

D.R.F.N.	: <i>Reports</i>
REFERENCE:	: <i>100264</i>
LIBRARY	: <i>WVK</i>

**STOCKHOLM UNIVERSITY
GEOLOGY**

EXCURSION

SUGE 2001

Land degradation

-natural and human induced

Hoanib River Catchment

By:

Mikael Bergholtz

Magdalena Piekarczywska

Johanna Waernquist

Yvette Vignuolo

Helena Öberg

Contents

Introduction	2
Hoanib River catchment	2
Land degradation	4
Erosion	4
Method – Rapid Veld Assessment (RVA)	5
Results – Natural induced land degradation	6
Heavy rains	6
Floods	7
Crusts	7
Results - Human induced land degradation	8
Overgrazing	8
<i>Termite mounds</i>	10
Deforestation	11
Irrigation	11
<i>Salinization</i>	11
<i>Waterlogging</i>	12
Overuse	12
Pollution	12
Discussion	13
Conclusions	15
References	

Introduction

As part of the course "water resources and water conflicts" a two week long excursion was held in Namibia between 15th to 29th November 2001. Due to its arid to semiarid climate and increasing population Namibia is an ideal location for studies regarding water resources and potential conflicts or competition between various users. The excursion was set to the northwestern part of Namibia, in the Hoanib River catchment (fig. 1). Four topics, all dealing with water resources and land management issues from different angles, were investigated and the aim during the excursion was to gather information and insights relating to the topics. This report addresses the topic: relationship between water and land degradation; natural and human induced. It describes how the availability, amount and quality of ground and surface water affect the soil and vegetation. Examples of both natural and human causes for changes in soil property and vegetation cover, land degradation, will be presented. The focus point of this report however lies on land degradation linked to human activities. During our visit in the Hoanib River catchment we did a minor field study using a method to assess the vegetation cover and it's grazing potential.

Hoanib River catchment

The Hoanib River catchment is one of twelve major ephemeral river catchments located in western and north-western Namibia and has an area of 17 200 km². All twelve of these rivers flow from the east to the west, ending in the Atlantic Ocean or in the Namib Desert. The Hoanib River originates in the western edge of Etosha National Park and runs its length of 270 km through private and communal farming areas and crosses the protected Skeleton Coast Park near its mouth. Communal farm lands makes up 91% of the catchment area, private farms 3% and 6% is protected in both the Etosha National Park and Skeleton Coast Park (Jacobson *et al.*, 1995). Many smaller rivers drain into the Hoanib River creating a network of waterflow in the whole area (fig. 1). Springs, wetlands and a large floodplain near the coast provide essential resources for a rich flora and fauna as well as for people, agriculture and tourism. Many useful plants for livestock, people and wildlife grow in and around the Hoanib River. Common riparian vegetation in the area is for example mopane, acacias and ana trees. The rich fauna includes elephant and rhino, which have enabled tourism to grow in the catchment.

Land degradation

Land degradation is defined as a reduction in the soil's capacity to produce in terms of quantity, quality, goods, and services. Several other concepts are important to this definition: sustainability or the ability of the land to continue to produce indefinitely, resilience or that quality of a resource that makes it sustainable or resistant to degradation, also the carrying capacity, or the number of people and animals the land can normally support without being significantly stressed. Landscapes throughout the world undergo transformation processes that include some form of natural degradation, but these processes are usually compensated for and counterbalanced by nature's inherent recovery ability. Net degradation occurs whenever the degradation processes significantly exceed nature's restorative capacity (*Land Use-Land Degradation and Desertification*, CIESIN). In other words, land degradation is a natural process that can be enhanced or dampened by human intervention (Jacobson *et al.*, 1995).

Erosion

Erosion is defined as the loss of topsoil e.g. by wind or water. This topsoil, that is washed away by water or blown off by wind, is normally very fertile. Soil erosion leaves the ground less nutritious, making it more difficult for plants and crops to grow. Soil erosion is a natural process that has shaped the surface of the earth over millions of years. The agents of wind and water have sculpted rocks and soil into a variety of shapes. In the western part of Namibia these effects can be clearly seen everywhere in the landscape. One example, where this can be seen, is the Khowarib Schlucht. However, when the natural process of soil erosion is excessive or goes unmanaged, it can lead to severe land degradation. It becomes a threat when there is a marked and irreversible loss of soil. The loss of topsoil is a serious economic problem all over the world. Not only are people, but also domestic stock is linked to soil erosion. Bad farming practices can lead to trampling, overgrazing and other forms of land degradation which speed up the loss of topsoil. Increased runoff and erosion means less recharge, less available water and poorer soil. Vegetation, even dry perennial grass tufts, encourages water to infiltrate into the soil, aiding groundwater recharge (*Hoanib River catchment Study*, DRFN).

Results - Natural induced land degradation

Heavy rains

The rains in semiarid climates are very intensive and erosive and they vary in time and place (fig. 3). Splash erosion is caused directly from the raindrops own gravity and run-off erosion forms both as sheetflow or is canalised into rills. Rapid and heavy runoff after storms causes erosion of stream banks or streambeds. Overland flow across a slope may occur as sheetflow, which is a thin layer of water where erosion takes place across an entire plain, exposing roots of the trees and shrubs. Sheetflow seldom attains depths of more than a few millimetres and soon breaks up into concentration of flow. This concentrated flow creates small channels a few centimetres deep called rills. As the flow in the rills deepens small valleys up to a few meters deep known as gullies is created. Water flows in the gully only after heavy rains. Gullies form commonly where a surface is bare of vegetation, mostly in arid climates. If the process proceeds badlands can form (Bradshaw & Weaver, 1993). We observed this type of eroded land in Warmquelle where the fluvial processes have eroded all the vegetation cover and formed deep gullies.

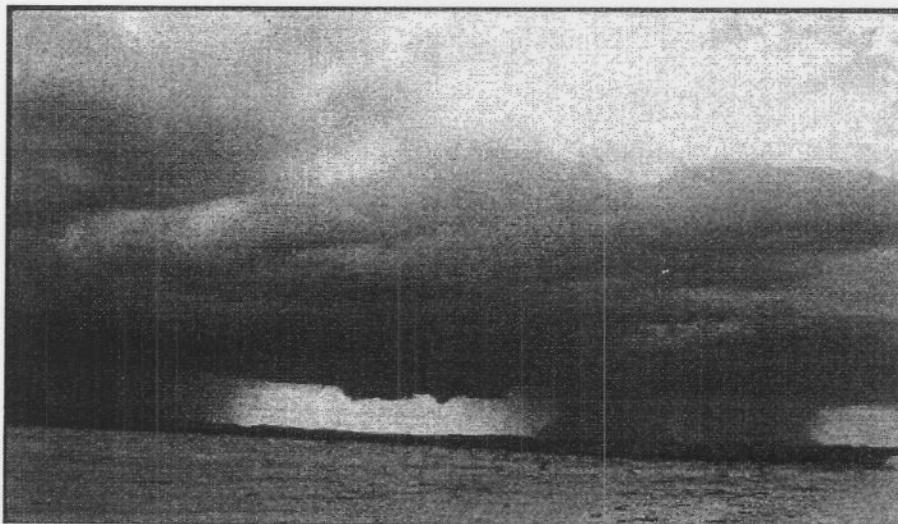


fig. 3 Heavy rain

Results - Human induced land degradation

Overgrazing

Livestock can destroy useful plants by overgrazing. If the grazing pressure is too heavy vegetation do not have chance to recover. In addition, compaction of the soil by livestock movement occurs. The only plants that will grow under these conditions are the more pioneer types and soon only non-nutritious and unpalatable species will remain (DRFN No.1). Overgrazing leads to removal of plants that protect the soil from heavy rainfall and wind erosion. Vegetation protects the soil because its roots stabilise the soil and even its leaves shade the soil and keep it moist. Overgrazing is a serious problem, especially in years of low precipitation when the vegetation is exposed to heavy grazing pressure by domestic stock that exceed the carrying capacity of the land (DRFN No.5) (fig. 4).

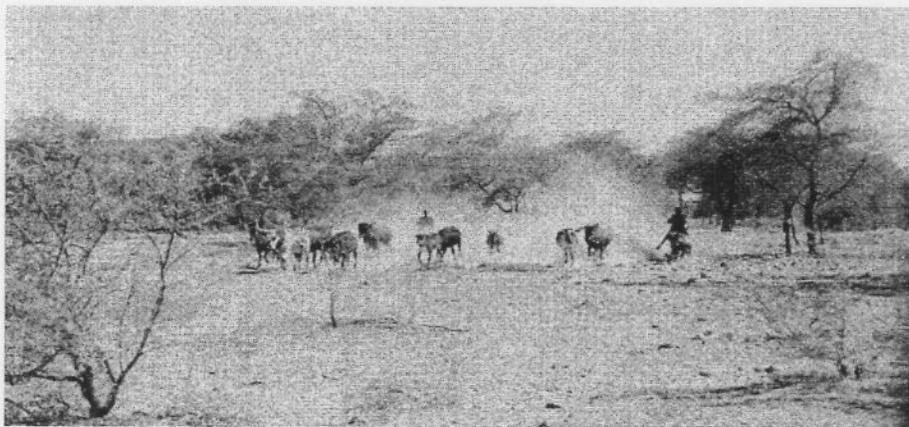


fig. 4 Domestic stock

Domestic stocks require water every day and have to return daily to a water point. They are unable to move great distances between grazing areas and water source. If livestock and grazing areas around boreholes are not managed properly there is negative effect on the land. The permanent human settlements with the available numbers of water points, springs and boreholes limit the traditional practice of livestock movements between different water sources and grazing areas. Concentration of livestock at the water source creates overgrazing and land degradation around the waterpoints, which is referred to as a sacrifice zone (0-1,5 km around the water source) (fig.5). During the wet season, when water is available in the veld it

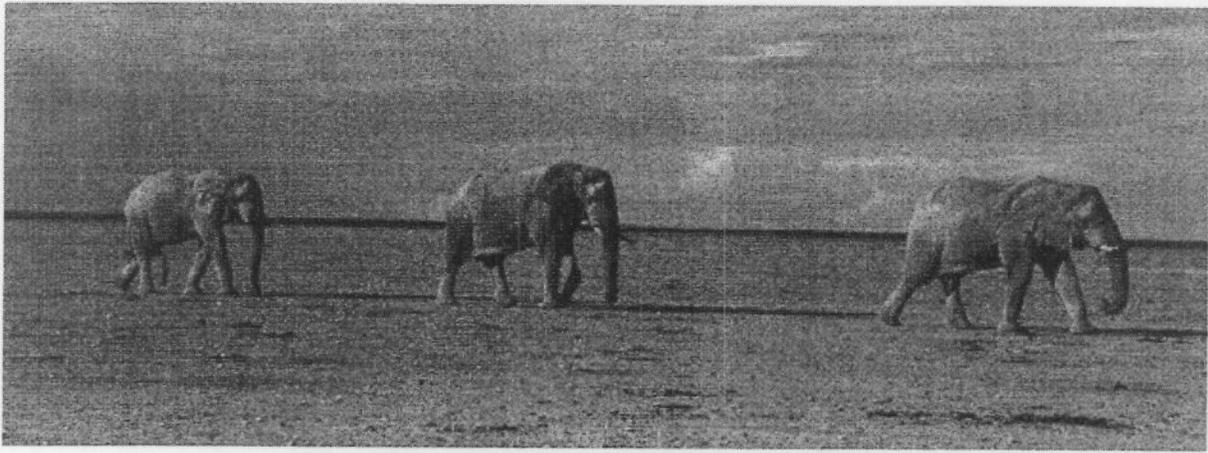


fig.6 Trampling elephants

Termite mounds

Micro faunas which includes the termite and ant populations play an important role in the decomposition of dead plant material. These activities of decomposition will increase the fertility of the soil and these microfaunas are not common in areas with reduced plant material caused by over utilisation by domestic animals (Hoppe-Speer, Report). During our excursion we have seen many examples of termite mounds in the fertile soils and no termite mounds on the eroded, bare soils (fig. 7).

