1	17	0	0	10	0
			2 years					27	0	0	0	0	0

Questionnaire - Damara Farms

Vrede#82b	1	Mr. Mathews Adams	Nil Desperandum/5 years	2 hholds, 11 people	1	0	1	0	180	0	0	1	0	0
			11 years					300	0	0	0	0	0	0
Welkom#51	4	Mr. Pinias Hanadaob	Malanres/1 year+3 months	18 people	1	1	1	2	240	0	30	5	1	0
			3 years					76	0	27	5	2	0	0
Hhold = Household														

Marketing from farms

TABLE 8a MARKETING OF LIVESTOCK FROM BERGVILLE FARM - DAMARALAND DISTRICT

Destination	Cattle	Goats	Sheep	Pigs	Year	Month
Khorixas	0	5	0	0	1996	January
Renosterberg	22	0	182	0	*	*
Riemvasmaak	0	1	0	0	*	*
RSA						
Khorixas	4	0	0	0	*	February
Abattoir-Outjo	0	1	0	0	*	*
Abattoir-Otjiwarongo	0	4	2	0	*	March
Tweespruit	103	365	0	0	*	*
Khorixas	2	0	0	0	*	April
Goeienhoop	0	6	0	0	*	*
Gifputs-Otjiwarongo	0	86	8	0	1995	February
Bloemhof	2	0	0	0	*	March
Khorixas	1	0	0	0	*	April
Orpheus-Outjo	1	0	0	0	*	*
Khorixas	0	8	0	0	*	May
Abattoir-Outjo	0	1	0	0	*	July
Fransfontein	0	10	0	0	*	*
Chaudams	1	0	0	0	*	August
Abattoir-Tsumeb	2	4	4	0	*	*
Chaudams	2	0	0	0	*	October
Abattoir-Outjo	1	0	0	0	*	December
Apollo	0	5	2	0	*	*
Khorixas	1	0	0	0	*	*

Marketing from farms

TABLE 8b BLOEMHOF FARM - DAMARALAND DISTRICT						
Destination	Cattle	Goats	Sheep	Pigs	Year	Month
Abattoir-Outjo	0	1	0	0	1996	January
Auction-Outjo	3	0	0	0*		*
Khorixas	0	2	0	0*		*
Meatco-Otavi	40	0	0	0*		February
Renosterkop	0	2	0	0*		April
Halt	0	30	0	0*		*
Oas-Pos	0	0	11	0	1995	January
Opdraend	5	0	0	0*		*
Khorixas	0	63	0	0*		February
Khorixas	0	6	10	0*		April
Khorixas	2	0	0	0*		*
Abattoir-Outjo	0	1	0	0*		May
Khorixas	1	0	0	0*		June
Khorixas	0	0	0	1*		July
Geduld	0	100	0	0*		October
Khorixas	5	0	0	0*		*
Khorixas	1	0	0	0*		November
Khorixas	0	10	0	0*		December
To Bloemhof	Cattle	Goats	Sheep	Pigs	Year	Month
Bergville	2	0	0	0	1995	March
Opraend-Post	45	125	0	0*		April
De Riet	0	30	0	0*		August

Marketing from farms

table 8c BLOUKRANZ FARM-DAMARALAND DISTRICT						
Destination	Cattle	Goats	Sheep	Pigs	Year	Month
Florida	0	4	0	0	1996	April
Chaudamas	1	0	0	0	1995	January
Macaria	0	4	0	0	*	May
Khorixas	0	2	0	0	*	July
TABLE 8d DEO VALENTE FARM-DAMARALAND DISTRICT						
Destination	Cattle	Goats	Sheep	Pigs	Year	Month
Khorixas	0	2	0	0	1996	April
Khorixas	1	0	0	0	*	*
Delta	0	37	0	0	1995	February
Khorixas	1	0	0	0	*	*
Abattoir-Outjo	0	3	0	0	*	March
Khorixas	1	0	0	0	*	July
TABLE 8e DE RIET FARM-DAMARALAND						
Destination	Cattle	Goats	Sheep	Pigs	Year	Month
Bethanis	23	30	15	0	1995	April
Fontein-Post	0	45	0	0	*	May
Bloemhof	0	30	0	0	*	August
Khorixas	3	0	0	0	*	November
Elderado	13	0	0	0	*	*
To De Riet	Cattle	Goats	Sheep	Pigs	Year	Month
Kaokokroon	15	0	0	0	1995	January
TABLE 8f EASTWOOD FARM-OUTJO DISTRICT						
Destination	Cattle	Goats	Sheep	Pigs	Year	Month
Abattoir-Outjo	0	0	0	1	1996	January
Bethanis	21	80	30	0	*	*
Abattoir-Outjo	1	0	0	0	*	February
Auction-Outjo	4	0	0	0	*	*
Auction-Outjo	1	0	0	0	*	*
Agra v/k-Outjo	0	6	0	0	1995	January
Chaudams	1	0	0	0	*	May
Karoo v/k -Outjo	23	0	0	0	*	June
To Eastwood	Cattle	Goats	Sheep	Pigs	Year	Month
Waterval	0	1	0	0	1996	February

