

**Section 4**

**NEPRU Briefing Papers**

## LAND TENURE DATA

### 1. Introduction

1.1 There are many different sets of figures on land ownership in Namibia, prepared by different authors and at different times. In this brief paper we attempt to set out a consistent set of data with sources.

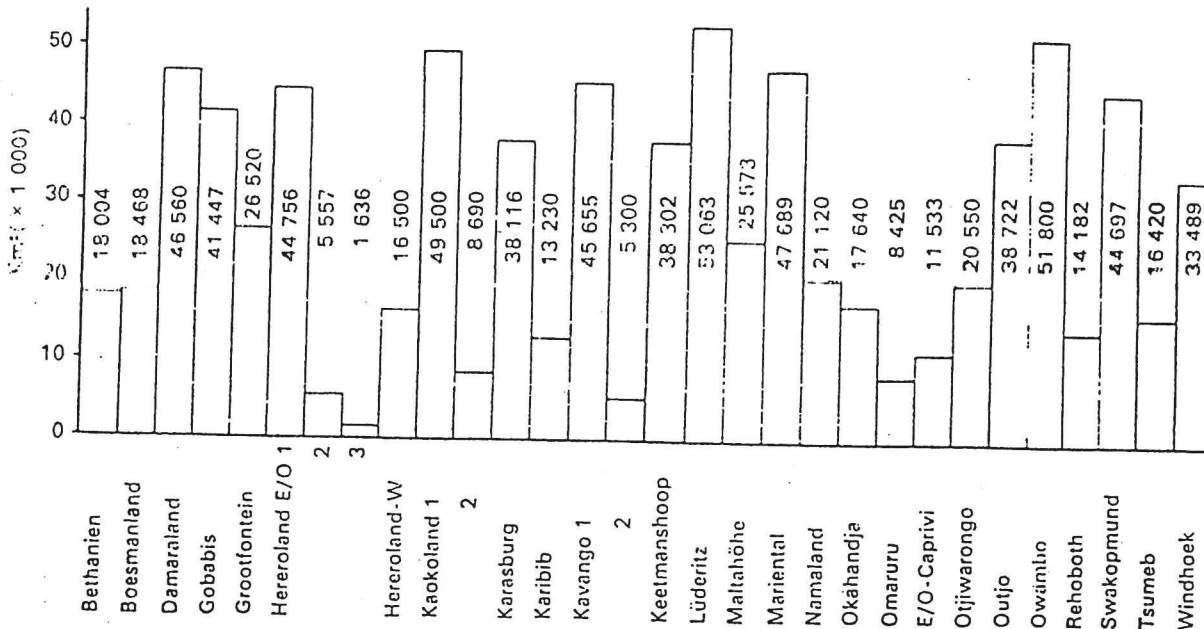
1.2 The principal sources are:

- (a) *The National Atlas of South West Africa (Namibia)*, 1983. Edited by J.H. van der Merwe, Institute for Cartographic Analysis, University of Stellenbosch and the Directorate Development Co-ordination, SWA.
- (b) *The Current Land Tenure System in the Commercial Districts of Namibia*, April 1991. Department of Agriculture and Rural Development, Ministry of Agriculture, Water and Rural Development, Windhoek.
- (c) Data provided by the Ministry of Wildlife, Conservation and Tourism to NEPRU, June 1991.

### 2. Administrative Units

2.1 The total area of Namibia, including Walvis Bay (1,124 km<sup>2</sup>), is 824,268 km<sup>2</sup>.

2.2 Pending the report of The Delimitation Commission which is charged with the delineation of the boundaries of the regions and Local Authorities along geographical rather than ethnic lines, the names of the 26 magisterial districts remain in common use. For the record these are reproduced below (Source: *The National Atlas of South West Africa*, 40).



### 3. Diamond Area

3.1 Diamond Area 1, in the Namib Desert between the Orange River in the south and latitude 26°S in the north and extending inland for 100 km from the coast (an area of 25,000 km<sup>2</sup>), is an exclusive mining area under the administration of Consolidated Diamond Mines.

3.2 Diamond Area 2, in the Namib Desert north of latitude 26°S, is now incorporated in the Namib Naukluft Park under the Ministry of Wildlife, Conservation and Tourism.

### 4. Conservation Areas

4.1 Three general vegetation regions are identified in Namibia: desert, savanna and woodland. There is a proclaimed area in each of these regions. Some 100,000 km<sup>2</sup> or 12 per cent of the country is protected. More than three quarters of this land is of no use for agriculture. In other words, only 3 per cent of the land area suitable for agriculture has been set aside for conservation. The major conserved land areas comprise the following:

#### *Desert*

4.2 The desert conservation areas (74,029 km<sup>2</sup>) are as follows:

- (a) Hot Springs Ai-Ais and the Fish River Canyon, 461 km<sup>2</sup>
- (b) Namib Naukluft Park, 49,768 km<sup>2</sup>
- (c) National West Coast Tourist Recreation Area, 7,800 km<sup>2</sup>
- (d) Skeleton Coast Park, 16,000 km<sup>2</sup>

#### *Savanna*

4.3 The savanna conservation areas (22,967 km<sup>2</sup>) are as follows:

- (a) Daan Viljoen Game Park, 40 km<sup>2</sup>
- (b) Hardap Recreation Resort, 252 km<sup>2</sup>
- (c) Etosha National Game Park, 22,270 km<sup>2</sup>
- (d) Waterberg Plateau Park, 405 km<sup>2</sup>

#### *Woodland*

4.4 The woodland conservation areas (11,470 km<sup>2</sup>) are as follows:

- (a) Khaudom Game Park, 3,841 km<sup>2</sup>
- (b) Mahango Game Park, 245 km<sup>2</sup>
- (c) Western Caprivi, 6,000 km<sup>2</sup>
- (d) Mudumu National Park, 984 km<sup>2</sup>
- (e) Mamili National Park, 400 km<sup>2</sup>

## 5. Agriculturally Usable Land

5.1 According to the Ministry of Agriculture, Water and Rural Development, of the total area of the country (824,268 km<sup>2</sup>) 696,000 km<sup>2</sup> are agriculturally usable, the balance being made up of diamond areas and/or nature reserves. Of the 696,000 km<sup>2</sup>, approximately 33.39 million hectares fall within the Communal Area and 39.16 million hectares fall within the commercial farming area.

5.2 Strictly speaking, these statistics overstate the agriculturally usable area within the Communal Areas. MAWARD has identified 1.2 million hectares in western Kaokoland and 2.4 million ha in western Damaraland as being unutilised. The areas lie in the semi-desert mean annual 50-100 mm rainfall zone. The Ministry advises that the areas are not suitable for agricultural development because of their ecological sensitivity. They are situated adjacent to desert areas and act as natural buffers against the inland expansion of the desert (NEPRU Working Paper 3, Appendix B).

