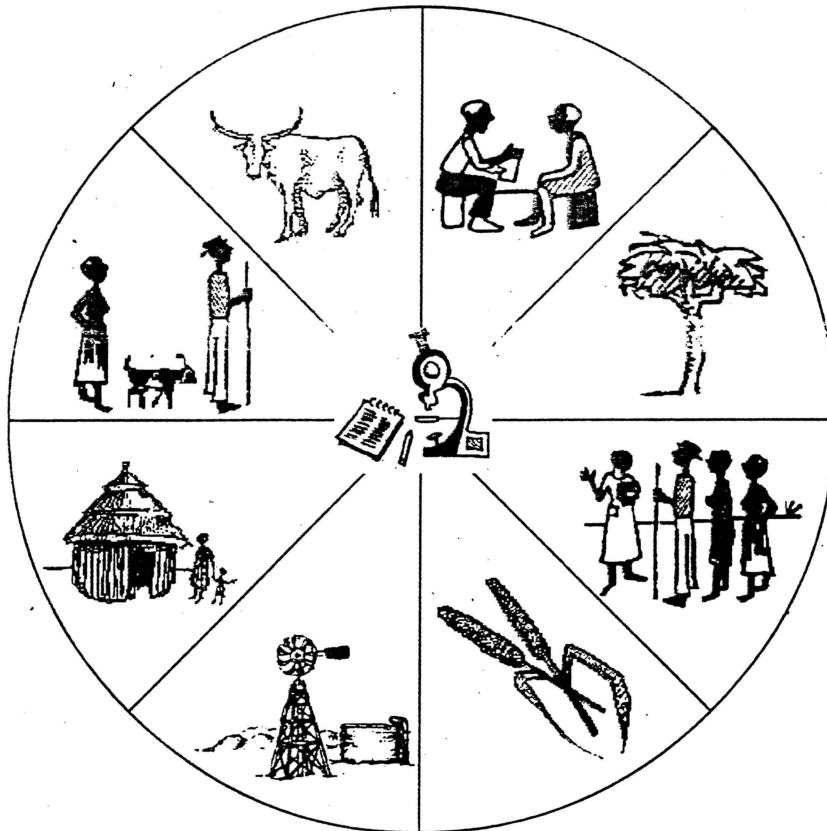


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**AN OVERVIEW OF THE ENVIRONMENTAL SITUATION IN FOUR
NORTHERN REGIONS: OHANGWENA, OMUSATI, OSHANA
AND OSHIKOTO**

1997

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OSHANA and OSHIKOTO**

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INTRODUCTION

This paper presents an overview of existing data for the former Ovamboland. Data range from available physical to socio-economic aspects in the region. The information has been extracted from secondary literature sources and presents an environmental picture of the region. An expanded annotated bibliography and references for the work done in the region has also been compiled.

PHYSICAL ASPECTS

GEOGRAPHICAL CHARACTERISTICS OF OVAMBO

The features of the Ovambo region are closely linked with and similar to the features of central southern Angola. Ovambo is located between the Angolan border in the north, the Tsumeb and Outjo districts in the south and west respectively and the Kavango region in the east.

The area today comprises four regions according to current political designations, namely; Ohangwena, Oshana, Omusati and Oshikoto. Oshakati is the main business centre for all regions.

Ovambo covers an area of 51 800 square kilometres. It is approximately 120km wide from north to south and stretches almost 425km from Ruacana in the West to the 18 degree longitude line in the east and constitutes 6.3% of the total land area of Namibia (A. Marsh, et al. 1991). It is estimated that about 36 500 square kilometres of Ovambo is suitable for crop cultivation and stock farming, 9 500 square kilometres for forest, 2 000 kilometres for irrigation (Commission of Enquiry into SWA Affairs, Ovambo, 1962). About 3 800 square kilometres is unsuitable for agricultural development due to salt pans, rocky and mountainous terrain (S. Chris, 1993).

The area is a broad plain of low relief averaging 1 100 meters above sea level. The area is transversed by shallow, ephemeral water courses, called oshanas, that originate several hundred kilometres north of the border in Angola and flow southward through Ovambo to the Etosha Pan. The drainage lines converge near lake Oponono. Oshanas are shallow, often vegetated, interconnected channels and pans with very low gradients in which water accumulates, moves or stands, depending on the amount of rain that falls in any one season.

- ◆ the velocity of water rarely exceeds 0.5 m/sec (A. Marsh and M. Seely, 1992).
- ◆ the banks of Oshanas are lined with trees and bushes.
- ◆ the efundja (flood) is infrequent and occurs only when good rain has fallen.

WATER

1. Ephemeral Water Sources

The Oshanas are flooded mainly by waters originating in the Cuvelai catchment area in Angola. Local downpours also contribute to water flow in the region, particularly in the eastern area that is not tied to the catchment area in Angola. Local runoff is relatively insignificant due to the sandy nature of the soils.

The flood in Oshanas is known as 'efundja' and usually occurs in February. The Oshanas may remain filled with water until June.

To utilize the runoff, dams have been excavated in the oshanas or in pans. These dams are open on one side to permit water flow.

The majority of excavation dams and pumped storage dams are located in the Cuvelai Basin. A number of dams have also been constructed in pans located in the areas west, east and south of the basin.