Marketing from farms

TABLE 8g ELBA FARM- DAMARALAND DISTRICT						
Destination	Cattle	Goats	Sheep	Pigs	Year	Month
Khorixas	1	0	0	0	1996	February
Springbokil	65	0	0	0	1995	March
Navarre-Post	6	0	0	0*		*
Condor-Post	106	0	0	0*		*
Condor-Post	2	0	0	0*		June
Khorixas	1	0	0	0*		*
Diep rivier	1	0	0	0*		November
Bergsig	54	0	0	0*		*
Khorixas	1	0	0	0*		*
Navare	50	0	0	0*		December
Khorixas	2	0	0	0*		*
TABLE 8h KAOKOKROON FARM-DAMARALAND DISTRICT						
Destination	Cattle	Goats	Sheep	Pigs	Year	Month
Bella vista	0	2	0	0	1996	February
De Riet	15	0	0	0	1995	January
Khorixas	1	0	0	0*		March
Olifants water	3	0	0	0*		*
Agra v/k-Outjo	0	20	0	0*		April
Chaudamas	1	0	0	0*		May
Okombahe	1	0	0	0*		July
Leeukop	0	4	0	0*		*
Khorixas	0	1	0	0*		August
Khorixas	0	1	0	0*		Septembe
Khorixas	1	0	0	0*		October
To Kaokokroon	Cattle	Goats	Sheep	Pigs	Year	Month
Olifants Put	0	10	0	0	1995	July
TABLE 8i LOERKOP FARM-DAMARALAND DISTRICT						
Destination	Cattle	Goats	Sheep	Pigs	Year	Month
Kamp 3	0	5	0	0	1996	February
Khorixas	0	10	0	0	1995	January
Loerkop	0	10	0	0*		February
Abattoir-Windhoek	0	0	1	0*		March
Orpheus-Damraland	4	0	0	0*		April
Khorixas	2	0	0	0*		*
Sienna	4	0	0	0*		May
Khorixas	0	2	0	0*		June
Abattoir-Outjo	1	0	0	0*		July
Libra	4	0	0	0*		August
Abattoir-Outjo	0	6	0	0*		Septembe

Marketing from farms

Destination	Cattle	Goats	Sheep	Pigs	Year	Month
Khorixas	0	1	0	0	1996	January
Khorixas	3	0	0	0	*	February
Khorixas	10	0	0	0	*	*
Khorixas	0	1	0	0	*	March
Khorixas	0	4	1	0	1995	January
Khorixas	13	0	0	0	*	February
Okakarara	0	6	1	0	*	*
Khorixas	2	0		0	*	April
Khorixas	0	1	0	0	*	May
Abattoir-Khorixas	0	3	0	0	*	June
Pietersburg	6	0	0	0	*	*
Okakarara	0	2	0	0	*	August
Groenpoort	0	3	0	0	*	*
Agra v/k-Outjo	3	0	0	0	*	*
Agra v/k-Outjo	1	2	0	0	*	September
Abattoir-Outjo	0	10	0	0	*	November
Khorixas	1	0	0	0	*	December

Marketing from farms

TABLE 8k NARACHAAMS FARM-DAMARALAND DISTRICT						
Destination	Cattle	Goats	Sheep	Pigs	Year	Month
Fransfontein	0	30	0	0	1996	January
Khorixas	0	4	0	0	*	*
Auction-Outjo	1	0	0	0	*	*
Khorixas	1	0	0	0	*	*
Chaudamas	1	0	0	0	*	*
Pos 66	0	0	7	0	*	*
Abattoir-Windhoek	0	1	0	0	*	February
Auction-Outjo	4	0	0	0	*	*
Auction-Outjo	1	0	0	0	*	*
Vaalhoek-Post	0	1	0	0	*	March
Okatare	4	0	0	0	*	*
Pos 4-Municipale	0	0	1	0	*	*
Uitslg	0	1	0	0	*	*
Abattoir-Walvis bay	0	1	0	0	*	*
Auction-Outjo	1	0	0	0	*	*
Kalkrand	0	16	0	0	*	April
Khorixas	0	1	0	0	*	*
Stilte	2	0	0	0	1995	January
Khorixas	2	0	0	0	*	*
Agra v/k-Outjo	3	0	0	0	*	*
Sonnegroet	2	0	0	0	*	February
Kamp4	41	0	50	0	*	*
Kromgat	7	25	0	0	*	*
Abattoir-Henties bay	0	10	0	0	*	*
Mariental, Hardap	0	0	1	0	*	April
Khorixas		5			*	May
Elandslaagte			2		*	*
Abattoir-Outjo			1		*	*
Abattoir-Outjo			3		*	*
Khorixas		1			*	*
Khorixas	2				*	*
Elandslaagte			2		*	June
Windhoek-Katutura		2	2		*	July
Windhoek-Katutura		2	2		*	July
Opuwo	8				*	*
Khorixas		1			*	*
Nooitgedacht	15				*	August
Khorixas		1			*	*
Elandslaagte		18			*	September
Orpheus-Outjo	1				*	October
Omihana		23			*	*
Chaudamas	1				*	*
Orpheus-Outjo	1				*	November
Bethanie		85			*	*
Orpheus-Outjo	1				*	*
Orpheus-Outjo	2				*	*
Khorixas	1				*	December
Municipale area			1		*	*
Estorff-Post	20	95			*	*

Marketing from farms

To Narachaams	Cattle	Goats	Sheep	Pigs	Year	Month
Waterval	1	0	0	0	1996	March
Waterval	2	10	0	0	*	April

Marketing from farms

TABLE 8: OLIFANTS PUT FARM-DAMARALAND DISTRICT						
Destination	Cattle	Goats	Sheep	Pigs	Year	Month
Sicily	9				1996	January
Khorixas	1				*	*
Auction-Outjo	1				*	*
Orpheus-Outjo	3				*	February
Fransfontein	6				*	April
Fransfontein	4				*	April
Khorixas		3			1995	January
Gainatseb	1				*	April
Kamp 2		15			*	*
Abattoir-Otjiwarongo		1			*	May
Kamp 24	5				*	*
Okatare	8				*	*
Abattoir-Otjiwarongo	20				*	*
Okamapuku	4				*	June
Abattoir-Khorixas	2				*	July
Okatare	2				*	*
Khorixas	1				*	*
Abattoir-Tsumeb		1			*	*
Kaokokroon		10			*	*
Khorixas	1				*	August
Chaudamas	1				*	*
Okatare	2				*	September
Fransfontein	2				*	*
Khorixas	1				*	*
Windhoek-Katutura	1				*	November
Agra Auction-Outjo	3				*	*