5.3 Further, there are some 2.7 million hectares of land in east Hereroland in the Kalahari Desert which is not agriculturally usable due to the absence of exploitable groundwater. Although it is technically possible to convey water into this area by pipeline from the Okavango, the costs of doing so are likely to be prohibitive for the foreseeable future.

5.4 Thus the net area of agricultural usable land in the Communal Areas is about 27 million hectares. Thus the relative proportions of agriculturally usable land are as follows:

Communal Areas, 27 million hectares = 43 per cent  
Commercial Areas, 36 million hectares = 57 per cent

5.5 Of course, not all agriculturally usable land in Namibia has the same agro-ecological potential. Land may be broadly subdivided into land suitable for small stock (sheep and goats) and that suitable for large stock (cattle). There is an intermediate category of land suitable for a mixture of the two. The major part of the land suitable for cattle and for mixed stock farming is in the commercial area. The small stock area is shared more or less equally between the communal and the commercial farmers.

5.6 On the other hand, the bulk of the land suitable for rainfed crop production lies in the northern Communal Areas. Only a small proportion of the land suitable for potential dryland

cropping is found in the commercial areas, in the neighbourhood of Grootfontein and Tsumeb.

## 6. Commercial/Freehold Areas

6.1 There are four main categories of owners of land under a freehold system of individual ownership (the so-called commercial area). They are (a) individuals who own the largest portion; (b) the municipalities and Peri-Urban Board; (c) the churches, particularly the Catholic Church; (d) the State which owns experimental and production or demonstration farms as well as other agricultural land (see Table 1)

Table 1: Land ownership distribution in the commercial area of Namibia, 1991

OWNER	Number of Farms	Hectares	Per Cent
<u>The State</u>			
Experimental/ production farms	20	169 216	0.47
Other agri- cultural land	44	297 697	0.82
		466 913	1.29
<u>Municipalities and Peri-Urban Board</u>			
	28	349 998	0.97
<u>Churches</u>			
	22	222 365	0.61
<u>Individual Owners</u>			
plots around towns	*(681)	33 958	0.09
company farms	55	728 882	2.02
individually owned farms	6123	34 362 764	95.02
		35 125 604	97.13
<b>TOTAL</b>	<b>6292</b>	<b>36 164 880</b>	<b>100.00</b>

\* Plots not calculated as farms

Source: *The Current Land Tenure System in the Commercial Districts of Namibia*, April 1991. Department of Agriculture and Rural Development, Ministry of Agriculture, Water and Rural Development, Windhoek.

## WATER SITUATION IN THE COMMUNAL AREAS

### Summary

#### *The national situation*

1 The annual water consumption in Namibia is forecast to increase from 250 million cubic metres (Mm<sup>3</sup>) in 1990 to 400 Mm<sup>3</sup> by the year 2005. The assured yield of both surface and underground water sources, excluding border rivers, is only 500 Mm<sup>3</sup> per year. Currently, about 60 per cent of the nation's supplies come from groundwater, but the relative contribution from groundwater will diminish. Extraction from Namibia's border rivers will have to increase and so will the cost (and price) of water due to the need to pipe it over long distances.

2 Some 106 Mm<sup>3</sup> or 42.4 per cent of the current water supply is consumed by some 7,000 hectares of commercial irrigation. About 67 Mm<sup>3</sup> of water goes to domestic consumers, mainly urban (i.e. 60 per cent), and 64 Mm<sup>3</sup> to livestock (mostly on the commercial farms). Probably less than ten per cent of the nation's current total water supply is consumed in the Communal Areas.

#### *Water supply authorities*

3 Formerly, the second tier authorities provided water for domestic and stock watering on communal land and to small rural settlements. Since independence, the responsibilities for the supply of water have been under review. An important new development is the emergence of the Directorate of Rural Development whose tasks span the entire range from needs assessment to operation and maintenance, in particular for the small installations in sparsely populated areas of communal land.

4 Under the second tier authorities, consumers were passive recipients. Users of communal supplies were not expected to pay for water. In the mid 1980s, major efforts were made to mobilise political support by injecting large sums into water supply in the Communal Areas. Local involvement in planning and implementation was minimal. The new administration has inherited a situation in which government is expected to provide water free of charge to consumers.

*Water pricing and charges*

5 The allocation of water, like land is an equity issue. In a modern nation state, free access to a safe and reliable water supply, sufficient for personal consumption and hygiene is a fundamental right. Over and above that basic requirement, water is a resource that is limited, costly to obtain and must be paid for by the consumer. Water pricing poses a series of difficult questions for Namibia. A set of principles might include:

- a) Partial Subsidisation of rural household water and of small-farm livestock water. Overall the goal should be to recover at least recurrent/maintenance costs but this needs to vary from area to area in relation to total water cost and income.
- b) Cross subsidisation of urban household water charges via an inverse step tariff (i.e. higher charges above some threshold level) with some charges even for stand-pipe water (subject to its systematic provision).
- c) Full cost (including depreciation and interest on capital cost) pricing of water for commercial ranches/farms served by publicly financed water supplies, including FNDC and other large ranches.
- d) Full cost (including depreciation and interest on capital) pricing of water to mining, manufacturing and commerce.
- e) Strict licensing, including some form of monitorable ceiling on extraction, of private facilities, unless there is no present or near term limit to withdrawals from that source.

*Irrigation*

6 Because of the scarcity of water, large-scale irrigation is unlikely to be viable. Medium-scale irrigation from pump schemes drawing on border rivers may be viable for high value crops, but further evaluation of existing projects is required before new ones are initiated. Micro or spot irrigation using water-efficient drip systems (e.g. for kitchen gardens and fruit trees) for household self-provisioning may be viable around boreholes.

7 The extension of water supplies for irrigation in Kavango and elsewhere needs to be based on a clear understanding of objectives and alternative means of achieving them. The aims of the existing FNDC irrigation schemes would seem to be unclear: food self-sufficiency, production, technology transfer, research, employment generation for local people?

*Access to water in the Communal Areas*

8 Water, not land, is the country's scarcest resource. Namibia is, without doubt, the driest country in Southern Africa. However, access to water is more closely related to land tenure and income than climatic conditions. The best aquifers underlie the commercial farming area. In the south and centre of the country, the distribution of exploitable groundwater mirrors that of the commercial farms, with the more difficult aquifers underlying the Communal Areas. The groundwater situation in the northern Communal Areas, especially in Kavango and eastern Ovambo, is generally better. Indeed, the extension of water supplies into underutilized areas is expected to be the most cost effective way of increasing employment and food production in the immediate term.