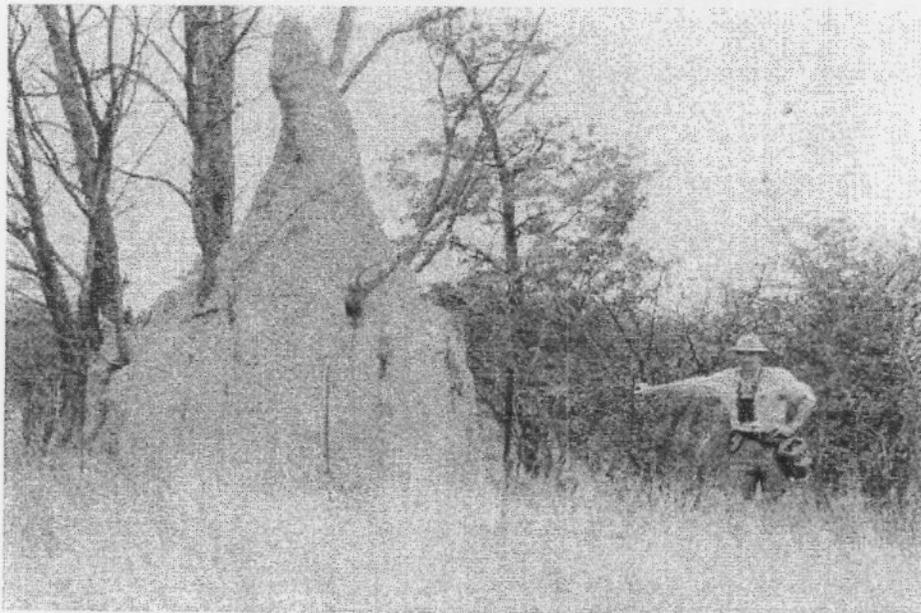


fig. 7 Termite mound

Waterlogging

Irrigation may also rise the water table. When all the pores of the soil are filled with water, the soil is waterlogged. Waterlogging can affect one or more of the soils horizons. The water table may rise to the extent that the plant roots are in a saline solution. Normal biological processes are then reversed. Instead of drawing water from the soil, plant roots may loose water to the solution, causing the desiccation and death of the crop (Bradshaw & Weaver, 1993).

Overuse

Apart from keeping people and animals from getting enough water, overuse of groundwater from a well or spring can lead to a lowering of the groundwater table, which in turn can cause different types of land degradation. A lowering of the water table in a borehole situated close to the sea or a saltwater aquifer can lead to saltwater intrusion in the well as well as in the soil around it. Already a lowering of the water table is in itself a form of land degradation. Trees that used to reach down to the groundwater table may after a lowering of the groundwater table die from lack of water. This leads to further degradation. When there is no covering vegetation on the soil it becomes more easily eroded by wind and runoff water. Diminishing vegetation also means less organic matter in the soil.

Pollution

Increasing pollution of land, ground and surface waters is a common problem in developing countries, partly due to increasing population and poor management. Groundwater quality problems arise from naturally occurring problems related to groundwater, soil chemistry and the dissolution of minerals. Problems related to inadequately controlled abstraction, including intrusion of saline or polluted water, discharges from human pollution-generating activities and leachates from urban industrial and agricultural activities. Inadequate well construction allows pollution to penetrate to deeper groundwater layers than should be the case for natural vertical transport (Falkenmark, M. 2000). Pollution by fertilisers, pesticides and herbicides that run off farmlands, effluent from industrial processes and sewage leaks in urban areas, can severely threaten water quality. Faeces and urine of livestock around water points also pollute groundwater. Pit latrines, sewerage drains, dumping sites of industrial waste are potential contaminants of groundwater (Jacobson *et al.*, 1995).

become very scarce for some inhabitants because of a large outtake from others. The town Erwee got water in a pipe from the seven springs that were located some two kilometres away. This had led to all but one spring drying out. The people that used to take water from the springs for themselves and their animals could no longer get enough.

On our trip we encountered a number of springs and drilled wells where water was extracted by humans and their livestock, most of them were only used for local purposes. In Sesfontein we saw a borehole that supplied a tourist facility, Fort Sesfontein, with water closets and showers and even a swimming pool. Their first well had run dry and now they had drilled another deeper one, 17 meters deep. For how long will the new one last?

Other examples of irresponsible use of groundwater could be seen at tourist facilities in Etosha and Palmwag and in the capital, Windhoek. These pools, showers, WC's and irrigated lawns certainly contribute to make the human outtakes of ground water too large for nature to keep up with. The most severe effects of overuse of water from a river are of course noticed downstream where there is less water or even no water at all in the riverbed. This affects humans, animals and vegetation in ways mentioned above in the case of ground water overuse.

The examples above all address ground water overuse, but overuse can also of course concern surface water, such as rivers, lakes and wetlands. A large outtake upstream a river may cause trouble downstream. In Namibia all rivers are ephemeral and they often do not reach all the way to the sea, but are consumed by infiltration and evaporation along the way. One way for people who have access to the river to save the water, to use it over a larger part of the year than just after the rains, is to build dams and reservoirs to store the water in. This can be an effective way of solving the problem with water deficiencies, used in the right way. It can also cause new problems, or be a very ineffective and therefore inadequate use of the water. If reservoirs are built in arid or semiarid climates the loss of water through evaporation is very high. If the ground in the reservoir is not prepared there is another loss through infiltration into the ground.

References

Bradshaw, M. and Weaver, R., 1993: *Physical Geography: An introduction to Earth Environments*. Mosby-Year Book Inc., Missouri.

Falkenmark, M., 2000: *No freshwater Security Without Major Shift in Thinking*, STOCKHOLM WATER SYMPOSIUM, SIWI, Stockholm, Sweden.

Heyns, P., Montgomery, S., Pallett, J. and Seely, M. (eds.), 1998: *Namibia's Water, A Decision Makers' Guide*. DRFN and DWA, Windhoek, Namibia.

Hoanib River catchment Study, Community Information Pamphlet No. 5, Soil Erosion, Desert Research Foundation of Namibia, DRFN, Windhoek, Namibia.

Hoanib river catchment study, Community Information Pamphlet No.1, Grazing, No. 2, Water, No.4, Wildlife & Domestic Stock, No.5 Soil erosion, Desert Research Foundation of Namibia, DRFN, Windhoek, Namibia.

Hoppe-Speer, S., DRFN, Polytechnic Report ??

Jacobson, K., Jacobson, P., Seely, M., 1995: *Ephemeral rivers and their catchments*. Desert Research Foundation of Namibia, DRFN, Windhoek, Namibia.

Leggett, K., Fennessy, J., Schneider, S., 2001: *The seasonal availability of grazing and browsing in the Hoanib River catchment northwestern Namibia*. DRFN, Windhoek, Namibia.

Schneider, S., Leggett, K. and Fennessy, J., 2001: *Rapid Veld Assessment, Development and Implementation of a Rapid Veld Assessment Method for Local Natural Resource Users*. DRFN, Windhoek, Namibia.

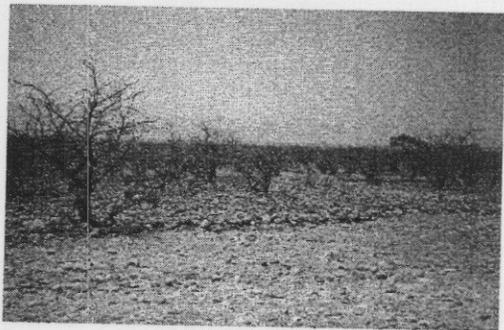
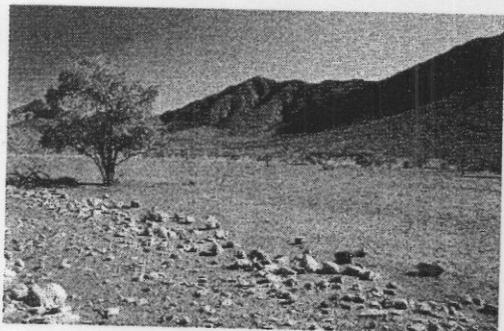
Skujins, J. (red.), 1991: *Semiarid lands and deserts: soil resource and reclamation*. Marcer Dekker INC., New York.

Water is life in the Hoanib River Catchment, Hoanib River Catchment Study, DRFN, Windhoek, Namibia.