2. Groundwater Resources:

The centrally located Cuvelai drainage basin is underlain by a brine lake, the water of which is unsuitable for human and animal consumption. Shallow lenses of potable water occasionally overlie this brine lake and are tapped by the construction of hand dug open wells (eendungu). There are many drilled boreholes in Ovambo.

3. (a) Rain and Water in the Oshanas

Mean annual rainfall increases from west (less than 300mm) to east (more than 500) across Ovambo. About 99% of the annual rain falls in summer, from October to April. Rain usually falls during convective thunderstorms and can have disastrous consequences for crops. Most of the rain that falls in Namibia has its origin over the Indian Ocean. As a consequence, the air masses bringing rain to Namibia have lost much of their moisture by the time they reach this area. Many other components of global Weather patterns such as Intertropical Convergence Zones (ITCZ) also influence the amount of rainfall in Namibia, adding to its variability (S. Chris, 1993).

(b) Evaporation

Average potential evaporation in Ovambo is about 2 500mm per year and is greatest in summer before the main rainy season. Most rainwater is rapidly lost.

(c) Temperature

Mean monthly temperatures at Ondangwa range from 26°C in December to 17.5°C in July. Frost does not occur in this region. Mean monthly values of humidity at midday range from 50% in March to 17% in September according to Weather Bureau records. Winds in the Oshana area are not very strong most of the year.

SOIL, WATER AND VEGETATION IN THE OSHANA AREA

(a) soil

The entire oshana area is covered by sandstone that can be seen in the bottoms of wells, borrow pits and reservoirs. The soil is composed of sand and clay and has a tendency to form a hard layer despite its sandy nature. Experience suggests that this layer could act as a serious constraint to the yield of crops.

The soil has a very low water retention capacity. The Nitrogen content is low, while the pH is around neutral. In high-lying areas the calcium (Ca) content is low, especially in loose sands, but most soils in the oshanas are rich in calcium. Phosphorus (P) is low throughout the area (A.Jensen, 1990). The soil also has a deficiency of micro-nutrients such as manganese (Mn), iron (Fe) and zinc (Zn) (see table.1). In this area, an apparent total lack of molybdenum (Mo) may lead to high toxicity if nitrate fertilisers are used extensively (A.Jensen, 1990). The soil has very little potential for exploitation of valuable minerals - consisting of a combination of Kalahari sandstone overlain by a shallow layer of sand.

(b) Surface Water

The most active oshana is the Cuvelai which arises in the Sierra Encoco highlands of Angola, where mean annual rainfall exceeds 1000mm.

When there is heavy rainfall in Angola, the central Oshanas may flow strongly for several months, possibly even as far as the Etosha Pan. Strong local rainfall over the western or central oshanas may also cause water flow within the oshana system, sometimes moving in a northerly direction. The old channels for waterflow and ponds are now partially filled with sand and vegetation, having flowed only occasionally in this century. It is believed that under present climatic conditions, any flow would probably only occur during an exceptionally high rainfall event.

Oshana water flow and direct rainfall both contribute to shallow groundwater recharge.

In 35 years of monitoring there were:

- only three large floods recorded
- 19 years with variable floods
- 13 years when no floods occurred at all

The last major flood was in 1954 (A.Marsh and M.Seely, 1992) Since then, people have started building homesteads on the edge of oshanas. It is believed that if a major flood occurs in the future, there could be a catastrophe or great damage to farms and fields.

Fresh surface water is found in pans and oshanas, ponds provide high quality water until they evaporate.

(c) Groundwater

Groundwater in the Oshana area occurs in three relatively discrete compartments:

- a) a discontinuous perched aquifer (DPA)
- b) the main shallow aquifer (MSA)
- c) a saline deep aquifer (SDA)

In northern Ovambo, the (DPA) provides a limited amount of water at shallow depths. Conical hand-dug pits, *omifima*, allow access to this ephemeral water source. MSA water quality varies from drinkable to highly saline, and is often connected with deeper aquifer sources, while MSA fresh water is associated with groundwater highs (Road Master Plan, vol.1;2&3, 1991).

d) Vegetation

Main vegetation types are:

- (a) woodlands
- (b) the central drainage system with shrub savanna
- (c) the grasslands of southern Ovambo

A number of biomes and vegetation types are represented in Ovambo. Well developed Kalahari woodlands extend from Kavango into north eastern Ovambo; thornveld savanna extends from the south into the south east; *mopane* savanna dominates the vegetation of the north-central and western areas and the pro-Namib transition zone is evident in the extreme north west where there is a clear escarpment. The southern and central Cuvelai basin is dominated by seasonally flooded grasslands and palm savanna. The vegetation has been severely modified by man in the past century, with the rate of change having accelerated over the past two decades due to population pressure. The areas most affected correspond to the areas supporting the highest concentration of people, i.e. the central Cuvelai basin area. This lies within the palm tree, *mopane* and grassland habitats. Large areas of natural vegetation have been cleared for cultivation, and most of the trees in this and immediately adjacent regions have been cut for building and fencing materials, leading to severe deforestation. On the satellite photographs, the difference in vegetation on either side of the Angola/Namibia border illustrates the extent of the environmental degradation in Ovambo. A dozen invasive alien plants have been recorded from the area, mostly in association with roads and borrow pits. The most important of these are the *Datura* (thorn apple) and *Opuntia* (prickly pear) species; *Nicotiana glauca* (wild tobacco); and *Prosopis* species (mesquite tree).