Marketing from farms

TABLE 8m ONVERWAG FARM-DAMARALAND DISTRICT						
Destination	Cattle	Goats	Sheep	Pigs	Year	Month
Springbokvlakte	33	100			1996	April
Kamp 2	20				*	February
Kamp 2	24				*	March
Makalani	60				*	May
Khorixas	7				*	*
Abattoir-Damaraland	3				*	September
Abattoir-Outjo		134			*	October
TABLE 8n OPRAEND POST-DAMARALAND DISTRICT						
Destination	Cattle	Goats	Sheep	Pigs	Year	Month
Bloemhof	45	125			1995	April
TABLE 8o RIETKUIL FARM-DAMARALAND DISTRICT						
Destination	Cattle	Goats	Sheep	Pigs	Year	Month
Khorixas	1				1996	February
Khorixas		7			*	*
Khorixas		3			*	March
Goedgevind	25				1995	January
Engelbrecht		70	12		*	*
Uitskot			20		*	*
Uitsoek				4	*	April
Khorixas	1				*	*
Khorixas		10			*	June
Abattoir-Outjo		1			*	*
Khorixas		2	8		*	July
Khorixas		10			*	*
Gainatseb		5			*	September
Chaudamas	2				*	October
Khorixas	1				*	*
Auction-Outjo	1	2			*	November
Auction-Outjo		15			*	*

Marketing from farms

TABLE 8p VRĒDE FARM-DAMARALAND DISTRICT

Destination	Cattle	Goats	Sheep	Pigs	Year	Month
Boesmanpan		13			1996	February
Khowarib-Sesfontein		10			1995	November
Renosterwraak		12			*	December

TABLE 8q WATERVAL FARM-DAMARALAND DISTRICT

Destination	Cattle	Goats	Sheep	Pigs	Year	Month
Vasbyt-Outjo	4				1996	January
Eastwood		1			*	February
Narachaams	1				*	March
Moreson	1				*	April
Moreson	2				*	*
Abattoir-Swakop	20				*	*
Narachaams	2	10			*	*
Chaudamas	8				1995	January
Chaudamas	5				*	*
Abattoir-Outjo	4				*	*
Khorixas	4				*	*
Chanelamas	4	4			*	*
Khorixas	1				*	*
Agra v/k-Outjo	5				*	*
Khorixas		1			*	February
Small ruggens	1				*	March
Arandis		1			*	May
Agra v/k-Outjo	1				*	June
Dwarstrek	6				*	*
Khorixas	1				*	August
Khorixas		3			*	*
Persianner		10			*	*
Agra v/k-Outjo	1				*	Septembe
Okadare	3				*	*
Khorixas		1			*	October
Navarre	1				*	November
Iris-Post		6			*	*
Auction-Outjo		6			*	December
Renosterkop	2				*	*
Persianner		10			*	*
Khorixas		1			*	*

Marketing from farms

TABLE 8r WELKOM FARM-DAMARALAND DISTRICT						
Destination	Cattle	Goats	Sheep	Pigs	Year	Month
Halt		2			1996	January
Goeiehoop	3				*	*
Blauwport	3				*	*
Auction-Outjo	1	24			*	*
Geduld		21			*	*
Khorixas	1				*	*
Khorixas		6			*	February
Abattoir-Swakop	1				*	March
Blaawpoort	42				*	May
Kalkrand v/k-Outjo	8				*	June
Orpheus-Outjo	2				*	*
Hochland	5				*	September
Orpheus-Outjo	2				*	*
Palmwag		15			*	November
Khorixas		5			*	*
Khorixas	1				*	December

NAMIBIA STOCK CENSUS

TABLE 9 NAMIBIA STOCK CENSUS :DAMARALAND DISTRICT									
Year	Damaraland:N or S	Cattle	Sheep					Goa	
			Wool	Non-Wool	Karakul	Dorper	Other Sheep	Angor	Boerbok
1972/197	Damaraland	28034		18540					
TOTAL		28034		18540					
1974/197	"	40834		16872					
TOTAL		40834		16872					
1975/197	"	45385		15428					
TOTAL		45385		15428					
1976/197	"	48470		21741					
TOTAL		48470		21741					
1977/197	"	53207		28311					
TOTAL		53207		28311					
1978/197	Damaraland North	22864					13392		
"	Damaraland South	31156					17223		
TOTAL		54020					30615		
1979/198	Damaraland North	29568					15429		
"	Damaraland South	27137					14480		
TOTAL		56705					29909		
1981	Damaraland North	2318					6383		
"	Damaraland South	4614					6603		
TOTAL		6932					12986		
1982	Damaraland North	4980					7100		
"	Damaraland South	3752					6246		
TOTAL		8732					13346		
1983	Damaraland North	7664					7065		
"	Damaraland South	2033					8239		
TOTAL		9697					15304		
1984	Damaraland North	11575					11471		
"	Damaraland South	7051					9282		
TOTAL		18626					20753		
1985	Damaraland North	13836					11803		
"	Damaraland South	2947			1023		1464		
TOTAL		16783			1023		13267		
1986	Damaraland North	17094					14667		
"	Damaraland South	4302			2908		5282		12398
TOTAL		21396			2908		19949		12398
1987	Damaraland North	18398			9099		14788		
"	Damaraland South	2046			1729		2634		5020
TOTAL		20444			10828		17422		5020
1988 -Jun	Damaraland North	20525			5605		8457		92760
"	Damaaraland South	3533			816	118	4530		7606
TOTAL		24058			6421	118	12987		100366
1988- De	Damaraland North	23078			5919		8679		
"	Damaraland South	7997			86	1161	2879		14514
TOTAL		31075			6005	1161	11558		14514
1989-Jun	Damaraland North	23472			7058		8903		111900
"	Damaraland South	2857			2366	1812	2059		21499
TOTAL		26329			9424	1812	10962		133399