9 Because of the relatively favourable water supply situation in the privately-owned freehold areas, water shortages are unlikely to be a major constraint to land distribution. However, the operation and maintenance of water supplies could eventually become a major cost for government, unless consumers can be persuaded to accept and meet the water costs themselves.

10 On average, Communal Area households are a total of 45 minutes walking distance to and from water, compared with commercial land owners and urban dwellers who have water piped to their houses. Marked differences in the average daily per capita water consumption are evidence of the inequitable access to water. According to the Department of Water Affairs, consumption averages 330 litres per person per day in major towns and 85 litres per day in rural areas. In practice, where water has to be carried over large distances, per capita daily consumption rarely exceeds 20 litres.

11 Ovambo: The extremely high concentration of population and unfavourable groundwater conditions have combined to produce the most pressing water supply problems in the country. The situation has been exacerbated by the war, which has resulted in serious damage to installations, delayed maintenance and capital works, and the extremely high population growth rate in Ovambo, bolstered by the returnees. Most of the population are concentrated in the area of the Cuvelai river system. At the same time, large areas of Ovambo are hardly inhabited because of the lack of drinking water.

12 Some 400,000 people are served by a piped water scheme. The capacity of the system is now insufficient during peak demand and it cannot be extended without major investments. Thus, Ovambo



is currently the focus of activity by the Department of Water which is implementing a series of major water supply projects in cooperation with foreign donors.

13 **Kavango:** Like Ovambo, the population is concentrated in a small area because of the shortage of drinking water. However, compared with Ovambo, the water resources of Kavango are relatively plentiful. In addition to shallow groundwater along the river and tributary valleys, potentially exploitable groundwater is available through most of the Communal Area.

14 **Hereroland:** The setting aside of this "homeland" for the Herero-speaking people was made possible by the fact that much of the area was not settled by white farmers, being almost entirely waterless. Most of the Herero population at that time were concentrated along the western and southern fringes of the designated area where groundwater was more readily available. The Eastern National Water Carrier was extended in the 1970s to supply the Okamatapati area in Hereroland West. However, the overall impact of this water supply scheme on the distribution of population has not been very great. The old established settlement trends along the western and southern fringes have continued.

15 To this day, large waterless areas in Hereroland East and West remain unutilized during the dry season. In most of the area, the probability of striking aquifers with an assured flow are extremely low. Some groundwater may still be found in some of the area, but it will require further intensive investigation work. If found to be viable, the remaining areas will have to be developed with imported water.

16 **Kaoko, Damara and Nama:** The communal lands in the dry west and south of Namibia are clearly already over-populated in terms of the number of people that can gain a decent livelihood from stock rearing. Despite the already heavy levels of overcrowding and overstocking at the waterpoints, pressure continues to increase. Post-Odendaal, resettlement in this marginal area has been maintained only with a very high level of subsidy, which is likely to be unsustainable. The need is to provide safe and reliable supplies sufficient to sustain the existing population and their animals, rather than to increase water supplies or to extend them into unutilized areas. Under present conditions, some farmers will not be able to pay for water supplies if subsidies are withdrawn.

## 1. Introduction

1.1 This paper reviews the water situation in the Communal Areas, the water supply problems currently confronting farmers and government and the technical and organisational options for overcoming them within the context of land reform.

1.2 Water, not land, is arguably Namibia's scarcest resource. Land without year-round access to supplies of water for human and livestock consumption, may be suitable for wildlife, but is of limited value for human settlement and for agriculture. In terms of the total assured water yield per unit area of land, Namibia is, without doubt, the driest country in Southern Africa and probably one of the driest in the world. It is estimated that on average 83 per cent of the total rainfall evaporates shortly after falling. Of the remaining 17 per cent, 14 per cent is lost through evapotranspiration, one per cent recharges groundwater and only two per cent remains to be harvested behind dams.

1.3 Average figures for the country conceal significant regional variations. The mean annual rainfall ranges from 50 mm in the western region to 700 mm in Caprivi in the north east (Map 1). Variability increases as mean annual rainfall decreases. It is as high as 80 per cent in the far west and decreases to less than 20 per cent in the north east. But even in Caprivi, Namibia's wettest region, climatic conditions are, by world standards, defined as *semiarid*. On average, Caprivi has more than five dry months per year, (i.e. months in which the evaporative demand of the atmosphere exceeds the income of moisture from rainfall). On the other hand, Damara and Nama small-stock farmers in the arid west and south of the country, face on average, eleven dry months and rely almost entirely on groundwater supplies for domestic and stock watering purposes.

1.4 Data on distances travelled to fetch water (Table 1), assembled in the course of the 1991 national socio-economic/attitude-to-land survey, revealed that access to water is more a function of land tenure and income than climatic or hydrological/hydro-geological conditions. On average, Communal Area households are a total of 45 minutes walking distance to and from water, compared with commercial land owners and urban dwellers who have water piped to their houses.

Table 1 Minutes spent walking to and from water

<u>Regional grouping</u> (households in survey)	<u>Dry Season</u>	<u>Wet Season</u>
Ovambo, Cuvelai (124)	38	22
Non Cuvelai (94)	67	28
Kavango (108)	50	40
Caprivi (107)	47	33
Other Communal Areas (97)	23	16
Commercial Land Owners (105)	0	0
Farm workers (107)	2	2

1.5 Marked differences in the average daily per capita water consumption are further evidence of the inequitable access to water. According to the Department of Water Affairs, consumption averages 330 litres per day per person in major towns and 85 litres per day in rural environments. In practice, where water has to be carried over large distances, per capita daily consumption rarely exceeds 20 litres.

## 2 Background: The national situation

### *Water resources*

2.1 The Department of Water Affairs<sup>1</sup> estimates that the total annual water consumption in Namibia will continue to increase from 250 million cubic metres (Mm<sup>3</sup>) in 1990 to 400 Mm<sup>3</sup> by the year 2005. The total assured yield of both ephemeral surface and underground water sources, excluding perennial rivers, is estimated at only 500 Mm<sup>3</sup> per year. Thus increased extraction from Namibia's border rivers will be vital, even if their remoteness in the far north and south of the country will greatly increase unit costs. Namibia already has agreement with neighbouring riparian states for the annual extraction of 500 Mm<sup>3</sup> from the Orange River and 180 Mm<sup>3</sup> from the Cunene River.

2.2 A water master plan provides for the future withdrawal of water from the Cunene and Kavango rivers on Namibia's northern frontier. The Cunene River is an important source of supply for the densely populated parts of Ovambo, where potable groundwater is generally deficient. No agreements have been reached on the utilization of waters from the Kavango, the Kwando or the Zambezi rivers, although it is planned that the Eastern National Water Carrier will eventually draw at least 90 Mm<sup>3</sup> per annum from the Kavango River. When completed, this will be Namibia's largest single project and will augment water supplies in the central area of the country. The project is being developed in phases

according to water demand and the availability of capital funds. It has so far been completed between the central area of the country and the dolomitic aquifer in the vicinity of area of Grootfontein. An eastern extension supplies the Herero Communal Area in the neighbourhood of Okakarara.