Internet references:

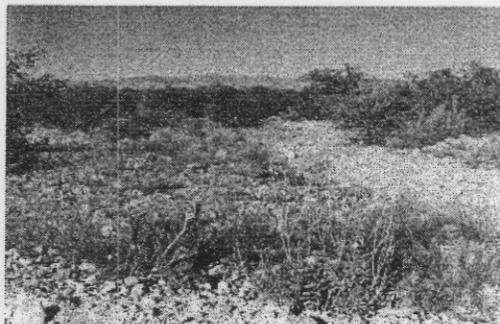
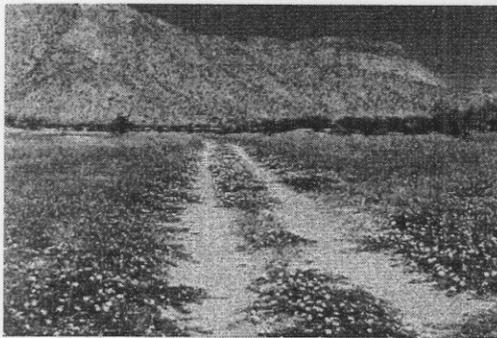
Land Use-Land Degradation and Desertification, CIESIN Thematic Guides **DRAFT**
(www.ciesin.org/TG/LU/degrad.html)

DEA, 2001: Directorate of Environmental Affairs, Ministry of Environment and Tourism, Namibia. (www.dea.met.gov.na/env_issues/env_issues.htm)



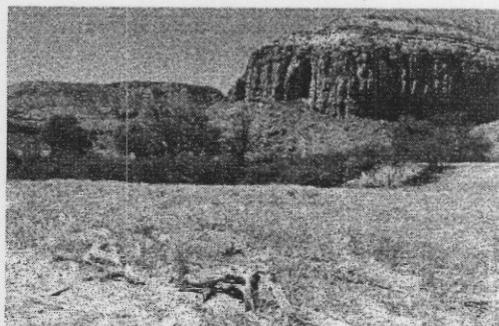
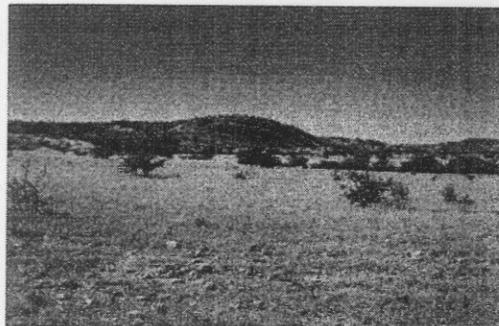
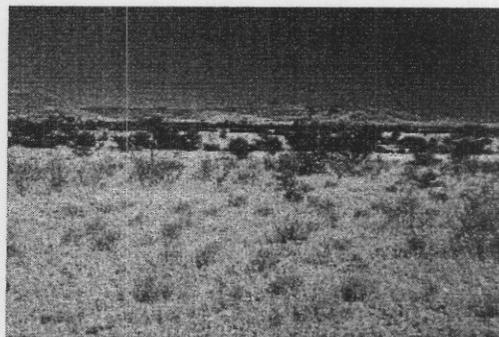
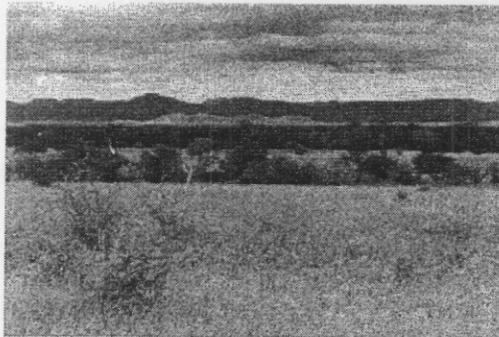
Rapid Veld Assessment (RVA)

Category 3 - Moderate Veld



Rapid Veld Assessment (RVA)

Category 4 - Good Veld



APPENDIX B: Rapid Veld Assessment

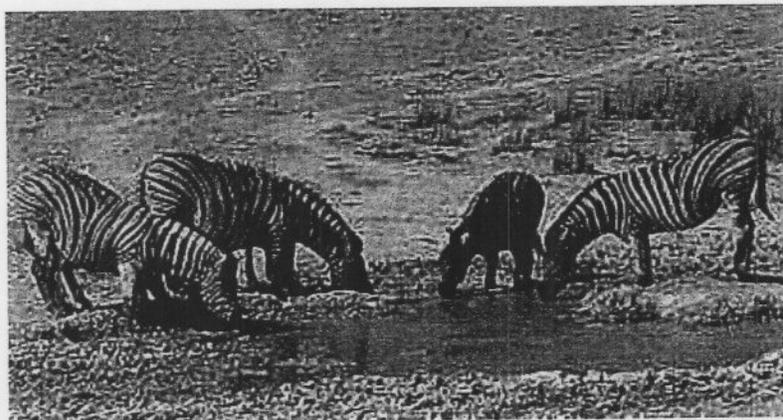
The GPS points that we took are illustrated in below.

GPS-point	RVA-category	Comments
1 S190727 E133709	0	Village
2 S190727 E133709	3	Far from village
3 S190302 E132640	0	Village
4 S190326 E132055	3	Far from village grazing cattle
5 S190300 E132654	0	Borehole "back on main road"
6 S191556 E135259	0	Khowarib camp

When travelling between points 1 and 2 the grazing was estimated to category 1 all the way. When travelling from point 5 we estimated the grazing to change from 0 to 2 about two kilometres from the borehole. Our findings support the hypothesis about the sacrifice zone, as mentioned above. The points are too few for us to make an appropriate assessment of the extent of the sacrifice zone. When using this method we encountered some difficulties in assessing the state of grazing. At our first attempt of using this method we included succulent species as grazable vegetation. This proved to be wrong. Because of this we assessed a higher category than it actually was. It is important to have experience and knowledge of vegetation species in order to make a valid assessment.

THE LIMITING FACTORS OF WATER AVAILABILITY AND DEVELOPMENT OPTIONS IN THE HOANIB CATCHMENT, NAMIBIA

Joakim Evertson and Anna Åhr



Abstract

Seeing water as an important resource in the Hoanib catchment area, limiting factors of water availability are presented. Both natural and human induced factors and the relationship between them is discussed and also what the consequences of them are. Some space is given to water-legislation and community-based development. Development options for people in the Hoanib catchment is presented in the light of tourism industry. The Namibian government's position on tourism as a reasonable development option is presented through studies of the "North West Tourism Master Plan" and "Wildlife Management Utilisation and Tourism on Communal Land". The community's view on tourism and wildlife is also discussed.

Contents

CONTENTS	2
INTRODUCTION	3
BACKGROUND	5
<i>Climate</i>	5
Southern Africa	5
Namibia	5
Hoanib	6
<i>Location</i>	7
<i>Geography and geology</i>	8
<i>Infrastructure</i>	9
<i>Demographics</i>	9
METHOD	11
RESULTS	11
<i>North West Region Tourism Master Plan</i>	11
<i>Conservancy and Wildlife and Tourism Council of Warmquelle and Sesfontein</i>	12
<i>Recent development trends</i>	15
<i>Limiting factors of water availability</i>	16
<i>Development options</i>	18
DISCUSSION	19
CONCLUSION	21
LITERATURE	22

Introduction

Looking at development options for the Hoanib catchment, tourism is one industry which people living in the area could gain from while still being able to preserve water and environment. In 1991, the Namibian Cabinet declared tourism as a priority economic development sector in the country. Accordingly the First National Development Plan (FNDP1) for 1995 – 2000, spells out the needs and objectives for national tourism development in Namibia (North West Region Master Plan, 2000). When developing an area towards using water in a more sustainable manner it is important that each unit of water used is returning as much economic good as possible.

Could tourism be the “right” way? The north west of Namibia has experienced considerable tourism growth over the last decade. The formal tourism products in the main centres and commercial farming areas have effectively harnessed this growth. Although the communal areas have experienced similar tourism growth, the residents have realised little return from wildlife and tourism over the same period. The Ministry of Environment and Tourism sought a way in which communities could improve their economic and social conditions through managing, using and benefiting from Wildlife. Their answer was conservancies. The state recognised that Namibian wildlife had the potential to create jobs and provide a steady income for thousands of poor rural Namibians, as well as earn much needed foreign exchange (Wildlife Management Utilisation and Tourism on Communal Land, 1995).

The following thesis is selected:

- Is tourism a development option for the population in the Hoanib catchment area?

Follow up questions in this report that need to be answered are

- a) What is the government’s position about tourism in this area and what are their development goals of the area?
- b) What activities exist in the villages and communities?

The “Wildlife Management, Utilisation and Tourism on Communal Land” and the “North West Region Tourism Master Plan” are two publications by the government showing the importance of this issue and the fact that tourism is a positive development option.

In this paper, we present some limiting factors of water availability in the Hoanib Catchment, one of the ephemeral rivers in the north west region of Namibia (fig.1). The paper will also

present tourism as a development option for the catchment and show why this is a reasonable development option for the area.

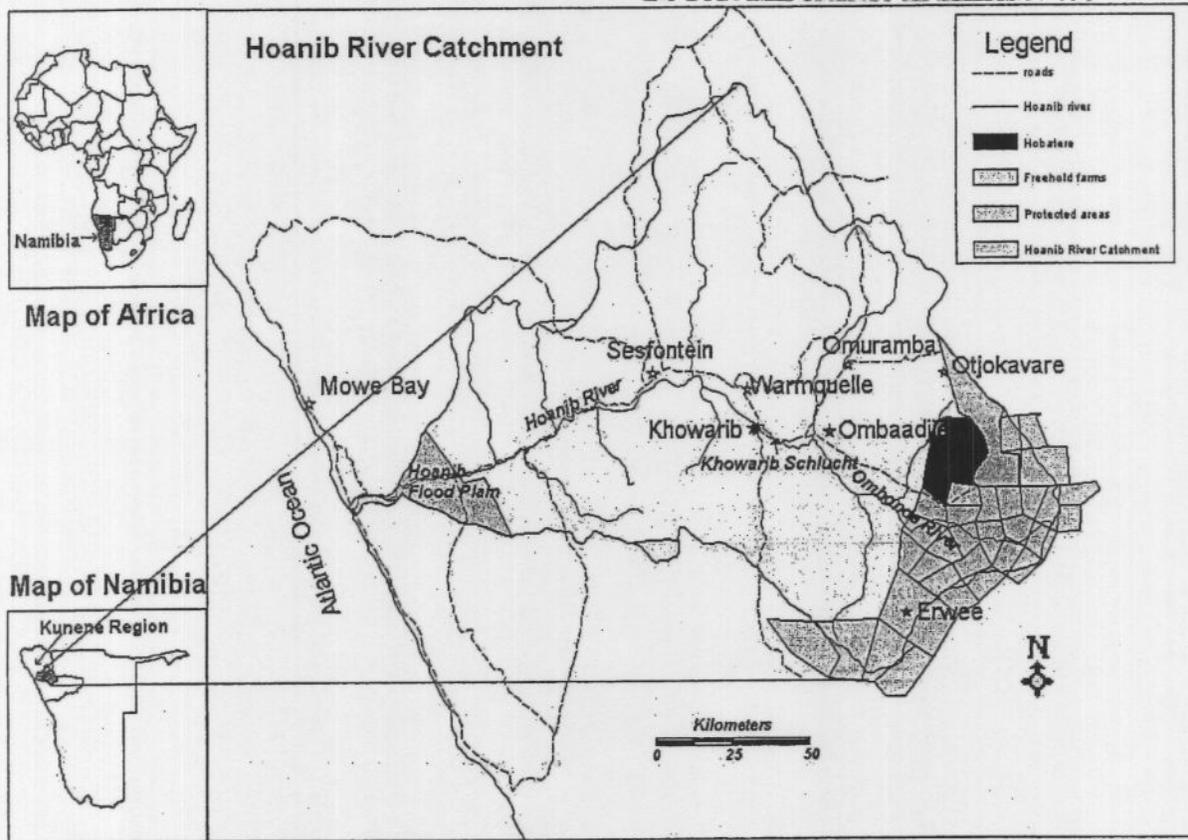


Fig 1. Location of the Hoanib River Catchment (Leggett et al., 2001)

Background

Climate

"The climate determines the productivity of the landscape" (Pallett, 1997:1). Water gives life and the availability of water in the landscape sets the limit to the life that can grow and prosper. Availability of water, whether from the natural environment or an artificial supply, determines how and where human development can take place more than anything else (ibid.)