NAMIBIA STOCK CENSUS

1989-Dec	Damaraland North	19496			5058		8903		89039
"	Damaraland South	10708			182	788	4296		38384
TOTAL		30204			5240	788	13199		127423
1990-Jun	Damaraland North	27376			5970		11645		109738
"	Damaraland South	11577			241	967	4446		28698
TOTAL		38953			6211	967	16091		138436
1990-Dec	Damaraland North	25776			5135		13475		119889
"	Damaraland South	3802			4959	3453	3267		35504
TOTAL		29578			10094	3453	16742		155393
1991-July	Damaraland North	28535			5844		9136		116963
"	Damaraland South								
TOTAL		28535			5844		9136		116963
1991-Dec	Damaraland North	25960			2934		19591		133975
"	Damaraland South								
TOTAL		25960			2934		19591		133975
1992-July	Damaraland North	34912			2481		16403		99535
"	Damaraland South								
TOTAL		34912			2481		16403		99535
1992-Dec	Damaraland North	27786			2647		18395		117013
"	Damaraland South								
TOTAL		27786			2647		18395		117013
1993-Jun	Damaraland North	35607			2666		13248		93475
"	Damaraland South								
TOTAL		35607			2666		13248		93475
1993-Dec	Damaraland North	24170			1338		16295		116710
"	Damaraland South								
TOTAL		24170			1338		16295		116710
1994-July	Damaraland North	19237			2402		13291		95392
"	Damaraland South								
TOTAL		19237			2402		13291		95392
1994-Dec	Damaraland North	12183			2050		10883		91949
"	Damaraland South								
TOTAL		12183			2050		10883		91949
1995-Jun	Damaraland North	18000			512		6129		39899
"	Damaraland South								
TOTAL		18000			512		6129		39899
1995-Dec	Damaraland North	15411					8334		59709
"	Damaraland South								
TOTAL		15411					8334		59709

NAMIBIA STOCK CENSUS

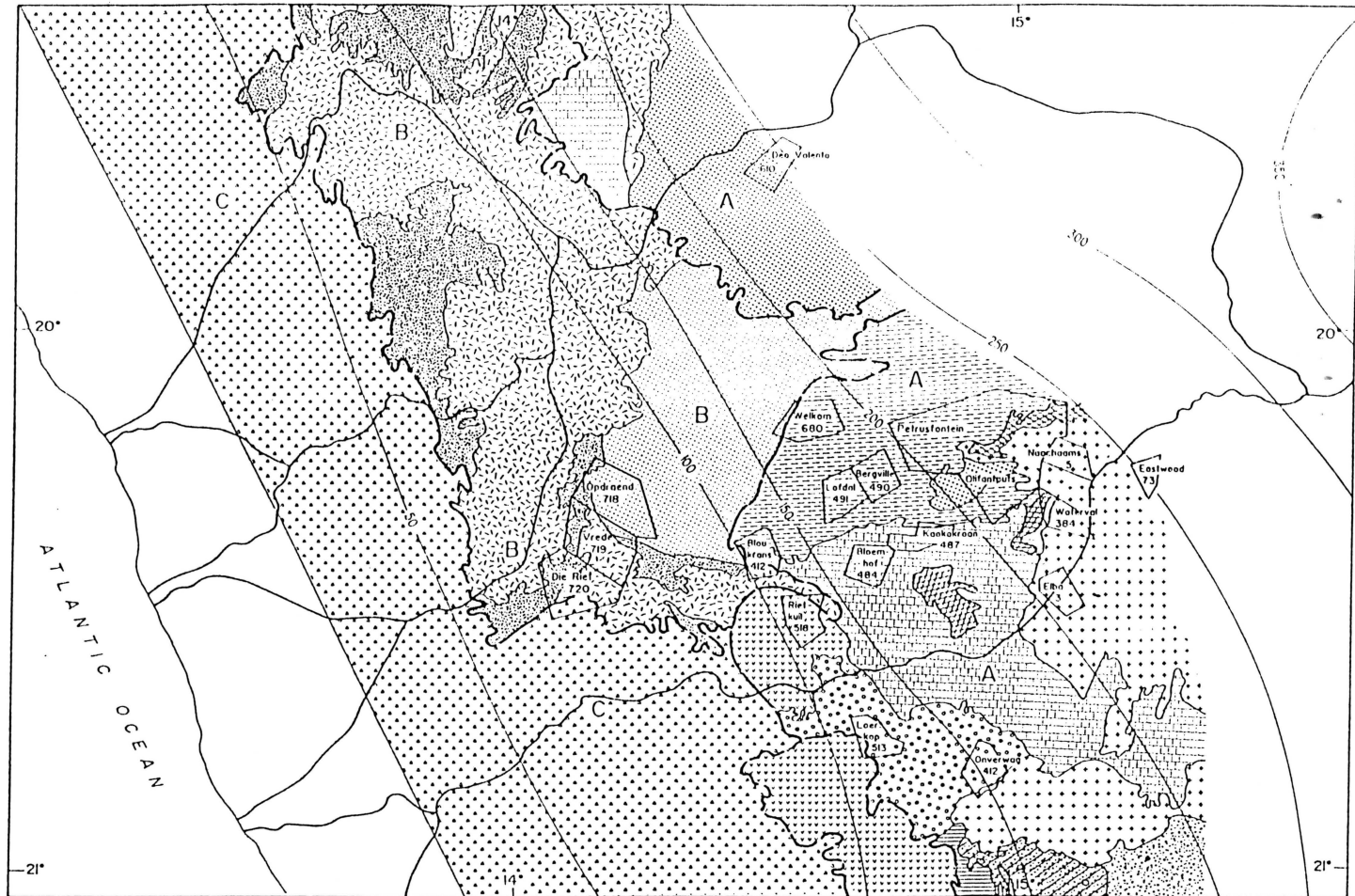
	Horses	Equidae	Donkeys/Mules	Pigs	oultry	Dogs	elts	Ostriches
Other Goats							Mice	
160292	2142	_	5508	75	5531	2823	_	_
160292	2142		5508	75	5531	2823		
146749	1850	_	5451	80	9645	1729	_	_
146749	1850		5451	80	9645	1729		
151927	1308	_	4708	90	8648	2862	_	_
151927	1308		4708	90	8648	2862		
149077	1006	_	4592	57	13302	2928	_	_
149077	1006		4592	57	13302	2928		
148475	1861	_	6525	90	10978	3058	_	_
148475	1861		6525	90	10978	3058		
29994	_	2612	_	29	5793	1212	_	_
83372	_	3930	_	26	5800	1668	_	_
113366		6542		55	11593	2880		
59733	894	_	3172	45	4624	150	_	_
60878	821	_	1984	25	4776	1528	_	_
120611	1715		5156	70	9400	1678		
32574	278	_	2468	30	4033	958	_	_
40640	989	_	1671	37	3331	758	_	_
73214	1267		4139	67	7364	1716		
34041	278	_	2633	55	4451	1449	_	_
28644	744	_	1638	47	33251	839	_	_
62685	1022		4271	102	37702	2288		
36189	106	_	2631	68	4262	1135	_	_
17143	428	_	905	47	1899	478	_	_
53332	534		3536	115	6161	1613		
68079	383	_	2666	62	5338	1670	_	_
24135	510	_	1533	114	2188	1706	_	_
92214	893		4199	176	7526	3376		
75684	325	_	1345	52	5400	2196	_	_
10593	373	_	1084	64	1079	629	_	_
86277	698		2429	116	6479	2825		
91119	551	_	3225	70	6771	1622	_	_
11858	65	_	543	383	1813	1054	_	_
102977	616		3768	453	8584	2676		
85582	640	_	4946	94	6161	2009	_	_
8712	156	_	565	135	855	473	_	_
94294	796		5511	229	7016	2482		
_	461	_	3119	88	5326	2079	_	_
12443	138	_	863	173	1564	953	_	_
12443	599		3982	261	6890	3032		
11089	679	_	2778	103	7182	1827	_	_
17001	219	_	1038	25	2106	604	_	_
28090	898		3816	128	9288	2431		
_	381	_	3405	264	8027	2223	_	_
4340	159	_	1046	89	1529	777	_	_
4340	540		4451	353	9556	3000		