2.3 Water sources in Namibia can be divided into three major categories, namely perennial surface water, ephemeral surface water (impounded in dams) and groundwater. Currently a little more than 250 Mm<sup>3</sup> is utilized (Table 2).

Table 2 Utilization of water sources in 1989

Source	Demand on Sources (Mm <sup>3</sup> per year)
Perennial surface	58
Ephemeral surface	50
Groundwater	142
TOTAL	250

Source: Department of Water Affairs, 1990

#### *Water demand*

2.4 The estimated demand of the various consumers (Table 3) shows the relatively large requirement (106 Mm<sup>3</sup> or 42.4 per cent) of the 7,000 hectares currently under commercial irrigation (on the banks of the Okavango, below the Hardap dam, and the Tsumeb-Otavi-Grootfontein triangle), which, because of the very high water requirement (currently 15,000 m<sup>3</sup> ha<sup>-1</sup> per year) and relatively low economic return, must be considered a tertiary priority, after domestic and stock, and mines and industries.

Table 3 Estimated future water demand in Namibia

Consumer	Consumption (Mm <sup>3</sup> )			
	1990	1995	2000	2005
Domestic*	67	81	91	115
Stock	64	67	70	75
Mining	12	15	25	30
Tourism	1	2	3	5
Irrigation	106	130	147	175
TOTAL	250	295	340	400

\*Urban 39, Rural 28

Source: Department of Water Affairs, 1990.

### *Irrigation*

2.5 Irrigation provides an opportunity to greatly intensify land use and create livelihoods for relatively large numbers of people (at one household per 3 to 4 hectares). However, because of the high requirement for water per unit area, large-scale irrigation is unlikely to be viable in Namibia. Medium scale irrigation from pump schemes drawing on border rivers and the Okavango, or from dams on the Hardap model, may be viable for high value crops, but requires further evaluation of existing projects before new ones are initiated. Because of the high costs of pumping, irrigation from groundwater is unlikely to be viable in most areas, except perhaps in the Kaarstveldt (including Otavi Highlands/Tsumeb and some other artesian aquifers).

2.6 Micro or spot irrigation using water-efficient drip systems (e.g. for kitchen gardens and fruit trees) for household self-provisioning may be viable on ranches, for example. In this case the water for crops is a by-product of human and livestock use and may have a low incremental cost. There is a need to test the feasibility of this type of spot irrigation in different areas because such additional food output is one possible way of raising ranch output and the consumption of fresh produce by workers and their families.

### *Water consumption in the Communal Areas*

2.7 According to the Department of Water, of the 67 Mm<sup>3</sup> supplied to domestic consumers in 1990, 60 per cent was consumed by urban dwellers. Thus the rural water consumption (i.e. rural domestic, 28 Mm<sup>3</sup>; plus stock, 64 Mm<sup>3</sup>) of 92 Mm<sup>3</sup> (25.6 per cent of total water demand in 1990) was considerably less than that allocated to commercial irrigation.

2.8 The proportion of the rural water supply used by the Communal Areas (inhabited by 65 per cent of the total population) is not separately recorded by the Department of Water Affairs, but it probably amounts to less than a quarter of the 131 Mm<sup>3</sup> consumed by domestic and stock (Table 3), that is less than 10 per cent of total national water demand. This follows from the fact that, according to the Department of Water Affairs, some 77 per cent of domestic and stock water is supplied from groundwater and of the 32,000 boreholes in Namibia, 27,680 (86.5 per cent) are in private hands.

### *Water supply in the commercial areas*

2.9 The best aquifers underlie the commercial farming area; for example, in the marble bands at Otjiwarango, in the dolomitic karst area in the Grootfontein-Otavi-Tsumeb triangle and in the Karoo sandstones in the south east. In the south and centre of the country, the distribution of exploitable groundwater mirrors the distribution of commercial grazing land, with the more difficult aquifers underlying the Communal Areas (e.g. in Herero West and East, Damara and parts of Nama Communal Areas). It is also the case that, in much of the densely settled Ovambo floodplain, the groundwater is usually saline. Kavango, where groundwater conditions are much more favourable, is an exception.

2.10 Because of the relatively favourable water supply situation in the privately-owned freehold areas, the availability of water, at least initially, is unlikely to be a major constraint to land reform. However, if history is any guide (e.g. in Damara and Nama), the operation and maintenance of water supplies could eventually become a major cost for government on distributed land, unless consumers could be persuaded to accept and meet the water costs themselves at the outset.

### **3. Responsible authorities in the Communal Areas**

3.1 Under the previous administration, the Department of Water Affairs was responsible for the provision of bulk supplies. The second tier authorities provided water for domestic and stock watering on communal land and to small rural settlements. Since independence, the responsibilities for the supply of water have been under review. An important new development is the emergence of the Directorate of Rural Development whose tasks span the entire range from needs assessment to operation and maintenance, in particular for the small installations in sparsely populated areas of communal land.

#### *Department of Water Affairs*

3.2 Under the Water Act, The Department of Water Affairs is given the task of investigating water resources, establishing major water supply schemes and supplying water in bulk. It is also responsible for advising the Government on policy matters, concerning for example, the protection and utilization of the water resources and the equitable distribution of water within the country. It is expected that the scope of its work will be extended to include much of the source and scheme development work previously undertaken by the second tier authorities.

3.3 The Department's water supply development strategy is guided by the principle that local water sources must be utilized before a regional water source further way. Where water has to be shared by a number of consumers, the domestic and stock watering needs are given priority over other uses.

#### *Regional level*

3.4 Following the report of the Odendaal Commission in 1964 and the subdivision of the country into so-called homelands, the second tier authorities were given full responsibility for a range of services, including water development. This involved both source and scheme development, for which they relied on private contractors, as well as operation and maintenance within the Communal Areas. The Department of Water Affairs were involved only where a major bulk supply scheme was undertaken (e.g. Ovambo from the Cunene River, Hereroland from the Eastern National Water Carrier). In these circumstances, the second tier authorities paid the tariffs levied for bulk water supplied to them and were encouraged to charge individual consumers for the water used.

3.5 Under these authorities, consumers were passive recipients, entirely dependent on the Agriculture Department, whose staff and budgets were mostly taken up with water provision. Users of communal supplies were not expected to pay for water. Grazing fees were levied to cover some of these costs but revenue regularly fell below target. Little or no attention was paid to the sustainability of the system or the harmonisation of approaches in the various "homelands". In the mid 1980s, major efforts were made by the South African administration to mobilise political support by injecting large sums into the agricultural sector (principally water) in the Communal Areas. The pace of development was such that local involvement in planning and implementation was minimal.