WILDLIFE

Because of the high human population and heavy hunting pressure, few large mammals survive in the region. Small remnants of antelope population survive in the north east, and elephants move through the region seasonally.

The area supports a diverse but depressed avifauna of about 415 species, with about 280 species recorded from the Cuvelai system. Included are some 30 Red Data species, (rare, threatened, vulnerable) such as pelican, flamingo; Lappet-Faced Vulture; Bateleur; Grey Kestrel; Wattled and Blue Crane; Kori Bustard and Yellowbilled Oxpecker. In addition, 16 species of frogs, 98 reptiles and 94 small mammals have been recorded.

Fish are an important component of the wetland of Ovambo. Seventeen species have been recorded from the Cuvelai and since its linkage with Cunene River via a pipeline and canal, an additional 35 species have been recorded. The dominant species, and hence the most important as a source of food for people, are *Barbus* (barb/yellowish). *Clarias* (catfish) and *Oreochromis* (bream) species.

WATER INFRASTRUCTURE

The bulk water supply system in Ovambo started in 1959. Today, it consists of supplying water from the Cunene River, comprising canals, purification plants and pipelines. Taps and watering points make water available to the rural population. Besides this system, wells, boreholes, excavations and pumped water storage dams are found in the area.

In 1970, the canal was extended westwards bringing water from the Cunene River into the canal system. In 1975, a pipeline to transport purified water from Ogongo to Oshakati was constructed. Manholes, taps and cattle watering points were established along its length.

In the late 1970s and early 1980s, a tarred road was constructed between Ondangwa and Ruacana, disrupting the water flow in the Oshanas. Even though culverts were built, the road inhibited the normal flow.

Bulk Water Supply Network.

This involves importing water from the Cunene River at Ruacana or Calueque in Angola, through a system of canals and pipelines, and supplying potable water to central and eastern Ovambo.

Brief Description of Various Water Supply Components (for details consult Road Master Plan, Ovambo Vol. 1;2&3, 1991: Ministry of Transport, Works and Communication):

a) Cunene River - Olushandja:

Comprises three sections:

- pump stations and pipeline between the Cunene River at the Ruacana Falls and Olushandja,
- the pump stations and the pipeline between the purification work at the Ruacana falls and Ruacana Township, the Ruacana Airport and Olifa and
- the pump station, pipeline and canal from the Calueque Dam to Olushandja.

b) Olushandja - Okahao

Comprises:

- a purification plant which draws water from the Calueque - Olushandja canal,
- a pumpstation and
- a pipeline to Okahao via Eunda, Onesi, Tsandi, Onangola and Oikokola.

c) Olushandja - Ogongo:

Comprises:

- the concrete-lined canal from Olushandja to the Purification works at Ogongo via Mahenene, Ombalantu and Onakayale,
- water is supplied to livestock along the canal route and
- an old unlined earth canal adjacent to the concrete-lined canal which collects rainfall runoff between Ombalantu and Ogongo.

d) Ogongo - Okahao:

Provides:

- water from the purification works at Ogongo through a pipeline to Okahao and the settlements of Namundindi, Ohashiti and Epato route
- water is supplied to livestock at approximately two km intervals along the pipeline.

e) Ogongo - Oshakati:

comprises:

- a pump station at Ogongo and a pipeline from Ogongo to Oshakati via Oshikuku
- an unlined earth canal between Ogongo and Oshakati which collects rainfall runoff.

f) Oshakati - Ondangwa:

- consists of new bulk water pipeline between Oshakati and Ondangwa via Ongwediva

(g) Ondangwa - Oshivelo:

known as the South-East Pipeline, it comprises:

- a pumpstation at Ondangwa and
- a pipeline along the tarred road to Oshivelo. The pipeline ends about 60km before Oshivelo.
- Water is supplied en route to Onandjokwe, Onayena, Onyaanya, Ondjamba, Omuntele and Ambende as well as to a number of private consumers, stock watering points and the Rossing and Ferco Agricultural project.

h) Ondangwa - Oshikango:

Comprises:

- a major bulk water supply artery running from Ondangwa to Oshikango at the border between Namibia and Angola known as the Herringbone Network.

This network supplies water via branch lines to

Ondukutu, Oshigambo, Ongha, Eenhana, Endola, Onambutu, Ohangwena, Engela, Ongenga, Omungwelume, Oshandi and Odibo.

i) Water Supply Schemes Currently under Construction or Being Designed:

- Oshakati - Omakango pipeline
- Ogongo - Okalongo pipeline
- Okahao - Amwaanda via Okalili
- Uukwalondo - Onalukongo - Okalondo
- Ogongo - Okahao to Etope, Onaanda and Etsikilo
- Okatope - Okankolo

POWER SUPPLY:

The Ruacana Hydroelectric scheme supplies the region with electricity.

An analysis of samples of topsoil as well as subsoil taken in a field at Ondangwa confirms the value of Ovamboland as an agricultural area (Commission of Enquiry into SWA, Ovambo, 1962, Namibia National Archive).

Demography

It is difficult to establish the demography of Ovamboland in the 1880s accurately, on the basis of the written sources available.