NAMIBIA STOCK CENSUS








-	381	-	2386	264	8027	2223	-	-
-	324	-	1338	18	1169	931	-	-
	705		3724	282	9196	3154		
-	729	-	3712	87	8162	2090	-	-
6376	265	-	1317	18	2612	876	-	-
6376	994		5029	105	10774	2966		
-	814	-	3755	110	8656	2231	-	-
2472	199	-	1531	16	4428	1021	-	-
2472	1013		5286	126	13084	3252		
-	2660	-	3998	116	9925	2629	-	-
-	-	-	-	-	-	-	-	-
	2660		3998	116	9925	2629		
-	831	-	3802	76	9973	2559	-	-
-	-	-	-	-	-	-	-	-
	831		3802	76	9973	2559		
-	510	-	6300	101	2840	2113	-	-
-	-	-	-	-	-	-	-	-
	510		6300	101	2840	2113		
-	962	-	3891	154	5443	2308	-	-
-	-	-	-	-	-	-	-	-
	962		3891	154	5443	2308		
-	916	-	30	194	8357	3919	-	-
-	-	-	-	-	-	-	-	-
	916		30	194	8357	3919		
-	864	-	3876	128	11167	2559	-	-
-	-	-	-	-	-	-	-	-
	864		3876	128	11167	2559		
-	786	-	3657	187	8483	2218	-	-
-	-	-	-	-	-	-	-	-
	786		3657	187	8483	2218		
-	706	-	3657	199	7075	2796	-	-
-	-	-	-	-	-	-	-	-
	706		3657	199	7075	2796		
-	794	-	2264	103	5411	1533	-	-
-	-	-	-	-	-	-	-	-
	794		2264	103	5411	1533		
-	902	-	3633	276	12718	2412	-	12
-	-	-	-	-	-	-	-	-
	902		3633	276	12718	2412		12