3.6 Although the authority structure and budgetary system have changed following the abolition of the ethnic administrations, the arrangements for operation and maintenance of rural water supply have, as yet, altered very little. The new administration has inherited a situation in which government is expected to provide water free of charge to consumers in the Communal Areas. The whole issue of water charges has become highly politicised. The government will undoubtedly have an up-hill struggle in weaning consumers away from the idea of free water supplies and introducing the concept of community management and financing of schemes.

3.7 Proposals for the allocation of responsibility for the supply of water to the Communal Areas are in the process of being considered by the Water Supply and Sanitation Policy Committee. The precise arrangements will depend on the type of water supply scheme. However, for the majority of borehole schemes, for example, it is likely that the Department of Water Affairs will take over the task of source development, leaving the Directorate of Rural Development, at the interface between government and the community, responsible for such tasks as need assessment, operation and maintenance, extension work, etc.

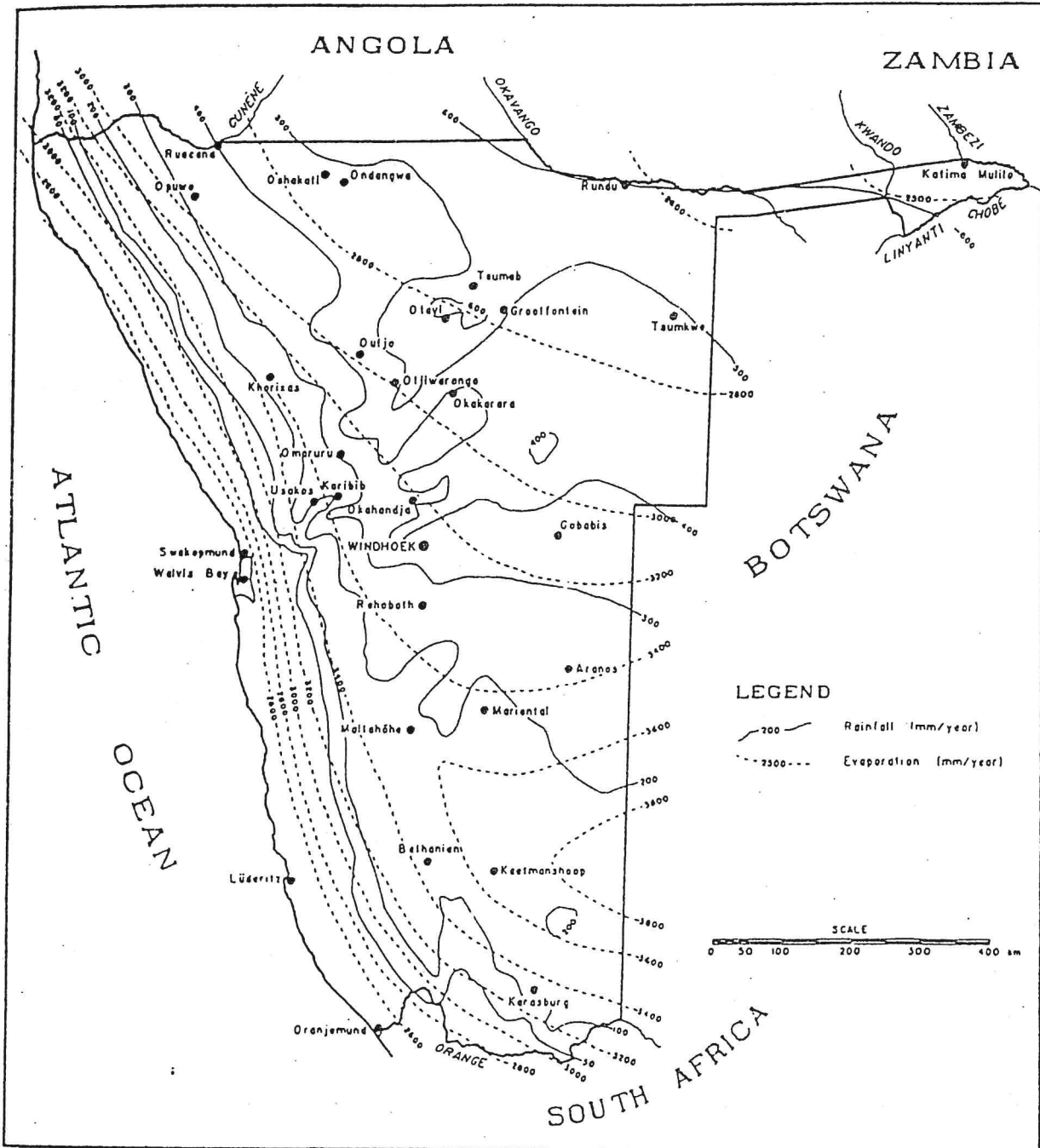
3.8 The extension of water supplies into unutilized, or only seasonally utilized, Communal Areas (see Map 2), especially in the north and east, is expected to be the most cost effective way of increasing employment and food production in the immediate term. Major difficulties will arise in matching the rate of physical progress in water supply to the development of community based schemes for operation and maintenance and schemes for environmental management.

#### **4. Water Pricing<sup>2</sup>**

4.1 The allocation of water, like land resources is an equity issue. In a modern nation state, free access to a safe and reliable water supply, sufficient for personal consumption and hygiene is a fundamental right<sup>3</sup>. Over and above that basic requirement, water is a resource that is limited, costly to obtain and must be paid for by the consumer. Water pricing poses a series of difficult questions for Namibia. A set of principles might include:

- a) **Partial Subsidisation** of rural household water and of small-farm livestock water. Overall the goal should be to recover at least recurrent/maintenance costs but this needs to vary from area to area in relation to total water cost and income. Water user committees to collect funds and to provide labour and routine maintenance should complement or substitute for cash water charges.
- b) **Cross subsidisation** of urban household water charges via an inverse step tariff (i.e. higher charges above some threshold level) with some charges even for stand-pipe water (subject to its systematic provision).
- c) **Full cost** (including depreciation and interest on capital cost) pricing of water for commercial ranches/farms served by publicly financed water supplies, including FNDC and other large ranches.





MAP 1

- d) **Full cost** (including depreciation and interest on capital cost) pricing of water to mining, manufacturing and commerce. This is crucial to avoid distortions of uses and of location in the context of physically scarce, high cost water.
- e) **Strict licensing**, including some form of monitorable ceiling on extraction, of private facilities, unless there is no present or near term limit to withdrawals from that source. Pegging of recent past offtake levels may be necessary as a starting point, with increased offtake levels being strictly monitored especially in areas where there is a danger of secularly falling water tables.