Population in Ovamboland ca 1850 - 1900.

Population in 1000s

Polity/tribe

	1850	1860	1879	1885	1896	1901
Ndonga		8	15	20	20-22	
Uukwambi		10	15		15	
Ongandjera		10	10		7	
Uukwaluudhi		6	8		7	
Ombalantu						
Ombandja			15	20		
Evale				2.5		
Kafima				1.5		
Ehanda					5	
Nkhumbi	50					
<i>Total</i>	<i>50</i>		<i>120</i>	<i>98</i>		<i>129</i>

SOURCE: The History of Ovambo people by P.Hayes, 1990.

By the 16th century, the Ovambo people were living in what is now northern Namibia and southern Angola. The people speak Oshiwambo and the area in which they live is known as Ovambo. Ovamboland, as it was then called, fell outside the Police Zone declared by the Germans, and little attention was paid to the region during the first two decades of German administration. Due to labour demands in the south, many Ovambo-speaking people served primarily as labourers on commercial farms in the south.

Little infrastructural development took place and only rudimentary social services were provided. The region was proclaimed a 'homeland' following the recommendations of the notorious Odendaal Commission in 1964. The war that began in 1966, which escalated in the 1970s and early 1980s, shaped the pattern of both social and economic development throughout Ovamboland. Social dislocation arising from the war and movements of people resulted in profoundly altered household production patterns in the rural areas. This gave impetus to the growth of urban areas like Oshakati, Ondangwa, Eenhana and others. Much of the development did not reflect the economic or social needs but rather, military occupation (Road Master Plan, vol.2, 1992).

Traditionally the Ovawambo live in a house constructed from sticks. There are stalls, cuca shops and numerous shop complexes serving homesteads. Women are the central figure in the family. Home industries such as dressmaking, wood carving and the making of clay pots and plaited baskets provide an income to many.

Research suggests that the first agriculturalists would have occupied northern Namibia at least 2 000 years ago (P.Hayes, 1990). Ovambo-speaking agro-pastoralists probably were present in northern Namibia and southern Angola by the early 17th century.

By 1921, the population of Ovambo was estimated to be 90 000. (1.6 people /km) (P.Hayes, 1990). Seventy years later in 1991, the population had increased to 615 057 (11 people /km) (Household and Population Census, 1991).

SOCIAL ECONOMY

Any environmental-assessment in the Ovambo region will inevitably have to take into consideration prevailing demographic and socio-economic factors (A.Botelle, 1992). In this section an overview of the social economy of Ovambo is presented.

Settlement Patterns

The area is the most densely populated in the country. The mean population density of the entire region is estimated to be 12 person/km, but densities in the centre of the Cuvelai delta can be as high as 100 persons/km.

The rural population lives in scattered homesteads. The grouping of homesteads is known as 'omukunda', a village. The dispersed settlement patterns that prevail in the region represents a constraint to the sustainable use of natural resources such as trees

Traditional Authority

The Ovambo people are divided into seven principal ethnic sub-groups; the Kwanyama, Ndonga, Ngandjera, Kwambi, Kwaluudhi and Kolonkadhi.

The Kwanyama sub-group lives in areas on both sides of the Namibia/Angola border. Movements to and fro across the border are common for both people and livestock. A border fence is now planned which will restrict or channel these movements. For development purposes, Ovambo people can be considered to be culturally homogeneous.

Each area is ruled by a chief, assisted by a number of sub-chiefs and headmen. A king rules Ndonga, Ngandjera, and Kwaluudhi. In pre-colonial times the powers of the chiefs were absolute and their influence extended to virtually every sphere of social and economic life. Chiefs and headmen do still exercise influence in Ovambo, not least in their control over land allocation. They also preside over 'tribal courts', where they can impose fines for various misdemeanours.

The System of Land Tenure

Rights to use arable land are obtained by the head of the household making payments to the headman or chief. When the head of a household dies there is no automatic right of inheritance and continued occupation normally depends on further payment. In Ovambo a woman generally had no rights to land and could be compelled to relinquish land once her husband had died. Today, she has recourse to the law. As pressure for arable land increases, prices paid for land are escalating, reflecting market value. Prices for arable land (agricultural land) and land near towns are high. The payments are appropriated by chiefs and headmen. The legal standing for traditional authority structures, and their control over land tenure, will be important for any environmental conservation programme.

At present there is a tendency for urbanisation in the region, but the majority of the population still resides in the rural areas. The overall agricultural production and availability of resources will in turn influence emigration rates from the region.

Culture

Within this region people respect their cultural norms as is the case elsewhere in Africa and all over the world. In the past, Ovambo people were never caught unawares by natural events like droughts. They made use of signs within their immediate environment. Some of the natural signs used to predict rain and a good harvest season are as follows:

1. If fruit-bearing tree-species like *bechamia* (omuve) and omwoongo bear many fruits, they believe that they can expect good rainfall and a good harvest that year.
2. If non-fruit bearing trees like the *mopane*, the most common species in Ovamboland, have a great number of (omakoti) mopane seed pods which have not been eaten, this implies heavy rainfall with a big flow so that the fallen seed pods will be carried away by the water.