MAPS

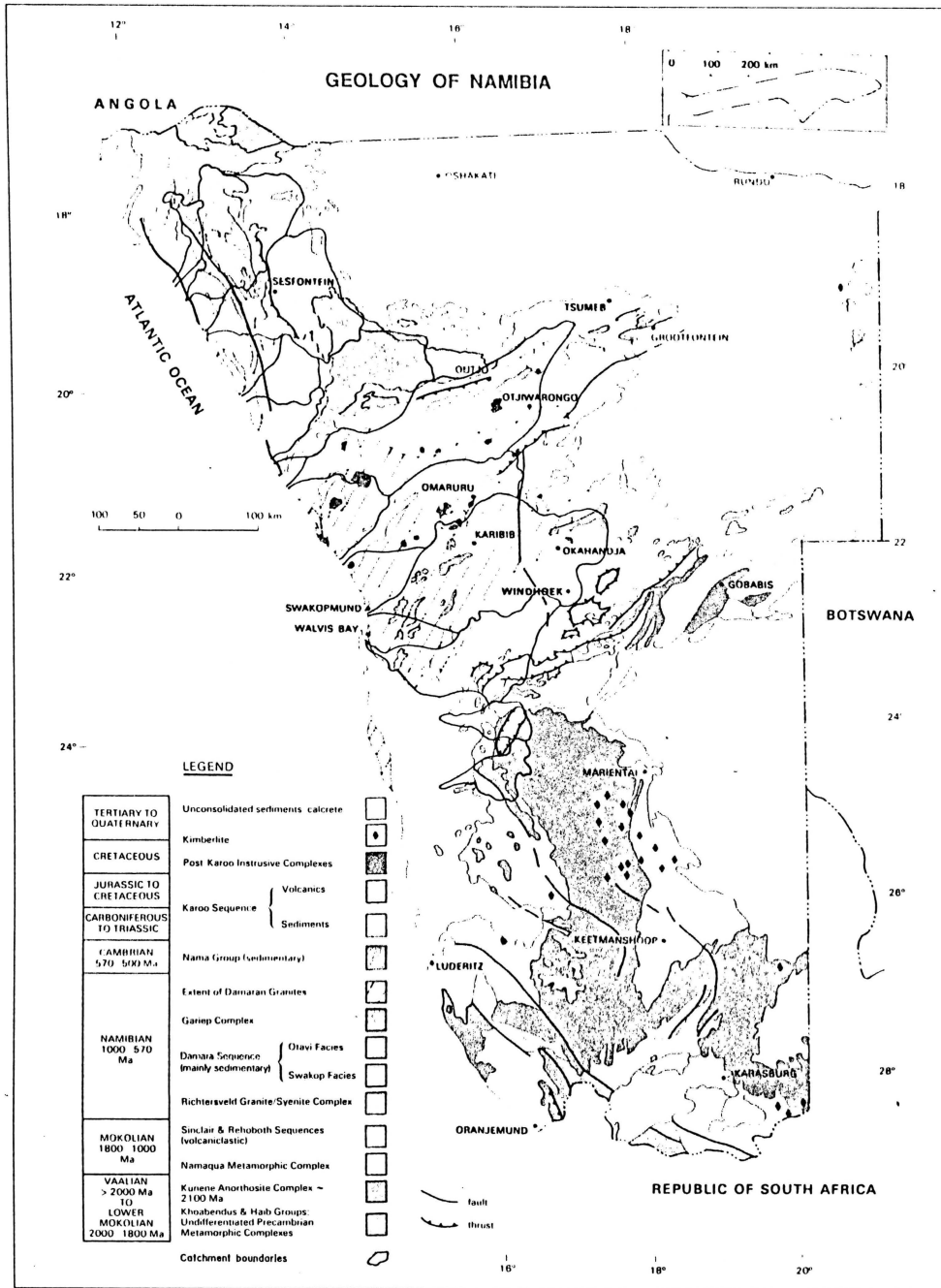
Annexe C



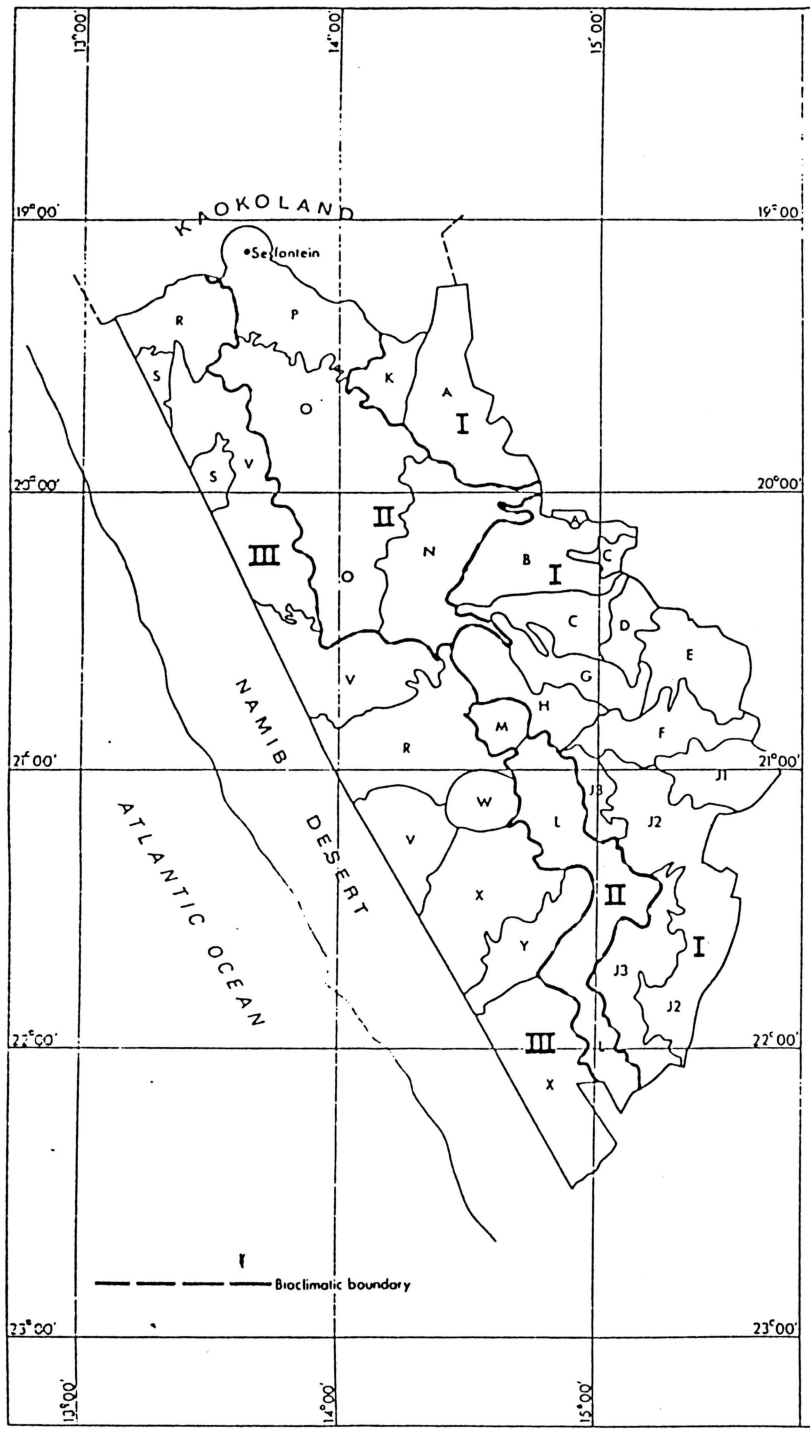
-  Open Woodland to tree Grassland
-  Medium open Woodland to Shrubland
-  Open Woodland to Shrubland
-  Short open Woodland to tree Grassland
-  Open shrubland to open Woodland
-  Short Woodland to medium open Woodland
-  Shrubland to short open Woodland