## 5. Ovambo

5.1 The extremely high concentration of population and unfavourable groundwater conditions in Ovambo have combined to produce the most pressing water supply problems in the country. The average time taken to fetch water in the dry season reported by respondents in the non-Cuvelai area was 67 minutes, the highest in the country. The situation has been exacerbated by the war, which has resulted in serious damage to installations, delayed maintenance and capital works, and the extremely high population growth rate in Ovambo, bolstered by the returnees.

### *Groundwater*

5.2 The most important traditional sources of water are low-yielding shallow hand-dug wells excavated 3 to 10 metres in the unconsolidated Kalahari sediments along the drainage lines of the Ovambo flood plain. The shallow groundwater depends on annual recharge by the highly variable Cuvelai drainage system which flows into Etosha Pan. As the dry season progresses, wells often become brackish and/or dry up. Traditional wells have been improved by lining, covering and the installation of hand-pumps, often with the help of churches and NGOs.

5.3 Deep boreholes yield highly saline water, especially in the south towards the Etosha pan. In the south west, the chances of striking deep groundwater improve but are still variable. In this direction, agricultural conditions are more marginal because rainfall is less reliable. To the east, groundwater conditions improve and a few boreholes were drilled by the former Owamboland Administration.

### *Surface water*

5.4 The north western border of Ovambo follows the Cunene River. The reservoir of the Calueque dam in Angola feeds a piped water scheme constructed and maintained by the Department of Water Affairs since the early 1970s. The system, which is now supplemented from Ruacana Falls power station, consists of 90 km of canals, 680 km of pipelines, 9 treatment plants, some 30 pumping stations, 200 standpipes for rural water supply and tanks/reservoirs at each of the 23 centres. In 11 centres, additional water is used and added to the scheme from oshanas during the rainy season. Some 400,000 people are served by the official and unofficial take-off points. The capacity of the system is now insufficient during peak demand and it cannot be extended without major investments.

5.5 In the longer term, given the required capital development, piped water supplies are not expected to be a constraint in Ovambo. Only a small fraction of the agreed extraction of 180 Mm<sup>3</sup> from the Cunene is currently being used.

### *Opening up new areas*

5.6 Most of the population are concentrated in the area where the regular *efundja* floodings of the Cuvelai river system occur. At the same time, large areas of Ovambo are hardly inhabited because of the lack of drinking water. An extended drinking water supply for people and livestock towards the higher rainfall areas in the east away from the Ovambo flood plain, would permit a smallholder settlement programme on a significant scale.

5.7 The northern quarter of this area is already settled and there are a number of ranches in the south east (Mangetti) area. In the central part of this eastern section, good quality water is available at drilling depths of 100-150 m. The probability of obtaining 1 m<sup>3</sup> h<sup>-1</sup> is reported by the Department of Water Affairs to be 60 to 70 per cent. In the south east of this section, in an area straddling the main road near Oshivelo, a potentially important artesian aquifer at 70 to 120 m has been found which requires further testing before its sustainable yield can be determined.

### *Work in progress and planned developments*

5.8 Ovambo is currently the focus of activity by the Department of Water Affairs. With financial support from the European Community, a comprehensive inventory of water sources (groundwater and surface) has been carried out in the transitional groundwater zone in the eastern part of the Cuvelai. This information will aid the identification of specific problems

and the formulation of solutions (type of scheme required, selection of equipment, etc.).

5.9 With the support of the Finnish Government, a major community-based water supply and sanitation project is due to commence in the densely populated parts of central northern Ovambo surrounding Engela. France is contributing to the Omakango-Omafufu pipeline; Germany to the rehabilitation of the Ogongo-Oshakati canal; India to groundwater development and Netherlands to the rehabilitation of Calueque pump station, the Ogongo-Okalongo Regional State Water Scheme, tapping points and the Ogongo purification plant.

5.10 Other plans for the development of surface supplies including irrigation in western Ovambo are still in the very early stages. Feasibility studies have not been undertaken, nor have sources of funding been identified.

## **6. Kavango**

6.1 Like Ovambo, the population is concentrated in a small area because of the shortage of drinking water. However, compared with Ovambo, the water resources of Kavango are relatively plentiful. In addition to shallow groundwater along the river and tributary valleys, potentially exploitable groundwater water is available through most of the Communal Area. Yields of up to  $5 \text{ m}^3 \text{ h}^{-1}$  of reasonable quality water are available throughout central and southern areas of Kavango at depths of 75-150 metres with a 70 per cent probability. In the east, around the Kaudom area, the probability of striking water declines to 40 per cent. In general the district has the greatest potential for the development of mixed farming of any area in Namibia.

6.2 In recent years, six drilling teams of the Department of Agriculture have drilled over 200 boreholes throughout Kavango and installed motorized pumps, at a cost of R25-30,000 per borehole, including installation. Current production is about 20-25 boreholes per year. In the past, the Department provided boreholes and pumps to ranches for individuals, but now the emphasis is on the provision of water to communities, subject to endorsement by local Agricultural Advisory Committees. Only genuine community proposals are reported to be approved. Each water point serves a community of between 50 to 250 people. This has been operated as a free service to the rural community, with the government paying for fuel and maintenance and employing pumpers.

6.3 As in Ovambo, The Department of Water Affairs has carried out a comprehensive inventory of water points in Kavango. This information will provide a basis for the extension of the existing water supply programme in the plains south of the Okavango valley. As elsewhere, the intention is to modify the conditions under which communities receive water, in such a way that they pay for the water they receive and are associated with and made responsible for the maintenance of the water point and pumps.

#### *Irrigation*

6.4 FNDC runs four capital-intensive, high-technology irrigation farms along the Okavango on 3400 ha of land leased from the regional authority. Some 625 ha are reported to be under irrigation for the production of field crops, fruit trees, horticulture, dairy products. The schemes are recognised by FNDC to be financially unviable and are currently losing some R2.2 M per year, due to high fuel, transport and labour costs. The projects are considered to be unreplicable by small or medium-scale farmers because of the high level of technology used, yet they continue to be justified by FNDC on the basis of "unquantifiable" benefits.

6.5 The extension of water supplies for irrigation in Kavango and elsewhere needs to be based on a clear understanding of objectives and alternative means of achieving them. The aims of the four FNDC irrigation schemes would seem to be unclear: food self-sufficiency, production, technology transfer, research, employment generation for local people?

#### **7. Herero**

7.1 The setting aside of this so-called homeland, Hereroland East and West, for the Herero-speaking people was facilitated by the fact that much of the area was not settled by white farmers, being almost entirely waterless. Most of the Herero population at that time were concentrated along the western and southern fringes of the designated area where groundwater was more readily available. Thus, in order to develop the area into a suitable place for settlement, on the lines recommended by the Odendaal Commission, a water supply system, based on a Master Plan<sup>4</sup>, had to be constructed.