Southern Africa

Southern Africa is characterised by low to fairly good rainfall. Precipitation mostly falls in the summer, except in the Cape where rain falls during the winter. There is great variation in the amount of rain and its timing and intensity during the season, especially in the drier parts of the region. Droughts are frequent and can strike at any time. Southern Africa experiences very high losses of water from evaporation and transpiration, with the result that only a very small proportion of the total rainfall enters streams or groundwater reserves. The rainfall pattern of southern Africa is influenced by three main factors: ocean currents, global air circulation and topography (ibid.).

Namibia

Namibia has an arid to semi-arid climate. The average annual rainfall along the coast is less than 25 mm while the wettest parts of the country receive above 500 mm on average. Namibia receives an average of 250 mm of rain per year but Namibia's rainfall is very variable from year to year and place to place (Heyns, 1998). Namibia is the driest country south of the Sahara (Pallett, 1997). Water potentially lost through evaporation is at least five times greater than water gained from rainfall, evaporation is about 3000 mm per year. Conditions are suitable for plant growth for only a short period of time and that is during the rainseason. Dry climates are characterised by great variations in the intensity and amount of rainfall, both over time and space. This variability can have serious negative effects on plant growth. The intensity of the rainfall effects the runoff that accumulates in rivers and the groundwater recharge. Low intensity rainfall may not produce any runoff at all (Heyns, 1998).

Most of Namibia lies in a belt of high-pressure cells that encircles the Earth. Air descends after it has lost its moisture over tropical areas further north. Seasonal movements of the Inter-

Tropical Convergence Zone to the north and the Temperate Zone in the south bring rain over Namibia. In mid-summer (December to March), the border between moist air from the north and dry stable air over the centre of the country is usually about latitude 20° S, while the low pressure cell hangs over Botswana. This arrangement allows moist air from the north-east to move in, and this is when the main rainy season usually occurs (Heyns, 1998). The main rainy season in Namibia is October to May (Jacobson et al., 1995) The moisture-laden air comes from two sources, the Indian Ocean and the Atlantic Ocean north-west of Namibia. During the winter months (June, July and August), most of the country is dry due to high-pressure cells over the interior of southern Africa. Occasional rain and even snow may fall during the winter in the south of Namibia as cold fronts of the relatively wet temperate Zone move north from the Cape. The seasonal pattern above is generally true but there are many exceptions to the rule (Heyns, 1998). The great variability in rainfall and since the rain only falls during certain times of the year makes most rivers in Namibia ephemeral (Jacobson et al., 1995).

Hoanib

Most of the precipitation over Namibia originates over the Indian Ocean. The clouds have passed over all of southern Africa when it reaches western Namibia and their moisture content has declined dramatically (Jacobson et al., 1995). This decline becomes even steeper when warm moist air from the east meets the cool, dry air near the coast. The result is an inversion of temperature, with cool air near the ground and warm air above. The result is less air turbulence. This situation contributes to very low rainfall inland and a steep rainfall gradient across the Hoanib catchment (Leggett et al., 2001). The highest rainfall experienced in the catchment depends on how far inland the catchment extends. The amount of rainfall is highest in the eastern part of the catchment and decreases towards the coast in the west (Table 1) as the variability in rainfall amount increases (Jacobson et al., 1995). Summer rains in western Namibia come in the form of thunderstorms and violent rain where the infiltration rate into the soil is slower than the accumulation rate on the surface. Excess water accumulates in depressions and flows downhill under the influence of gravity (Leggett et al., 2001). The climate influences the water availability in the Hoanib catchment. Leggett et al., (1995) states that the Hoanib river is an ephemeral river and that it relies upon seasonal rainfall to flow. Floods in ephemeral rivers occur when heavy seasonal rainfall provides sufficient water for the normally dry river channel to fill and flow. Because the rivers and the groundwater relies heavily upon seasonal rainfall, drought and floods are a normal state in these areas. Leggett et

al., (1995) states that drought or periods of aridity are the normal occurrence in arid and semi-arid areas. Water availability is therefore dependent on the spatially and temporally variable rainfall each year. The Hoanib catchment is well known for its abundance of mountain springs (fig 2). Springs are usually associated with groundwater emergence related to the surrounding geological features. Discharge from springs may vary from year to year in response to rainfall fluctuations. Even though springs are abundant, there are springs in many areas of the Hoanib cathment that are only active for a few months a year as they dry up as the water table drops (Leggett et al., 2001).

Table 1: 1999-2000 rainfall data from the Hoanib river cathment. The table illustrates how the rainfall decreases towards the coast in the west (Leggett et al., 2001).

Location	Distance from the coast (km)	Rainfall 1998-1999 (mm)	Rainfall 1999-2000 (mm)	Long-term Mean (mm)	Coefficient of variation (%)
Möwe Bay ¹	0	20.9	2.9	13.45	107
Sesfontein	100		106.5	107.9	N/a
Khowarib	120	115.5	310.5	N/a	64.7
Warmquelle	125		232.5	N/a	N/a
Erwee ²	150	159	N/a	N/a	N/a
Omarumba ²	155	N/a	N/a	N/a	N/a
Etendeka Mountain Camp ¹	150	92.5	288	N/a	72.7
Hobatere	180	182.5	432	251.38	57.4
Otjokavare	185	211.0	431.5	N/a	48.5
Otjovasandu	190	N/a	N/a	299.8	N/a
Kamanjab ¹	210	85	345	305	85.5
Opuwo ¹	215	209	559.4	289.14	64.5

¹-Located outside the Hoanib River Catchment

²-Insufficient data collected

N/a-not available

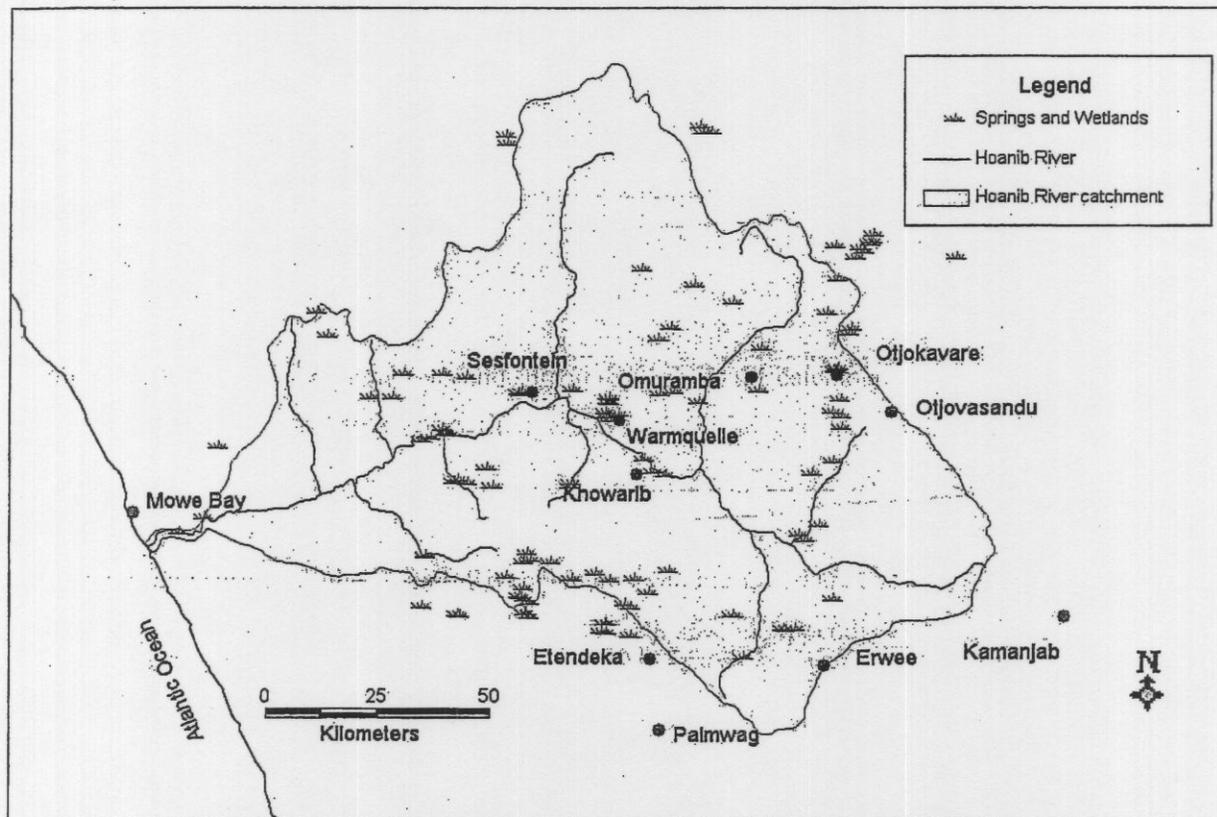


Fig 2. Location of springs and wetlands in the Hoanib river catchment (Leggett et al., 2001).

How much life the land can support depends on the annual rainfall in the Hoanib catchment, as well as in the rest of the North west region. In those cases when the rainfall is late or less than usual, the consequences can be dramatic. In 1980 cattle numbers were estimated at approximately 110 000 in the North west region, dropping to 15 000 in 1982 due to a severe drought in the region. By 1989 the population had recovered to 80 000. Droughts in this region are common and therefore a severe problem (Jacobson et al., 1995). Droughts occur in different ways and can be classified into four types. These are general rainfall drought, runoff drought, grazing drought and rain-fed crop drought (Heyns et al., 1998).

Geography and geology

The Hoanib cathment is situated in the northwest region of Namibia. This region is dominated by a harsh and variable climate and a steep topography drained by several ephemeral river courses (Jacobson et al., 1995). The catchment consists mainly of recent deposits of sand and

calcretes, which makes land use difficult. In the northwest region much of the land is bare, because the harsh climate limits soil development and vegetation growth. Soils within the western catchments vary in association with the diverse geology of the region and increasing aridity from east to west. Throughout the area, however, soils are generally thin and poorly developed. Alluvial and colluvial deposits are generally responsible for the thickest and most fertile soils in the region. Deep alluvial and colluvial deposits are common in many of the major valleys. Such soils are often calcareous and saline, with limited potential for irrigated agriculture (ibid.)