-  Shrub Grassland to Dwarf Shrubland
-  Tall tree Grassland to tall open Woodland
-  Shrub Grassland to Dwarf shrub Grassland
-  Open Shrubland to Dwarf Shrubland
-  Open Shrubland to shrub Grassland
-  Annual Grassland Plains
-  Rock Desert

-  Eastern Highlands
-  Transitional Zone to Eastern Highlands
-  Desert and Desert Margin
-  Bioclimatic Region Boundary
-  — 250 — Rainfall in mm



The geological map of Namibia reveals that much of the country is covered by recent deposits of sand and calcrete. In contrast, the western catchments contain some of the most interesting geological features in the country. (Source: Geological Survey, Windhoek)



DAMARALAND BIOCLIMATIC AND PHYSIOGRAPHIC REGIONS

LEGEND

For details of soils within each region see Expanded Legend

BIOCLIMATIC REGION	MAP SYMBOL	PHYSIOGRAPHIC REGION AND SUBREGION
EASTERN HIGHLANDS	A	North Eastern Red Plains
	B	Huab Drainage System: Plateau Section
	C	Huab Drainage System: Broad alluvial/alluvial valleys (Welwitschia Section)
	D	Eastern Kalk Plateau
	E	Upper Ugab Drainage System: Calcrete Valleys
	F	Central Ugab Drainage System: Colluvial/Alluvial Valleys
	G	Central Schist Hill Ranges
	H	Central Granite Plains
	J1	Omatjette Section: South Eastern Plains
	J2	Central Section: South Eastern Plains
	J3	Western Kalk Plains: South Eastern Plains
	K	Northern Schist Hill Ranges: Isolated Unit within Mountainous Regions
	TRANSITIONAL ZONE TO EASTERN HIGHLAND	L
M		Duneveld
N		Incised Huab Central Drainage Basin
O		Valleys and Plains of the Central Basalt Mountains Section
P		Hoonib Drainage Basin: Very Broad Strike Valleys to Plains
DESERT AND DESERT MARGIN	R	Intensively Folded Parallel Schist Hills
	S	Rock Plains
	T	Basalt Plain
	V	Basalt Mountainous Sections
	W	Brandberg Mountain Massif
	X	Southern Gravel Plains
	Y	Uplifted Tertiary Alluvial Plain of the Omaruru River

Scale 1:2 000 000 (Approx.)

Annexe D

OTHER ITEMS:

**DETAILED SOIL CLASSIFICATION
RECOMMENDED LAND USE
(1974-NATURAL RESOURCES OF DAMARALAND)**

SOILS

The soils are grouped on the basis of landform and parent material.

Hill features and steep slopes:

a) Soils derived from granite and quartzitic parent materials : Mispah and Portsmouth characteristics:

shallow to very shallow
red, coarse sands to loamy sands
normally with a stony and bouldery surface.

b) Soils derived from schist parent material: Muden soil series. characteristics:

greyish brown to very dark greyish brown litholic soils
stony and bouldery
they are characterized by extensive areas of exposed, vertically striated schist
soil development and vegetative growth is confined to the weathering surfaces.

Pediment slopes and pediplains:

Transported soils which are developed in materials derived from adjacent hills include: Portsmouth, Shorrocks and Zwartfontein.

characteristics:
moderately deep to shallow
red to reddish brown loamy to loamy coarse
sands to sandy loam .

Plains:

a) Granite Plains: Portsmouth and Mispah soil series. characteristics:

moderately shallow
red, coarse sands to loamy sands
red, coarse, gravelly, litholic soils with frequent granite exposures
deeper soils occur on the colluvial plains and margins to drainage lines.

b) Calcrete Plains: Muden soil series. characteristics:

greyish brown to very dark greyish brown
litholic soils with frequent calcrete outcrops
occasional black clays associated with small pans and waterholes.