7.2 In the absence of reliable groundwater in the area, the Eastern National Water Carrier was extended into Hereroland West, drawing water from the aquifer in the dolomitic kaarstland area east of Grootfontein. Thus, the Okamatapati area, representing

about 25 per cent of the grazed area in Hereroland West, is now mostly supplied by a 240 km main pipeline constructed between 1978 and 1981 to open up a waterless area of some 275,000 ha for stock farming.

7.3 The construction of the pipeline and the fencing of the range into individual farms was seen by government as a means of taking the pressure off the intensively grazed area around Okakarara and of introducing the Herero to "modern" farming methods. Fifty-six farms of about 5,000 ha (supplied by 360 km of secondary and tertiary pipelines) were planned, although only 41 farms were surveyed and fenced in the early 1980s. Each farm was divided into 4 camps with one central waterpoint. The scheme led to a large increase in stock numbers in the Okamatapati area without any detectable changes in the traditional systems of stock husbandry. The Okakarara area, from which settlers were drawn, continues to be under heavy grazing pressure.

7.4 From the outset, the Okamatapati scheme was seen by local people as a government project, centrally conceived and implemented without adequate consultation. Many people were reluctant to move from Okakarara to the new area. Farms were allocated free to farmers, who moved in before the construction of fences. In many cases, several households were allocated to one water point, but herds continued to be managed individually, which, of course, precluded the introduction of the rotational grazing systems recommended by the authorities. Recently, farmers have been pressing to have the 5000 ha farms subdivided and to be granted freehold rights to the land.

7.5 The overall impact of this water supply scheme on the distribution of population has not been very great. The old established settlement trends along the western and southern fringes have continued. Plans now exist to extend the supply from the Eastern National Water Carrier to Okandjatu and Otjinene to meet the growing demand generated by the local population.<sup>5</sup>

7.6 To this day, large waterless areas in Hereroland East and West remain unutilized during the dry season. Particular problems arise from the presence of the poison leaf (*gifblaar*) which is particularly dangerous for stock in the early part of the dry season when its leaves are still green. However, the management problems of these pastures are not unsurmountable.

7.7 In most of the unutilized area, the probability of striking aquifers with an assured flow of  $1\text{m}^3\text{h}^{-1}$  is 10-20 per cent at 150-200 m depth. Probabilities improve in the south west, but this area is already settled. Higher yields and probabilities of striking water are reported for a small area around Gam in the north east.

7.8 Some groundwater may still be found in some of the area but it will require further intensive investigation work. If found to be viable, the remaining areas will have to be developed with imported water.

#### *Operation and maintenance*

7.9 In the past, the second tier administration met all the costs of borehole construction and maintenance, but since 1988, efforts have been made to pass responsibility for basic operation and maintenance to users. However, stockowners supplied by the pipeline continue to receive water free<sup>6</sup>. The government continues to take responsibility for borehole construction, some maintenance and repairs and the employment of pumpers. The local community have responded to the challenge of taking charge of their water supplies with varying degrees of success. The grazing fees, which were originally seen by producers as payment for water supplies are now widely ignored, especially by the larger stock owners.

### **8. Kaoko, Damara and Nama**

8.1 Substantial areas of sparsely vegetated veld in western Namibia have been identified by MAWARD (Map 2) in Damara and Kaoko as being unutilized. However, these areas lie in the semi-desert and the extension of water supplies to them is probably neither economically nor ecologically justifiable. The semi-desert areas of short annual grassland and scattered bush are suitable for wet season grazing only and will not sustain livestock during the dry season however much water is provided.

8.2 The communal lands in the dry west and south of Namibia are clearly already over-populated in terms of the number of people that can gain a decent livelihood from agriculture. The need is to provide safe and reliable supplies sufficient to sustain the existing population and their animals, rather than to extend water supplies into unutilized areas.

### *Kaoko*

8.3 Traditionally, the highland areas of Kaoko are well endowed with springs and small stream-bed aquifers which sustain pastoralists during the dry season. During the summer months, when pans and wells were recharged, herds and flocks used to move out to the sandveld plains where there were few permanent water sources.

8.4 In the late 1960s, after Odendaal Commission, some 150 boreholes were hastily drilled in the sandveld and equipped with windpumps or diesel engines by the Second Tier Authority. These provided free year-round supplies that support large sedentary communities and discouraged seasonal transhumance. This in turn led to continuous grazing and a visible deterioration in the landscape, especially in the southern and eastern parts of Kaoko.<sup>7</sup>

8.5 Many of the pumps are now reported to be out of action as they were never adequately maintained and government is under pressure to repair them. However, before this is done there is need to involve the consumers in the replanning of water points to be provided in the area, (i.e. their location, capacity and choice of technology) as well as the arrangements for their management by the community.

### *Damara*

8.6 Following the Odendaal Commission and the designation of the area as the homeland of the Damaras, all the white-owned commercial farms (223 in total - many of them producing Karakul) were bought out by the government and Damara people were settled involuntarily on the land. Families were allocated to individual water points. In the 1981 census, the Damara population in the designated Communal Area was about 24,200.

8.7 The settlement process continues today, as Damara, mainly displaced labourers from the commercial farming areas, apply to the traditional authorities and to the Directorate of Agriculture in Khorixas for a place to settle. Formerly, the staff endeavoured to investigate the potential of the land on which people were applying to settle, but now it merely endorses decisions made by the traditional authorities. No applicants for settlement are refused. Thus, despite the already heavy levels of overcrowding and overstocking at the waterpoints, pressure continues to increase.



8.8 Water tables are reported to be falling and five per cent of boreholes are drying up each year. Three years ago, the rate was two per cent. The Water Unit drills boreholes, supplies all equipment and diesel, builds dams and windmills, and services and maintains all equipment. Farmers are not expected to contribute in any way so the teams are called out continuously for maintenance and repairs. Subsidies amounted to R 3.0 million in 1990/91.

8.9 Farmers are expected to pay a grazing fee of 5c for goats and sheep, and 60c for cattle per month. In the fiscal year 1989/90 only R22,000 of the budgeted R150,000 was collected by extension staff. Most farmers refuse to pay grazing fees on the grounds that government is not providing a sufficiently reliable borehole service and that they sometimes have to purchase parts or fuel themselves.

8.10 Resettlement in this marginal area has been maintained only with a very high level of subsidy, which is likely to be unsustainable. Under present conditions some farmers will not be able to pay for water supplies as farm units are both too small and their production potential too low. If subsidies are withdrawn, the poorest farmers will be hardest and soonest hit. This would force many of them either to seek work in towns or as farm labourers on their former holdings. Detailed surveys of farm economics, the socio-economic condition of those associated with the farms and the costs and benefits of farm subsidies are urgently required as a prelude to land reform and revision of water subsidies in this area and/or resettlement elsewhere.