Infrastructure

The Hoanib catchment area has a network of gravel roads that makes transportation relatively easy. There is a relatively good abundance of gas stations in the area. Electricity- and telephone lines stop at Erwee just outside the catchment. In the Hoanib catchment, electricity is gained by generators driven by gasoline or diesel. Boreholes have been drilled in the catchment for many years according to Legget et al , 2001 (fig 3). Many of the boreholes on the freehold farms in the eastern part of the catchment were drilled soon after the establishment of the farms in the late 1940's and early 1950's. Since then boreholes have been added regularly across the whole catchment by the government, private individuals and communities (ibid.). Even though there is an abundance of boreholes, the network of pipelines for water distribution is poorly developed. Most people in the villages still carry their water home from a spring or a communal waterpipe. In Erwee, a network of pipelines distributes water from a watertower in the village to the homestead and others. Warmquelle has a dam and a waterpipe that serves the population with water. Otjondundo has three natural springs and Sesfontein has six natural springs where the village people tap their water. In Sesfontein there is a borehole at the fortress camp that serves the tourists with water.

Demographics

As in most of Namibia the population in the western catchments is rapidly growing. Within twenty years, there will be twice as many people trying to make a living from the region's resources. The total population 1995 was 7 866 and the percentage of population under 16 years of age was 50 % (Jacobson et al., 1995). Water is static, as most natural resources, but the population is expanding. Water is scarce for today's population and having enough water all year is difficult, but as the population grows the amount of water per person will be reduced to half the amount of today in the year 2015 (ibid.).

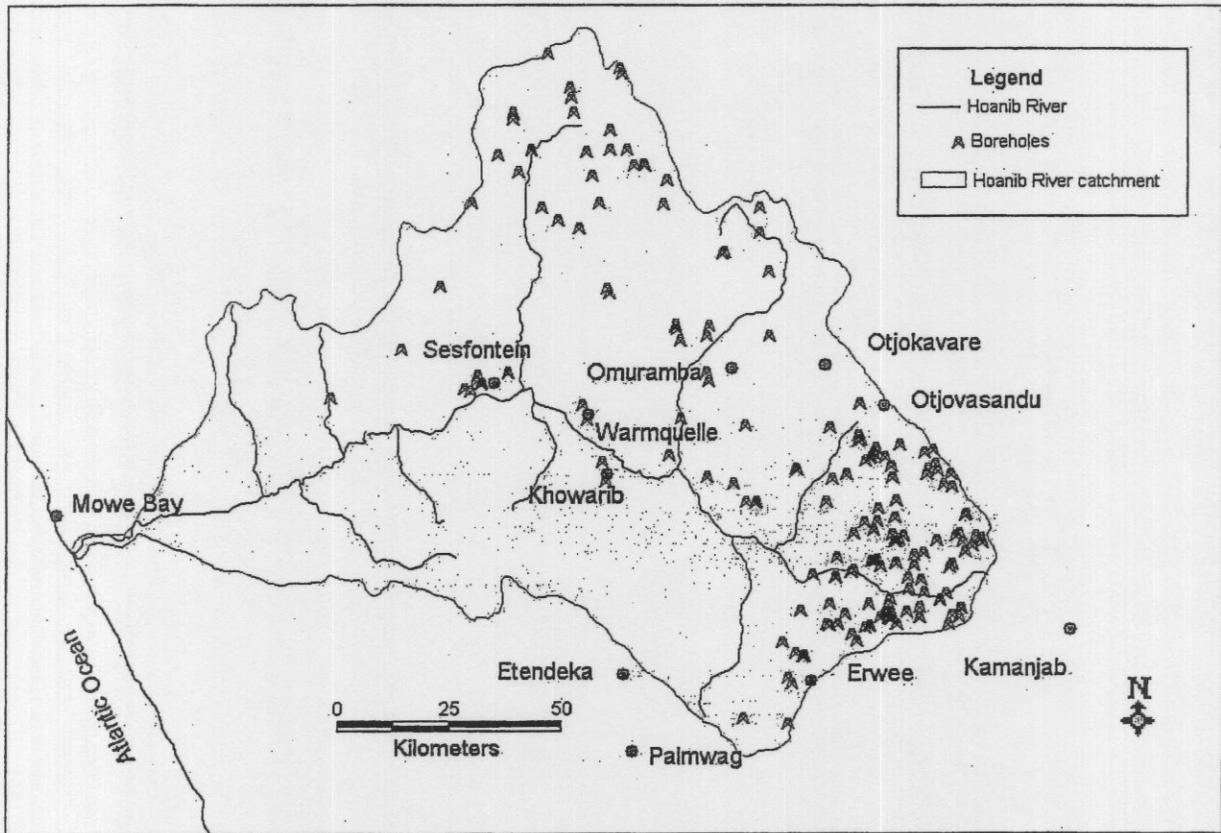


Fig 3. Location of boreholes in the Hoanib river catchment (Leggett et al., 2001).

Method

The Hoanib catchment area and its surroundings are studied through literature, maps and the Internet. Observations were made during a fieldtrip to Namibia in November 2001. The field trip included staying in private and communal camps and observing water related issues. During the field trip it became obvious that more information about the communities needed to be collected and that it was necessary to find out the existing and future connection between the local population and tourism.

To be able to answer the questions outlined in the thesis the governments "North West Region Tourism Master Plan" is studied and also the rights over wildlife and tourism to communities in communal areas. The Tourism Council of Warmquell and Sesfontein has applied to become a conservancy, this issue was also looked upon.

Results

The north-west of Namibia has experienced a tourism growth over the last decade. The Kunene and Erongo Regions have been identified by the Ministry of Environment and Tourism (MET) as a priority area for effective tourism development planning. MET has through funds from Austria undertaken a tourism master plan for the North-West Region of Namibia.

North West Region Tourism Master Plan

The three main objectives of the Master Plan are:

- 1. To provide a physical, institutional, policy and management framework to guide the development of tourism in the North-West Region, for the primary benefit of decision and policy makers operating in the area.*
- 2. To establish Community Based Tourism (CBT) as a key strategy for the conservation and protection of the sensitive environment which characterises the region, particularly its fragile ecology and cultural diversity.*
- 3. To establish CBT as a key strategy for increased investment, control of resources and income generation by local communities in the development of tourism in their area.*

(North West Region Tourism Master Plan, 2000)

Effort is put on developing low-impact CBT as a key strategy for conservation as well as the social and economic empowerment of local communities on communal land. This is repeated in the Communal Area Conservation legislation (June 1996 - amendment to Nature Conservation Ordinance No 4 of 1975) and the Community Based Tourism Policy (June 1995). Community based tourism (CBT) is a relatively new concept in Namibia and has not been able to keep pace with the increased demand and has in general not been able to meet private sector quality needs. The MET, NGOs, conservancies and to a lesser extent the private sector are striving to improve this through joint ventures, bed night levies and training. (North West Region Tourism Master Plan, 2000)

Conservancy and Wildlife and Tourism Council of Warmquelle and Sesfontein
Namibia is protecting important habitats and most species by a good network of game reserves and national parks. But it is also important to maintain biodiversity and the health of ecosystems outside the protected areas. Otherwise these protected areas will become islands of protection surrounded by competing land use. To be able to preserve wildlife, MET has agreed to devolve limited rights over wildlife to people in communal areas. This is done to encourage people on communal land to manage their land and resources in a sustainable manner. This means that they should be able to make decisions about how the land and resources are being used and have the right to exclude other people from using the land and resources. Without these rights there is no motivation to preserve resources. Rural people should be able to benefit directly from the use of the land and resources. In this way resources will have a value worth protecting.

Conservancies are not proclaimed land like game reserves and national parks. Residents will continue with other economic activities such as livestock and cattle farming. The conservancy will add wildlife use and tourism to their existing economic activities.

Conservancy formation is complex and time-consuming. The following steps are required for conservancy formation:

- MET/NGO's provide information to communities about conservancies
 - A community informs MET it would like to form a conservancy
 - MET and community carry out a brief field inspection
 - Community identifies members, selects committee
 - Conservancy defines its boundaries
 - Conservancy develops a constitution
- Conservancy applies to MET for registration on the prescribed form
 - Conservancy registered by MET and gazetted
 - Conservancy becomes operational

The new Tourism Act that replaces the Nature Conservation Amendment Act from 1996 will give conservancies tourism concession rights. This means that conservancies will have the exclusive right to operate commercial tourism activities within the conservancy. The private sector will have to negotiate with the conservancy to develop lodges and camps or carry out guided tours within the conservancy. Conservancies do not have the right to prevent self-drive tourists from using areas of land or to charge self-drive tourists a fee for using communal land. (Wildlife Management Utilisation and Tourism on Communal Land, 1995)

Sesfontein has together with Warmquelle applied to the Ministry of Environment and Tourism for registration to form a conservancy (fig 4). A participatory land-use planning exercise was done in the Sesfontein area, by consultants for the Ministry of Agriculture, Water and Rural Development. This included socio-economic and infrastructure profiles as well as planning utilising local expertise and consultants. Resources considered included water, soils and gardens, livestock and grazing, as well as wildlife and tourism.

The investigation established the existence of a strong conservation ethic from the local population. There was also a strong acceptance of mixed wildlife and domestic stock farming as well as firm commitment to allocate large areas for the exclusive use of wildlife and tourism. The envisaged conservancy establishment in the area would ensure that community benefits from wildlife and tourism would increase, thereby making this sector locally more competitive. Conservancies were considered the most appropriate local authority for dealing

with wildlife and tourism related issues. This sector was identified as the most important growth sector for local development in the Sesfontein area.