SOCIAL ASPECTS

In this section, an overview of social organisation is presented. Key subjects are:

Historical background of Ovamboland;

Population demography;

Land tenure;

Agricultural practices;

Settlement;

Livestock and

Customs and labour composition.

Although some of the data are quite old it has been used to try to give the past picture of the region. The information used in this section was derived from the results of a socio-economic survey conducted in a number of selected areas of Ovambo, and from existing secondary sources. Thus, the different sources prove inconsistent due to the period in which the surveys were conducted. The section ends with case studies from several selected areas of Ovamboland

History of Ovambo

In about 1550, Ovawambo people moved South from the great lakes in East Africa and settled between the Kunene and Kavango Rivers in the north of Namibia (P.Hayes, 1990). The Ovambo are divided into eight tribal groups: Kwanyama, Ndonga, Kwambi, Ngandjera, Mbalantu, Kwaluudhi, Nkolonkandhi and Eunda. The largest tribe is the Kwanyama.

By the 1880s, Ovambo societies on the Cuvelai floodplain were organised into different kingships and their policies were very different in social character.

In 1884, Ovamboland was nominally divided between Portuguese and German colonial territory, but not occupied until 1915 (P.Hayes, 1990).

The rinderpest epidemic of 1897 and famine in 1915 accentuated processes of internal socio-economic change already underway since the involvement of the political elite in long-distance trade.

In 1915 Portuguese forces defeated the Kwanyama and occupied northern Ovamboland. South African officials occupied southern Ovamboland after the conquest of the German army in SWA.

Ondjala Yekomba: the Famine that Swept the Land.

This was brought about by war between the Portuguese and the Kwanyama. Kwanyama homesteads and the King's place (ombala) were burned down and fields were destroyed. People fled south where the Ndongas rescued them by giving them melons to eat. A great social breakdown was experienced during this extreme famine.

3. They also make use of animals like goats and cattle. They believe if the new born babies of these animals are mostly female, this implies what they term a "female year", accompanied by heavier rainfall with powerful thunderstorms and storms. The same is true for human beings.

Population:

Estimated Urban Populations in 1990.

CENTRE	POPULATION
Oshakati/Ongwediva	65 000
Ondangwa/Oluno	15 000
Oniipa	7 000
Omafo/Engela	4 000
Ohangwena	3 500
Ruacana	3 500
Anamulenge	3 000
Okongo	3 000
Oshigambo	3 000
Eenhana	3 000
Okahao	3 000
Ombalantu	2 000
Ongha	2 000
Oshikuku	2 000
Elim	1 500
Okalongo	1 500
Omungwelume	1 500
Onayena	1 500
Tsandi	1 500
Okankolo	1 500
Onesi	1000
Onaanda	1000
Oshivelo	1000
TOTAL	131 000

Projected Population Growth

YEAR	POPULATION
1991	615 000
1995	692 000
2000	802 000
2005	930 000
2010	1 078 000
2015	1 250 000
2020	1 449 000

This data is only for the urban and peri-urban centers, villages excluded.

Social and Economic Stratification

A significant determinant of rural wealth in Ovambo is the extent of inputs from the people working elsewhere. Income variations lie more in the success of family members in securing employment elsewhere and the extent of their links with home and with differences in agricultural performance between households. There are marked income inequalities. In a UNICEF survey, the bottom 40% of the population earned 5% of the income while the top 20% earned 67% of the income.

Occupational structures

Despite low returns from agriculture, farming remains the dominant economic activity of the majority of households in Ovambo. The UNICEF survey of households in Onyaanya, Engela and Tsandi found that 62% of all household heads gave farming as their main occupation.

The limited resource base and development of the region mean that formal employment opportunities in Ovambo exist only in the public services and the small commercial sectors in towns.

ORMP's rural household survey found that 40% of the employed people were labourers, 15% teachers, 10% were in the army, and 10% were skilled technical or professional workers. The remainder was in the police or were clerical workers, sales persons or business people (National Planning Commission, 1991).

Wealth is often measured in terms of the number of cattle one owns.

Income Structures

Rural households in Ovambo have developed multiple income strategies in order to minimise the risks of an uncertain climate and the problems of a declining physical resource base.

Income from agriculture is supplemented by family members working in nearby towns. The shift towards reliance on migrant transfers, however, has been at the expense of arable agriculture.

The UNICEF survey of three rural areas in Ovambo computed annual household incomes of between N\$900 and N\$1900 (mean N\$1 540) - a per capita income of N\$255 or roughly U\$100.

Occupational composition of the Labour Force in Ovambo

Occupation	Number	Percent
Professional / Technical	5 815	41.6
Administrative / Managerial	37	0.3
Clerical	741	5.3
Sales	424	3.0
Services	1 397	10.0
Production / Construction	387	2.8
Transport	371	2.6
Agriculture/ Nature Conservation	72	0.5
General Workers	16 140	11.5
Military	3 140	22.4
TOTAL:	28 524	100

Population per region

Region number	Population
Omusati	189 919
Oshana	134 884
Ohangwena	179 634
Oshikoto	128 745

Based on the 1991 Population and Housing Census, Central Statistic Office.