8.11 The water supply system needs to be replanned with the consumers as well as the arrangements for their operation and management. Alternative technologies need to be considered: sand/ground dams; solar panels in place of diesel; two boreholes per farm, with equipment moved between them.

#### *Nama*

8.12 The Nama Communal Area is in several respects more marginal than Damara. It falls into the semi-desert agro-ecological zone. Average rainfall varies between 100 mm in the south to 200 mm in the north and is very unreliable. Potential evaporation rates are extremely high (3.6 to 4.0 m). There are believed to be 1,300 to 1,400 farm families. Following the Odendaal Commission, "Namaland" was increased to virtually double its earlier size by the addition of commercial farms. Today it consists of several blocks of unfenced land and several of land

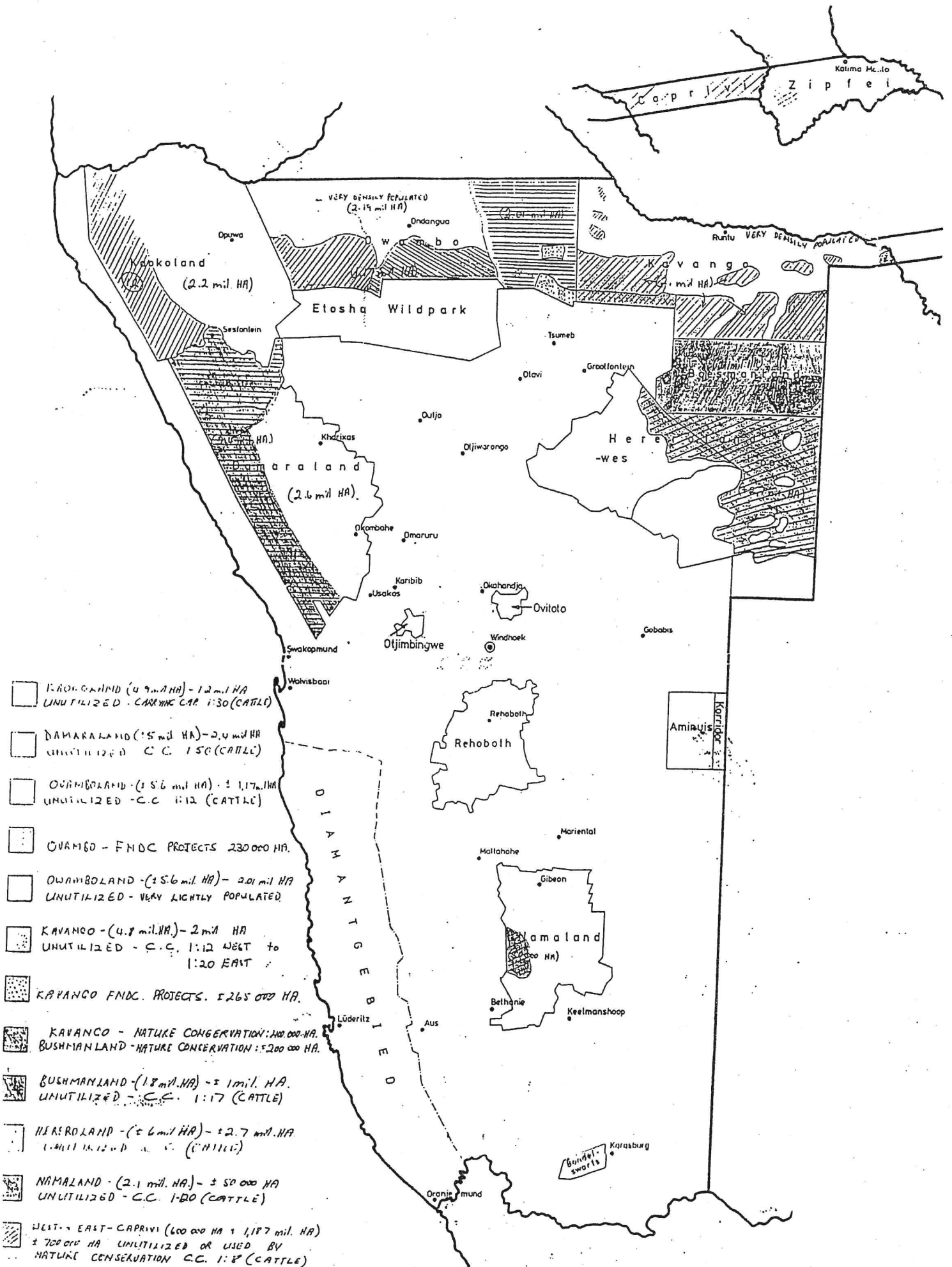
that was originally fenced, but which is now largely open due to the fences having fallen down. There is little difference in land use between the two.

8.13 As in "Damaraland", the settlement programme was not primarily intended to establish farmers, but rather to implement the apartheid policy, evacuating Blacks from the White-farming areas and vice versa. Thus, the circumstances under which they were settled and the support with which they were provided were not conducive to the development of a viable farming system. The result has been acute veld deterioration, a rural population composed largely of part-time farmers and impoverished labourers and the necessity for government to provide massive water supply subsidies.

8.14 The Directorate of Agriculture provides free fuel to all boreholes serving a "community", which in practice means more than one family. If only one family occupies a borehole it buys its own fuel, though maintenance is still carried out free. The staff are able to do little more than maintain the existing 850 windmills and 45 borehole engines, drill a few boreholes each year, maintain some fences, and distribute drought relief fodder. The main water supply issues relate to the high level of subsidy and the socio-economic problems which would result if it were withdrawn.

**Notes:**

1. *Perspective on Water Supply in Namibia*, Department of Water Affairs, Windhoek, February 1990.
2. Based on paper by Reginald Herbold Green, Ecology, poverty and sustainability: environmental portents and prospects in Rural Namibia. The Association of Agricultural Economists of Namibia, Inter-Conference Symposium, Swakopmund, 1990.
3. Goals for Children and Development in the 1990s.
4. *Hereroland Master Water Plan*, Interim Report, Hydroconsults Consulting Engineers, Windhoek, May 1972.
5. *A Master Water Plan for Hereroland*, Planning Division, Department of Water Affairs, SWA, Windhoek, February 1988.
6. Evans, P. (1990) *Review of Water Supply Situation and Associated Issues in Herero Region, Namibia*, 18-21 September 1990, UNICEF Namibia.
7. *A review of agriculture in Kaokoland with special reference to animal husbandry and veterinary extension*, by R.D.Paskin, BVSc. Directorate of Veterinary Services, Windhoek. March 1990.



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