The Sesfontein Conservancy, made up of a number of communities, has been struggling for more than three years to form a conservancy. All the conditions as laid out by the MET have been met and the application was approved by the Governor of the Kunene Region and Regional MET office in May 1999. The MET technical committee has not passed the application. Sesfontein has a detailed land use plan which was done in consultation with the community and co-ordinated by the Ministry of Agriculture, Water and Rural Development. The core wildlife area has been rezoned and is presently being negotiated with the MET, Desert Adventure Safaris (Palmwag) and the Sesfontein Conservancy Committee. These zones still need the approval of all parties including the conservancy members. The aim is to allow the concession area (Palmwag) to be included in the Sesfontein conservancy (North West Region Tourism Master Plan, 2000)

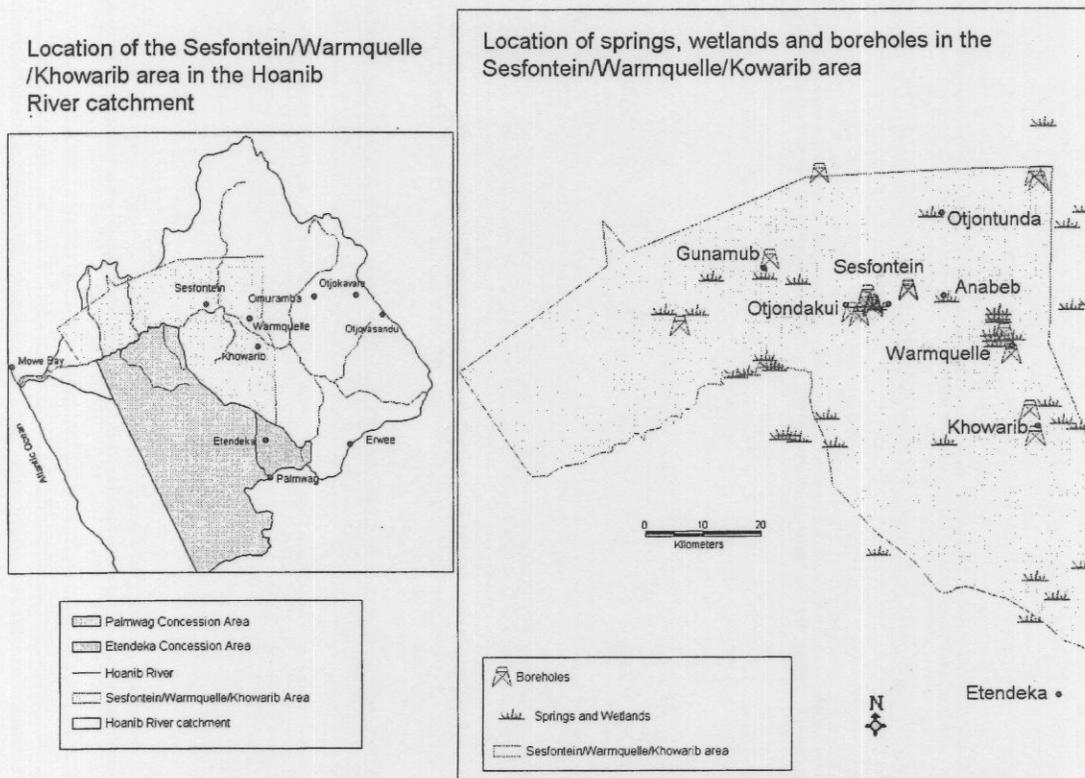


Fig 4. Location of the Sesfontein/Warmquelle/Khowarib conservancy in the Hoanib catchment (DRFN, 2001)

Recent development trends

MET has through their work with the tourism master plan for the northwest region of Namibia discovered recent development trends.

- *There is increased demand for a Southern African tour, including Namibia, resulting in shorter trips to Namibia by overseas tourists*
- *Tourists are, to an increasing degree, looking for special locations and facilities (adventure, wilderness and local culture)*
- *Tourists are, to an increasing extent, looking for ecologically and socially responsible destinations*
- *The number of Bed and Breakfast operations, guest farms and hunting farms on commercial farms has increased rapidly. These all offer personal service.*
- *The trophy hunting industry on the commercial farms is well established while the communal areas have only recently started to realise this potential through conservancy formation.*

- *A considerable increase in overlanders has been experienced in the focus area.*
- The number of self-drives in the focus area is increasing*
- *The lack of regulated tourism within the focus area is resulting in the uncontrolled establishment of tourism facilities within the focus area. Many of these are sub standard.*
 - *The lack of control over tourists is resulting in the degradation of the environment, which, in turn, is detracting from the tourist experience.*
 - *As local residents and tour operators open up 4x4 routes, these sites become better known and are used by self-drives. This encourages the operators to seek new exclusive routes and hence opening up more new areas.*
 - *The fastest tourism growth is taking place outside of parks*
 - *The trophy hunting industry is becoming increasingly important.*
 - *To improve economies of scale of trophy hunting, conservancies are being formed on commercial farms.*(North West Region Tourism Master Plan, 2000)

Currently, the trophy hunting industry is said to be worth N\$ 100 million per year.

Limiting factors of water availability

Water availability in the Hoanib catchment area is limited by several factors. The following section presents factors that limit water availability in the Hoanib catchment. There is a lack of bulk water supply in the Kunene region as a whole. However, many boreholes in the region have been drilled and equipped by the government and private organisations. Nearly all the small settlements in the communal area in both regions are located in close proximity to an existing borehole. The availability of water in these regions, and especially in the Kunene Region, has a determining effect on the location and establishment of settlements.

The following limiting factors of water availability were recognised:

- Climate - low precipitation
 - high evaporation
 - low infiltration
 - high spatial and temporal variation of precipitation
 - only 1% of groundwater is renewed each year
 - drought
 - floods

- Geography – remote area
 - water only available in certain area of the basin
 - badlands
 - sandy soils

- Technique - lack of knowledge of how and where to drill boreholes

- Laws
 - there is no need for an Environmental Assessment when drilling boreholes or taking water from wetlands.
 - there are no limits or fees on water usage

- Limiting land
 - private land and other borders limit the possibility to extract water
 - the best land is already taken which makes it difficult for a growing population to find land close to water

- Economy - lack of money makes it difficult to drill boreholes
 - building a network of pipelines cost money
 - without money it is difficult to repair broken pipes so loss of water becomes a big problem due to water leakage

- Demographics
 - high rate of population growth
 - large size of family

Development options

In order to see the possibilities of development in this area, several factors have been considered:

- **Economy** - economic aid through international co-operation
 - high cost tourism
 - funds for research in area
 - money through activities in villages, such as handcraft, culture villages, tours.
 - aid from NGO's through donations

- **Technology** –training amateurs and professionals
 - water efficiency
 - donations to buy new technology
 - help from NGO's or professionals of how and where to drill

- **Laws** - wildlife management
 - preserving more areas.
 - better law implementation
 - follow up on implementation
 - new laws to fill gaps
 - taxes on water for commercial use

- **Land management** – Community Conservancies
 - Wildlife and Tourism Councils
 - growing crops for profit gained by communities
 - community-based programmes
 - land not good for land use can be rented to other activity
 - show options of land use instead of cattle

- **Demographics** – birth control
 - reduce migration of work force to urban areas

Discussion

When discussing limiting factors of water availability both natural and human induced factors have been taken into consideration. Natural factors are mainly determined by the climate. The climate is so unreliable that no accurate prediction can be made regarding rainfall from year to year. Low precipitation and high variability in both time and space makes the available water on land very limited. The precipitation falls as short powerful thunderstorms. The intensity of rainfall has an effect on the runoff accumulating in rivers, and low intensity rainfall may not produce any runoff at all.

High evaporation due to the high daily temperature and low infiltration affects the groundwater recharge. This is why there is only 1 % renewed groundwater and only 1% of the existing groundwater is available for water use. Besides the fact that there is only a limited amount of water available it is also only available at certain locations.

When water takes the form of surface water it is easily used by both humans and animals. These location are also often populated (e.g. Sesfontein and Warmquelle). Other locations of water are more difficult to reach. Groundwater that flows several meters below the surface is not as easily used as surface water. A borehole has to be drilled and this costs money. A certain amount of knowledge of how and where to drill is also required. Drilling needs both money and knowledge (experience) and both of these factors are limited in this region.

Location of land is also a very important factor of water availability. Land close to perennial springs is already in use and alternative locations for land is very limited. Land with availability to a perennial water source may be so remote from roads or other necessities that the land is useless for people to live in. This land is often the favourite location for wildlife, since it is undisturbed here. Land borders may also prevent farmers from reaching water. A fence can easily seal off a property and the resources inside.

Human factors of limiting water availability include poor networks of water distribution and maintenance of existing waterpipes. This contributes to a huge loss of water through leakage. Since there is only a certain limited amount of water available, population density becomes a limiting factor of water availability. A certain amount of water can only maintain a certain

amount of life. It is therefore important to inform the population about birth control to prevent overuse of water.

As Pallett et al, 1995 stated "*The climate determines the productivity of the landscape*" it follows that the productivity of the landscape determines the development options of the area. The thesis for this project is:

- Is tourism a development option for the population in the Hoanib catchment area?

With regard to the result presented in this paper the answer to this thesis question has to be that tourism is a development option for the area. The Hoanib catchment has great potential to benefit from tourism eventhough it may not solve every problem or be the only source of economic income necessary to support the whole population. The observations made during the fieldtrip and the information found in the governments "North West Tourism Master Plan" and "Wildlife Management Utilisation and Tourism on Communal Land" shows that the area has great potential for tourism. It also shows that the government and other organisations are willing to help the communities with this.

In a sensible area like this it is important that the tourism takes the form of high cost, low impact activities. One such activity is trophy hunting, which is worth N\$ 100 million per year in Namibia. Activities like this yield a high income and have a low impact on the environment.

Both the "North West Tourism Master Plan" and "Wildlife Management Utilisation and Tourism on Communal Land" was initiated to promote tourism in areas like the Hoanib Catchment. It was made to initiate a development of a whole region. Sometimes though it is not enough to only give an area the right to an opportunity, it is also necessary with local support, information and education. Some of these issues could be observed during the field trip in November 2001. Educating amateurs and professionals can solve problems like cattle grazing in wrong areas for the season, borehole drilling, leaking waterpipes and irrigation during the wrong time of the day. Donating or lending money or equipment to the right people can solve other problems.

DRFN (Desert Research Foundation of Namibia) educates professionals from different departments of the government on amongst others sustainable environment and biodiversity. This type of education can be taught to people by different NGO's, such as DRFN in the

communities and in schools in the Hoanib catchment area through money from donors. Water efficiency is also something that can be taught in schools and to locals within a community as a part of a development plan for a conservancy of a community (like Warmquelle and Sesfontein.) Being able to use water more efficient is an important issue because of possible lack some day in the future. Here are some examples of efficient use of water in the Hoanib catchment observed during the field trip:

- bucket showers instead of tapped showers
- no taps
- only plants adapted to the climate and soil
- plants that do not need a lot of water
- irrigate fields in the evening or early morning

Money does not have to come from donors, it can be money earned by the community through taxes or fees. Hotels and other managers of tourism or industry in the area could be requested to pay taxes for consuming water over a certain level which will be measured at the water source , being a drill hole or a tap. These taxes could be returned to the community for the purpose of using for preserving water sources and to improve technique through education and to buy equipment that has a better and more efficient technique. This can give a push in a direction towards efficient use of water. Using a bucket to shower is more efficient and much cheaper. It also provides the tourist with a feeling of being in the "wild". There are a lot of similar things that can be done so that the tourist has to think before using water, like not having any taps or if planting gardens at campsites, only use the plants that are natural to the environment.

Conclusion

Water availability in the Hoanib catchment in north-west Namibia is limited by several factors. The climate is the main factor that limits water availability. Other factors are thin and course soils, steep topography and remote locations of springs and wetlands. Human induced factors that limit water availability includes poor network and maintenance of waterpipes, leakage and lack of knowledge of how and where to drill boreholes. Lack of money and education limits the population to seek new sources and to maintain already existing sources of water.