Town	Pop. NO.
Oshakati	2 1603
Ondangwa	7 926
Ongwediva	6 197

Regional Pop. density (NO. of people /sqkm)

Region	Pop. NO.
Oshikoto	4.9
Omusati	15
Ohangwena	17
Oshana	22

Rural Settlement:

About 80% of the population of Ovambo lives in dispersed rural settlements. Most of the population lives on individual farms of 2 to 5 hectares. Settlement patterns are fairly dense (up to 100 people / kms).

Agriculture and people's livelihood

The land use system is an agrosilvopastoral one, where crops, trees and livestock are used. Omahangu is the major food source and product in the region. Other crops include:

- sorghum
- beans
- pumpkin, melons etc.

The livestock component consists of cattle, donkeys, goats and a few sheep.

The tree component consists of a diverse mix of local, multipurpose species, including *mopane*, *marula*, palms, figs and *baobabs*.

Most farms include an area for the homestead fields, livestock kraals, and an area with *mopane* trees or scrub.

Ploughing starts in November/December using draught animals (oxen and donkeys) as well as cultivate by hands.

In 1978/79, 110 000 hectares were used as mahangu fields in Ovambo.

Under normal conditions, mahangu fields yield about 250 - 400 kg/ha and about 70 - 1000 kg/ha in years of below average rainfall (MIN. Agriculture, 1992).

Gathering and storage of wild plant resources remain important practices especially during drought. These also form part of a rich variation of diet.

Wild fruit trees like

- ◆ omive (*Berchemia discolor*),
- ◆ Omulunga (*Hyphaene petersiana*)
- ◆ Omwandi (*Diospyros mespiliformis*)
- ◆ Omwoongo (*Sclerocarya birrea*)
- ◆ Omikwiyu (*Ficus sycamorus*)

provide stable sources of food.

Omunghete (*Richinodendron rautenii*) have edible kernels which can be used to provide cooking oil.

Source: Directorate of Veterinary Services

Livestock Census, December 1995 Ovambo

	Number
Cattle	423 566
Goat	230 000
Donkeys	120 000
Horses	13 635
Pigs	2 188
Poultry	49 981
Ostriches	98
Sheep	19 003

Place: National Archive

Source: Commission of Enquiry into SWA Affairs, 1962

Ovamboland:

Description:

The area is extremely flat, without a single hill or mountain. There are no perennial rivers or streams in the interior.

The central area is characterised by a number of dry water - courses or 'Oshanas'. Presence of drinking water for man and stock or beast in the area was largely due to floodwater of the Cuvelai as well as local floods. Water is also easily obtainable from wells.

Ovamboland was formerly a densely wooded region, but today is not the case. Some area are entirely deforested.

Livestock numbers by Veterinary Districts

District: OVAMBO

Year	1990	91	92	93	94
Cattle	350 000	350 000	445 000	254 000	334 000
Goats	360 000	360 000	348 000	176 000	172 000
Pigs	2 000	2 000	2 000	8 000	2 000
Horses	4 000	4 000	4 000	14 000	14 000
Donkeys	120 000	120 000	9 000	-	12 000
Poultry	20 000	20 000	20 000	30 000	50 000

Livestock	Year
	1945/46
Cattle	250 000
Goats	120 000
Donkeys	6 000

The Droughts of the 1970s and 1980s caused a progressive decline in the regional cattle herd. In 1960, the human population in Ovambo was 230 000. In 1991, the number increased to 615 000 (Households and Population Census, 1991). The ratio of cattle to people decreased to 1.7:1 (1970) to 0.88:1 (1980) to 0.79:1 in 1992 (Central Statistics Office, Veterinary Service, 1992).

POINT OF DEPARTURE.

Ovambo falls within the region considered highly vulnerable to desertification, particularly in the western parts. This threat is compounded by the large and growing population, the large numbers of domestic stock and the high rate of deforestation. At present, probably the only factor that has prevented a very serious degradation of the environment in the Ovambo region is the Cuvelai Delta, which regenerates the region in most areas. If the flow of this system was impeded, one could expect a fast eastward shift of desert conditions and marked reduction in the productivity of the environment with a concurrent collapse in the ability of the area to support man and animals.

The water of the Cuvelai is the life-blood of Ovambo. It is essential for recharging the fresh-water aquifers on which a large proportion of the population and the stock depend.

CASE STUDY 1.

SSD Resource Library:

Onaanda Community based road construction project, western Ovambo region: A base-line socio-economic survey by A. Botelle, 1992

*12 000 - 15 000 inhabitants
water sources in wet season:
-oshanas and hand dug wells

Water sources in dry season:
-hand dug wells
-boreholes
-communal taps

- Average of 17 people per km in Onaanda district ; average number of people per household is 8.8.
- 97% of all migrant workers lives outside Ovambo region.
- more than 80% of all migrants are male.
- 60% of all households have at least one absent member.
- 97% of households own arable land, averaging 1.75 hectares per household.
- More than 955 of households own livestock, small stock and poultry, (higher than other areas of rural Ovambo).
- 80% of households use firewood for cooking.

Physical environment:

Since the 1960s, most of the indigenous forest has been cleared for arable land, fuel, construction of kraals & fencing of homesteads, leaving only a few isolated species of endemic flora such as *makalani* palms, drought resistant secondary growth, such as *mopani* shrubs and "ohuhama" thorn trees. This *mopani* and thorn shrub is disappearing rapidly from the area due to continued exploitation.