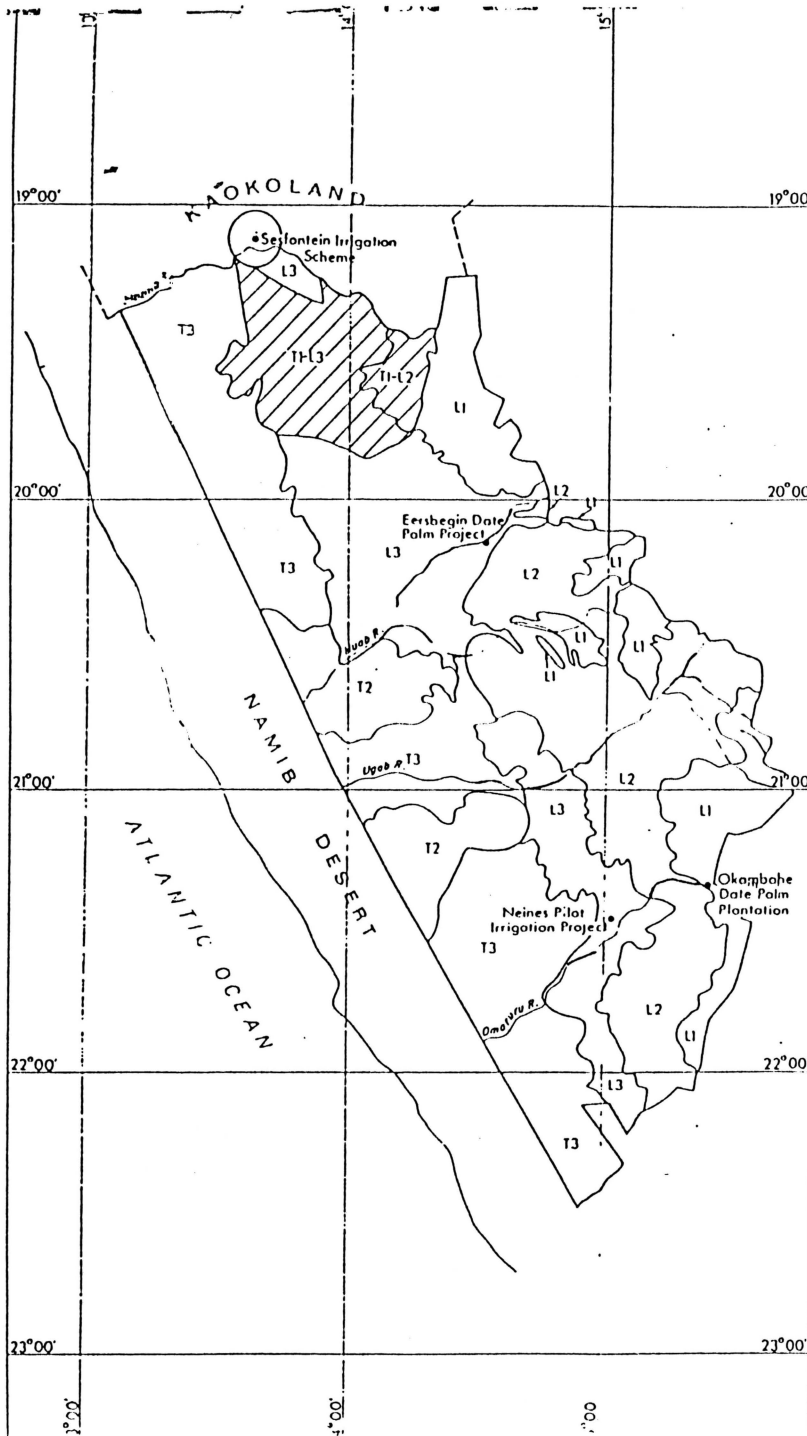
Colluvial/Alluvial Deposits:

Colluvial/alluvial deposits in broad valleys: **Dudfield and Limpopo soil series.**

characteristics:
brown to dark yellowish brown sandy loams to sandy clay loams
they overlay highly calcareous alluvium to greyish brown, very dark brown sandy loams to sandy clay loams
calcareous soils and saline at depth
the soils break down to a structureless powder when subjected to heavy traffic
alluvial soils often have poor drainage (decreased suitability for irrigated agricultural potential).

DAMARALAND RECOMMENDED LAND USE

LEGEND



MAP SYMBOL	LIVESTOCK PRODUCTION	
L1	Cattle : Permanent use	Very Extensive Systems of Livestock Production based on Cattle and/or Small Stock
L2	Small Stock : Permanent use	Very Extensive Systems of Livestock Production based on Small Stock only
L3	Sporadic use :	Utilisation based on Migratory Systems of use : i) Shifting grazing systems with very large units ii) Reservation of areas for use by livestock brought in from adjacent regions to exploit seasons of favourable grass growth
<u>SETTLEMENT BASED ON MINOR IRRIGATION PROJECTS</u>		
	<u>Established Schemes :</u>	
•	Sesfontein Huab River : Omaruru River :	Eersbegin Date Palm Pilot Project Okombahe Palm Plantation Neines : Omaruru State Water Scheme
	<u>For Detailed Investigation :</u>	Localized Schemes developed along Major Rivers and Tributaries
<u>TOURISM</u>		
	<u>Game Reserve :</u>	Alternative use of the land north of the Grootberg Sesfontein road to the Hoanib River. Greater mobility enables game to make more effective use of the extensive mountainous areas. Conditions favour development to encourage game concentrations and to provide access to scenic attractions
T2	<u>Scenic Attraction :</u>	Desert and Desert Margin Areas Brandberg Mountain Mountainous Basalt Regions and the Valleys of the Hoanib, Ugab and Omaruru Rivers
T3	<u>Wilderness Areas :</u>	Desert Wastelands

Scale 1:2 000 000 (Approx.)

9. RECOMMENDED LAND USE

Our recommendations regarding optimal forms of land use in Damaraland are set out in Map No 5 - RECOMMENDED LAND USE - and its expanded legend. A summary of our recommendations is presented in Table 5 and depicted on a small scale map as Figure 4. The following is a brief review of the subject.

9.1 LIVESTOCK PRODUCTION

The natural environment dictates that the main agricultural industry in Damaraland must be based on livestock production. Three systems of livestock production are recommended: two of the systems are allied to permanent settlement and the third is a migratory system of use.

L.1 Very Extensive Livestock Production based on Cattle and/or Small Stock

These areas are confined to the eastern border of Damaraland where rainfall and soil conditions are more favourable. The environment is suitable for stock, and under good veld management high levels of productivity can be achieved with adapted breeds.

L.2 Very Extensive Livestock Production based on Small Stock only

These are areas of lower rainfall and poorer soils, producing a less favourable environment, to which sheep and goats are better suited than are cattle.

L.3 Very Extensive Livestock Production based on Migratory Systems of Use

Here a low and erratic rainfall pattern produces vegetation which cannot support permanent livestock populations and settlement because of the wide variations in pasturage production from year to year. During periods of drought it would be necessary to remove all livestock to more productive areas. Management must be geared to make maximum use of favourable seasons. This would be accomplished either by a system of shifting grazing in large units or by the reservation of areas for use by animals brought in from adjacent areas.

The vegetation of these regions is particularly sensitive to damage by overgrazing and systems must be adopted to minimise heavy stocking.