Tourism is an option for development in this harsh area and is supported by the government through the "North West Tourism Master Plan" and "Wildlife Management Utilisation and Tourism on Communal Land". The communities have also showed interest in developing tourism and preserve wildlife through applying to be recognised as a conservancy. The Hoanib catchment has a good opportunity to succeed with its ventures with support from the government and NGO's.

Litterature

Desert Research Foundation of Namibia. 2001. Map on CD.

Heyns, P., Montgomery, S., Pallet, J and Seely, M (eds.). 1998: Namibia's Water, A Decisions Maker's Guide. DRFN and DWA, Windhoek, Namibia 173pp.

Jacobson, P.J., Jacobson, K.M. and Seely, M.K. 1995. Ephemeral Rivers and Their Catchments: Sustaining People and Development in Western Namibia. Desert Research Foundation of Namibia, Windhoek. 160 pp.

Leggett, K. Fennessey, J and Schneider, S. 2001. Rainfall, Water Sources and Water Use In The Hoanib River Catchment, North West Namibia. Desert Research Foundation of Namibia, Windhoek. 39pp.

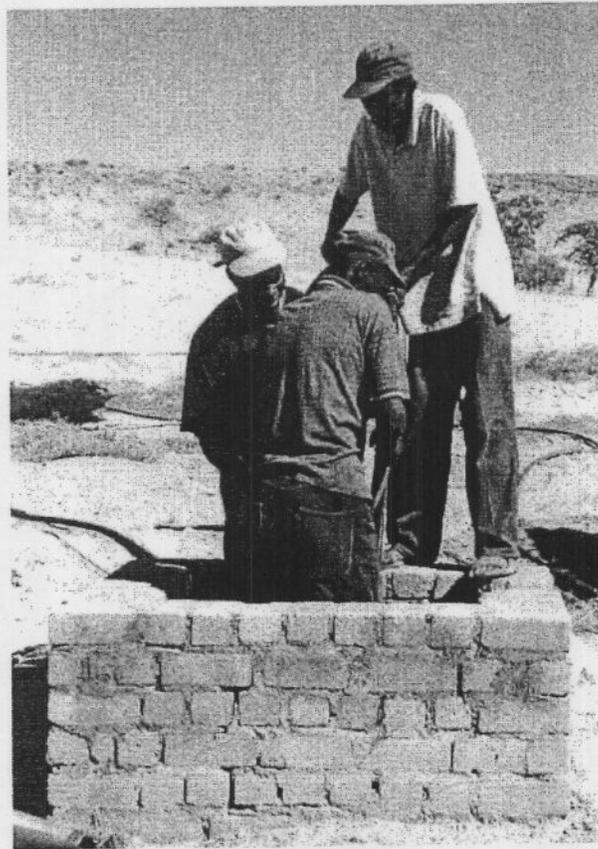
North West Region Tourism Plan. 2000. The Namibian Ministry of Environment and Tourism, Windhoek.

Wildlife Management Utilisation and Tourism on Communal Land, 1995. The Namibian Ministry of Environment and Tourism, Windhoek.

Pallett, J. (Ed.). 1997. Sharing water in southern Africa. Desert Research Foundation of Namibia, Windhoek.

Present Water Use in Northwest Namibia

A step towards future conflicts?



By:
Mamite Andersson
Marika Bergkvist
Katarina Eriksson
Sofie Wallenberg

ACKNOWLEDGEMENTS	3
ABSTRACT	3
INTRODUCTION	4
<i>Objective</i>	4
<i>Method</i>	4
<i>Background</i>	4
WATER RESOURCES AND WATER USE.....	4
<i>Description of the area</i>	6
<i>The geography of the Hoanib Catchment</i>	8
<i>Climate</i>	10
<i>Ethnic groups</i>	11
<i>Land tenure</i>	13
CASE STUDIES	15
<i>Erweë</i>	15
<i>Warmquelle</i>	17
<i>Seisfontein</i>	18
<i>Etosha National Park and surroundings</i>	20
DISCUSSION OF FUTURE SCENARIOS.....	21
REFERENCES	23

Acknowledgements

We would like to thank Patrik Klintenberg, Stephanie Schneider and Julian Fennessy for guiding us, feeding us and protecting us from elephants and "killer turtles". And above all, sharing their unique knowledge about the local area, culture and wildlife. We are most grateful for you being impressively patient with us, "for better, for worse" and making our stay in Namibia exceptionally memorable for us.

Abstract

A field course in Namibia initiated this study of present water use in Northwest Namibia, an arid area with low precipitation and high evaporation. The aim is to, by the impressions from the excursion and literature studies present a vision of future effects and possible conflicts. Different ethnic groups share the same nature resources not only among themselves and their livestock, but also with commercial farms, tourism and wildlife. Legislation regarding water use is not sufficient at the time being and yet to be improved. The general opinion among the rural population in the study area seems to be that there is no actual water scarcity. This is reflected in the way the water is used at present. The main question though, is whether the water supply will be sufficient in the future considering water management of today and development of the areas. If water scarcity finally will occur, disputes over water management, or even severe conflicts, might be inevitable.

Introduction

Objective

The objective of this report is primarily to describe the customs of water use in north-western Namibia. Furthermore, as a reflection of present conditions of water management, discuss what this might lead to in the future.

Method

This report is mainly a literature study, although a field study in Namibia was accomplished in November 2001. The excursion to Namibia enhanced the understanding of the environmental conditions in the country.

Background

In both developed and developing countries, development put a great pressure on the environment. Namibia, the country studied in this rapport, is a country in an interesting developing phase in the semi- arid to arid part of southern Africa. Namibia has only been independent since 1990 and during the apartheid regime from South Africa development was planned separately for the different ethnic groups living in southern Africa (Nghitila 1998). The rapid population growth and the expected growth of urban centres in Namibia will probably lead to drastic increases in water demand.

A great challenge for Namibia's development strategies (and throughout the whole world) will be to balance the conflicting needs for resources by all recourses users and between different generations.

Water resources and water use

Perennial rivers occur only at the northern and southern borders of Namibia, which is far from the areas of high water demand (Heynes *et al* 1998). All rivers that starts in Namibia are ephemeral, which means that they flow only for a few days a year as a result of strong rains over their catchment (Jacobson *et al* 1995). The ephemeral rivers in Namibia are irregular and unreliable water resources but water from the ephemeral rivers are of great importance for vegetation, livestock, wildlife and domestic use. The ephemeral rivers are the third largest water source for use in Namibia (figure 1). Because of the scarcity of perennial rivers is

Namibia one of few countries in the world that have constructed dams on ephemeral rivers for large-scale water supply.

It is estimated that only 1 % of the precipitation in Namibia recharges groundwater resources. The groundwater supply in the interior part of Namibia amounts to 73 % of the total consumption (Heynes *et al* 1998). The maintenance of groundwater resources will become a very essential part of Namibia's economic development.

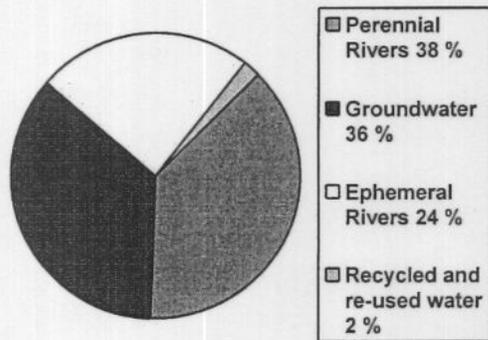


Figure 1: Water Sources for use in Namibia 1996 (Heynes *et al* 1998).

In 1995 was agriculture the far greatest user of water in Namibia, 66 % of the total water use in the country was used within the agricultural sector (figure 2).

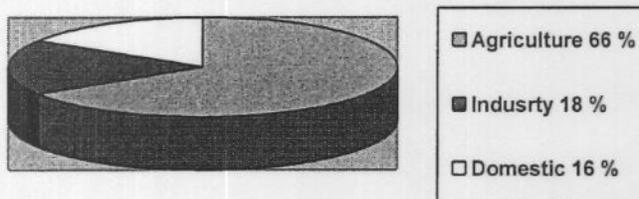


Figure 2: Sectoral water demand in Namibia in 1995 (Heynes *et al* 1998).

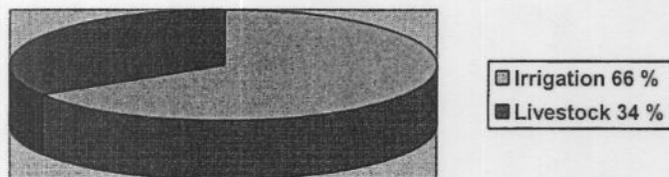


Figure 3: Proportions of the water use within the agricultural sector in Namibia in 1995 (Heynes *et al* 1998).

Within the agricultural sector is most of the water used for irrigation purposes (figure 3). Because of the arid climate and the poorly developed soils in most part of Namibia is the agricultural sector supply to the countries economy very limited.

What might happen in a near future is a sectoral conflict over Namibia's water resources. In a phase where Namibia's urban centres are growing and there is an expected industrial development, the sectoral water demand proportions will probably change. Namibia is no exception of the global pattern that urban lifestyle is much more water demanding than the rural lifestyle.

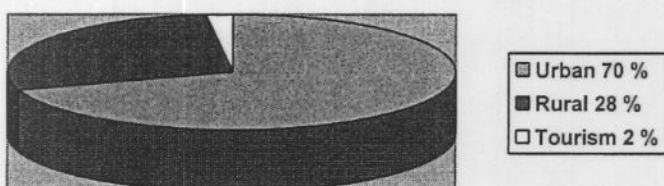


Figure 4: Water demand within the domestic sector in Namibia 1995 (Heynes *et al* 1998).

Description of the area

The Republic of Namibia (figure 5) is located on the south-western coast of Africa. Namibia is bordered by to Angola in the north, Botswana in the east and to South Africa in the south. In the north-eastern part of Namibia the long narrow easterly-extended Caprivi Strip gives the country a short border to Zambia and access to the Zambezi River.

central plateau contains both savannah landscapes, undulating plains, mountain massifs and salt pans, of which the Etoscha Pan is the most famous. The central plateau is the core of the agricultural life in Namibia.

The most easterly of Namibia's topographic regions is the Kalahari Desert. The Kalahari Desert extends into Angola and across Botswana to Zimbabwe and Zambia and is a part of southern Africa's central plateau.

The eastern parts of Namibia are covered by recent unconsolidated sediments as sand and calcretes. Further to the west there is a greater variability in deposits. The bed rock in the north-western part of the country is mainly consisting of precambrian gneisses. The bedrock in the mid western part of the country is dominated by sedimentary bed rock, while metamorphic and volcanic bed rock occurs mainly in the southern part of Namibia.