Mopani shrub has a uniquely beneficial property when compared to other vegetation found in the area, which is its ability to bear new leaves toward the end of the dry season when all other vegetation has died or has been consumed by grazing ruminants (from September each year).

*Abandoned, saline reservoir in Onaanda.

*There is a reservoir at Ongatudhiya maintained by locals -- supplying H₂O during the dry season.

Ovambo: Socio - economic aspects:

1. Returnees situation;

- about 45 000 Namibians repatriated in 1989
- 80% of the returnees have been repatriated in Ovamboland.
- Impact ?
- less than 10% returnees have been able to find work.

(Source: The Integrated of Returned exiles, Former Combatants and other War Affected Namibians. Rosemary Preston, Colette Solomon, Colin Gleinchman, etal March 1993, ISBN 0-947433-27-9

Problems facing returnees:

- lack of community-based structures that suppose to regulate the use of existing resources.
- .lack of overall land use plan for region which can accommodate the interest of both small and large farmers.
- expansion of human settlements
- expropriation of land for conservation purposes
- establishment of commercial ranches
- fencing off of land for private purposes
- extensive enclosures of the land.

During, and for some time after, the rainy season, water is found in the small pans (eendobe), and large pans (omakango) that dot the area.

(Source: The Enclosure of Rangelands in the Eastern Oshikoto Region of Namibia. Ben Fuller and Sakaria Nghikembwa with Tani Forbes Irving SSD Report NO. 24, Jan 96.)

CASE STUDY 2,

Focus on Uukwaluudhi: Omusati Region

- Lies on the western edge of the Cuvelai flood plain
- characterised by partially wooded grasslands, settled and farmed areas
- the vegetation is open palm-marula savannah broken by degraded mopane woods and shrub land. These features are established on sandy soils, derived from Kalahari sands.
- the area has seasonally variable water table prone to salinity.
- bordering Kunene district is slightly elevated sand plain, broken by rough terrain and rocky intrusions.
- characterised by degraded wooded savannah dominated by *Colophospermum mopane* (omusati)
- no shallow water table and very little seasonal surface water - sparsely populated.
- a series of boreholes have been sunk.

Ovambo region is semi-arid with variable rainfall. - average of around 500mm in the east to around 300mm in the west.

- the Uukwaluudhi area is subjected to an east-west rainfall gradient and experiences great rainfall variability.
- rainy season : from October to April tending to fall between December and March.
- Tsandi is the Centre for the region.

Rainfall declined sharply from mid 1970s and 1980s resulting in about 30 years of low rainfall.

- from 1970s rainfall was observed as extremely variable.
- the area was hit by 1992/93 drought
- during the last 15 years, there have been hardships involving low crop yields and extensive death of livestock.
- during this period, grazing and water availability have changed.
- most people own goats and the minority own large numbers of cattle.
- people/farmers have no access to outside grazing beyond their boundaries.

Uukwaluudhi provides a source of fuelwood for commercial extractors for neighbouring areas.

- *Mopane* trees are most preferred build materials for homesteads.
- omuve (*Berchenica discolor*) and omwandi are general protected and not felled.
- Omulunga (palms) are used for oil and alcoholic beverages.

Rangeland degradation:

- caused by combination of :
- high cattle numbers
- poor rainfall
- poor positioning and management

Livestock Numbers:

FAO/IFAD data - , about 379,542 with an increase in 1962.

Veterinary service recorded : 485,520 cattle in 1992 for the whole Ovambo region.

- general fluctuation due to droughts.
- these numbers are uncertain.
- current numbers of cattle estimated by DVS to be as low as 300,000.
- there is an influx of cattle from Angola.

According to FAO/IFAD (1990) statistics for Ovamboland

- about 515 of households own no cattle
- 4% own more than 50
- 16% owning more than 10 cattle.
- more people own goats, than cattle.
- 43% households own none (same source).
- More and more people tend to move towards drought resistant stock like donkeys, but these animals are heavy grazers.

Cattle mobility and Migration: Uukwaluudhi:

- transhumance not practised in the past.
- pasture scarcity has forced people to practise it since 1951, due to increasing human settlement.
- cattle posts away from settlements.

Population growth: Uukwaluudhi:

- is the least populated region in the northern part.
- subjected to immigration from neighbouring areas, like Uukwambi, Ongandjera and Ombalantu.

Land and Resource Rights:

- entrusted to headman, King and chiefs;
- leadership : village headmen:
- responsible for: resource management like:
 - i) grazing regulations
 - ii) protection of trees
 - iii) waterpoints

Water Development:

- Generally in Ovamboland, areas depend upon surface water accumulating from rainfall, trapped in earth dams from the Oshanas seasonal floods and in shallow hand dug wells tapping the main shallow aquifer.
- this source is supplemented now by established dams facilities
- due to road development, the Oshana system water flow and recharge of the aquifer has been disturbed. Vegetation along the boundaries of these infrastructures is subjected to overgrazing.
- the pipeline system pumping purified water from Ogongo to Oshakati was developed in the 1970s and supplies water to small towns and watering points for cattle on the southern Ovambo grasslands.
- this system supplies areas further east, such as the eastern woodlands at Eenhana.

(Extracted from: The Economic Impact of Desertification in Northern Communal Areas: Uukwaluudhi
Julian Quan, David Barton and Czech Conroy, Social Science Group, Natural Resources Institute, Kent; United Kingdom.)

Deforestation in Ovamboland

Building a traditional homestead requires about 4 000 poles; approximately 1000 trees must be cut down. A typical farm will need about 20 000 to 30 000 poles for fencing and 4 000 to 6 000 trees need to be cut, while a fence that uses wires and sticks and poles, will require about 2 000 to 3 000 trees.

Omusati and Ohama trees have decreased during living memory whereas rare wild fruit trees, such as omigongo, omiye and omilunga (*marula*, bird plum and *makalani* palm) remained the same or may even have increased.

In 1957, the area was green with many trees and fruit trees, and during this time there was more rain. There were large numbers of cattle and enough grass for all the cattle. The human population has grown now, causing the number of trees to decrease as everyone had traditional houses during those day, Today, Ombalantu is a desert.

The 1991 National Census showed that the population doubles approximately every 25 years. Because of this, many homesteads need to be built, meaning that more and more trees have to be cut. As a result, the areas around many settlements in northern Namibia have lost most of their trees. The demand for trees is increasing while the trees are decreasing drastically.

Another important point is that it is not only local people who are causing deforestation near their settlements but businessmen from major towns such as Oshakati are making money from cutting and selling timber that they get from rural areas. "Tree cutting has become a business".

Quote: "Due to the lack of knowledge, we did not know how important trees were, so we just cut them unknowingly. The colonial regime taught us to take trees for granted, that trees are not important, that they do not belong to us".

Nowadays, people have to cut living trees for firewood, as dead wood is becoming scarce.

The growing human population has also reduced the number of wild animals, which used to be very common but are rare to absent now.

From 1980, the trees started disappearing fast. There was no law enforcement and people did as they wanted. They even used to burn down trees. At this time you couldn't go to the law and even headmen couldn't say anything. From 1990, with Independence, the problem became more serious and even more trees were cut.

Limitations of this paper:

As a report, it has the limitation that not all information has been analysed in depth. A broad approach is needed that can be refined over time, as more information becomes available, or if more detailed studies of particular areas are undertaken.

What can be done:

- Identification and mapping of environmentally sensitive areas in the entire Ovamboland.
- Assess the tourism potential for the region
- Investigate socio-economic development:
- Interviews with selected tribal chiefs, church leaders and government regional representatives to assess their views on matters related to the environment and future economic aspirations.
- Proper assessment on rangeland degradation
- Lack of representative rainfall data may be resolved by the establishment of many sub-weatherstations in the entire region.
- Investigation of the effect on the environment of the closeness of water-points along the main road from Namutoni to Oshikango
- The evaluation of economic values for some fruit-bearing tree species in Ovamboland. This will help people to know how valuable those trees are and contribute to curb deforestation if proper analysis is done.

APPENDIX A:

Exchangeable indications	Topsoil	Subsoil
m.e. % Na	0.213	0.239
m.e. % K	0.210	0.323
m.e. % Ca	1.52	0.98
m.e. % Mg	1.36	2.20
Water-soluble Salts:		
	Topsoil	Subsoil
m.e % Na	0.0174	37.7
m.e % Ca	0.044	1.37
m.e % K	0.0769	0.0615
m.e % Mg	0.55	1.21
m.e % CaCO ₃	traces	1.73
m.e % bicarbonate	traces	traces
m.e % Chlorides	0.038	26.65

Mechanical analysis	Topsoil	Subsoil
Very coarse sand	2.07	9.36
Course sand	28.92	22.53
Medium sand	26.54	26.54
Fine and very fine sand	37.46	28.65
Silt	2.91	4.17
Clay	2.10	8.95

Water permeability in cm.per hour.

Surface layer: 95.7cm

Subsurface layer: Nil (0)

The permeability of loam is 17.35cm/hour. If the permeability of a soil is less than 0.1cm. an hour, then such soil becomes unsuitable for irrigation (Commission of Enquiry into SWA Affairs, Ovambo, 1962, Namibia National Archive).

Some recommendations made by the above enquiry made provision for: the expansion of stock farming in Ovamboland.

However, irrigation with water from the Kunene was not recommended because of the high cost involved and the potential salinity of the soil caused by irrigation.

This Commission presumed that Ovamboland could be developed a sound agricultural economy.

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APPENDIX B:

RAINFALL AT ONDANGWA FROM 1906 TO 1940 -41:

Year	Rain in inches
1906-07	17.5
1907-08	8,2
1908-09	37
1909-10	20
1910-11	10
1911-12	25
1912-13	13
1913-14	14,8
1914-15	12,3
1915-16	11.5
1916-17	28.0
1917-18	19.5
1918-19	11.5
1919-20	13.7
1920-21	31.4
1921-22	7.0
1922-23	11.0
1923-24	19.0
1924-25	31.2
1925-26	14.0
1926-27	27.0
1927-28	14.7
1928-29	5.5
1929-30	6.5
1930-31	19.5
1931-32	11.0
1932-33	9.7
1933-34	36.0
1934-35	16.0
1935-36	20.0
1936-37	32.0
1937-38	27.0
1938-39	19.0
1939-40	21.0
1940-41	15.5

(SOURCE: NAN A450,C.H.L
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