Nearly half of Namibia's population lives in the northern parts of the country, 15 % of the population lives within the commercial farming areas north and south of Windhoek, 10% in the central and southern ex-homelands, now community land and more than 10 % lives within the area of Windhoek, the capital ("Namibia" Encyclopaedia Britannica online). Namibia has a population growth rate of 3 % per year. The socio – economic varying conditions between white minority and black majority; rural and urban areas; male and female headed households and different ethnical groups in the country are remarkable broad (Utrikesdepartementet 1999).

In 1970 a so-called Veterinary Cordon Fence was erected to prevent the spread of cattle diseases from communal land areas into the commercial farming areas. The Veterinary Cordon Fenced is extended from the Atlantic coast eastwards towards the Botswana border. The fence, aside from disrupting movements of animals and people also creates a major economic division among Namibia's pastoral producers. The people living north of the fence have fewer opportunities to market their animals and receive a lower price for their livestock (Fuller. & Koujo, 2000).

The geography of the Hoanib Catchment

The Hoanib River is an ephemeral river and the catchment is one of twelve major ephemeral river catchments in the semi-arid areas of northwestern Namibia (figure 6) (Jacobson *et al.*

1995). The soils within the area are usually poorly developed as a function of the arid climate. At the coast region, soils consist of littoral sands, or soils associated with gypsum and salt deposits. Further inland, soils are generally more calcareous. These soils have limited potential for irrigated agriculture (Jacobson *et al* 1995).

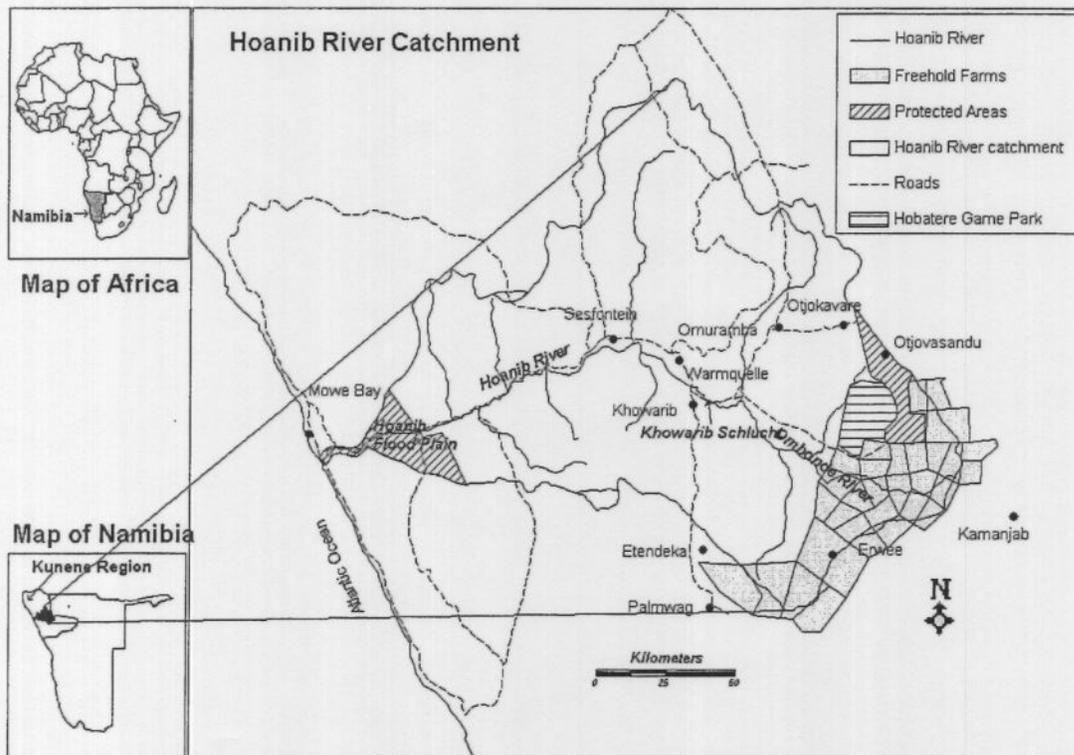


Figure 6. Hoanib River Catchment (Leggett *et al* 2001)

The western part of the catchment from the east boundary of the Skeleton Coast Park to the Atlantic coast is very arid with virtually no vegetation existing outside the river course. The central part of the catchment is sparsely vegetated but further to the east is the catchment densely vegetated, with Mopane woodland dominating.

The Hoanib Catchment area contains numerous springs and wetlands. Small streams and springs, within the riverbeds, are fed by subsurface river flow, but springs in the catchment are in most cases associated with groundwater. In many parts of the catchment, springs are only active for a few months of the year (Leggett *et al*. 2001). The availability of surface water at springs and wetlands often results in highly saline soils because the high rate of evaporation leaves natural salts on the soil surface (Jacobson *et al*. 1995 in Leggett *et al* 2001 page 44).

The vegetation in the catchment is mainly attached to Hoanib River and is often referred to as "riparian forests" or "linear oasis", which are narrow vegetated strips associated with a river course (Jacobson *et al* 1995). Wetlands in the river provide surface water for both communities living in the area, domestic stock, and wildlife (Leggett *et al* 2001).

The land tenure of the Hoanib Catchment area is mainly communal farmland (91 %), the remaining areas consist of private farmland (3 %) and protected areas (6 %), Etoscha National Park and Skeleton Coast Park.

Within the western catchments, of which Hoanib is one, water tables are falling at many sites and estimations shows that up to 5 % of the active boreholes are drying up each year. Between 1989 and 1991 approximately 6.4 million Namibian dollars were spent on boreholes, pumping equipment and diesel fuel, all provided free of charge. These subsidies are aimed at meeting the basic needs of rural populations. There is an urgent need throughout the western catchments to reduce the amount of water use to levels that aquifers and rangeland can sustainably support (Jacobson *et al* 1995).

Climate

According to the Köppen-Geiger-Kohl system, Namibia has BWh (desert climate, hot) along the coast and BSh (steppe climate, hot) further inland (Strahler & Strahler 1992). The average day temperature is in the summer ranges between 20°C–34°C and the night temperature 0°C–10°C (General Information Explore Info Africa 1998).

Precipitation is prevented all due to Namibia's location on the west side of the African continent, the cold Benguela current in the Atlantic Ocean and the prevailing southern winds. This explains why the Namib Desert is located along the coast. There is a rainfall gradient from the Atlantic Ocean across Namibia. Most precipitation falls in the north-eastern parts of Namibia and very little, if any, at the coast. The mean annual rainfall ranges between less than 50 mm per year along the coast and 700 mm in the north-eastern parts of Namibia (Hamutenya 2001). The precipitation is usually falling in January to March, mostly as thunderstorms and intensive showers (figure 7).

The precipitation originates from the Indian Ocean and when the air masses reach Namibia they have already lost their moisture along the African continent. When the warm ocean air converges with the cold Atlantic air, an inversion, which prevents turbulence and leads to low precipitation at the coast of Namibia (Leggett *et al* 2001). The evaporation exceeds 2 600 mm per year because of Namibia's position by the Tropic of Capricorn. In this region drought events are not something unusual. Drought means a period of more than two years with precipitation lower than the long time mean (Jacobson *et al* 1995).



Figure 7. Rain in Etoscha, November 2001 (Photo by Sofie Wallenberg)

The cold Benguela Current affects the temperature and the precipitation along the coast, e.g. Walvis Bay, which has an annual temperature of 19°C in the summer and an average rainfall of only 20 mm. The cold current along the coast enables cold water to rise and in this warm weather fog develops which turns out quite thick along the Atlantic (Liljequist 1970).

The precipitation in the Hoanib River catchment has a very high variability, from 13.2 mm at the coast to 325 mm in the eastern part of the basin (Leggett *et al* 2001). The annual average does not necessarily give a true picture. An average rainfall of 200 mm per year e.g. indicates showers of anything between 80 mm and 280 mm (General Information Explore Information Africa 1998).

Ethnic groups

The Hoanib River Catchment is located beside the border between the regions that during the apartheid regime was called Kaokoland and Damaraland. Most of the populations in the area are mainly pastoralists. The catchment has an estimated population of 8000 persons of which most are Herero and Damara speaking. (Hoanib River Catchment Study 2000)

The Damaras are a group of Bantu origin. The Damaras used to be seminomadic agropastoralists and hunter-gatherers, who lived in the central of Namibia until the Hereros started to occupy the area. In 1960, the South African government moved the Damaras to Damaraland, which is a land of poor soil and irregular rainfall.

The Herero people of Namibia are pastoralists. Their initial home was in Kaokoland near the Kunene River, but some 150 years ago a large part of the Herero population moved southwards. The Himbas are nomadic pastoralists and a branch of the Hereros. Their livestock, cattle in particular, are the main indication of wealth and status in their society.

Boer from South Africa among with ancestors from the German colonisers represents only 6% of the Namibians (Bonniers Stora Lexikon). They live mainly in Windhoek or are commercial farmers in the most fertile areas.

Namibia became a German colony in 1884 (with the exception of Walvis Bay that became British in 1878). Germany lost their colony after the 1st World War and South West Africa was given as a mandate to South Africa from the League of Nations the 17th of December 1920. After the 2nd World War, South Africa requested to incorporate South West Africa as their fifth province, but the request was turned down. This resulted in a dispute, when South Africa refused to put the area under United Nations (UN) guardianship. When the National Party won the election in South Africa in 1948, apartheid was introduced in both South Africa and their occupied territories. This led to forced segregation between ethnic groups within the nation. In 1960 the South West Africa People's Organisation (SWAPO) was formed and their aim was to liberate the state. There would be a long period of fighting before they reached their goal. First, the UN removed the mandate from South Africa in 1966 and the state was given the name Namibia (Nationalencyklopedin 1994). Then in 1988, with help by pressure from the United States, South Africa agreed to leave the territory and the 21st of March 1990 Namibia gained independence. The leader of SWAPO, Sam Nujoma was appointed as the new republic's president.

Legislation and policy regarding water

Article 95 of the Constitution of the Republic of Namibia serves as the core from which water legislation and policy is developed. It states that: *"the State shall actively promote and maintain the welfare of the people by adopting... policies aimed at... maintenance of*

ecosystems, essential ecological processes and biological diversity of Namibia and utilisation of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future..." (Jacobson et al 1995).

The Water Act of 1954 is the legislation protecting Namibia's water resources (Jacobson *et al* 1995). It states that water running in a natural river, either permanent or ephemeral, is public and can be used by the different landowners surrounding it, in a reasonable manner. Water originating and naturally remaining on someone's land, like a spring, is private and can be used by the landowner alone (Jacobson *et al* 1995). Groundwater is also regarded as private, but extraction may be restricted.

Moreover the Water Act regulates drilling of boreholes. It says that The Department of Water Affairs must be given thorough information about everything concerning the borehole (Jacobson *et al* 1995). However, this regulation is difficult to enforce and the punishment for the offender is not deterrent (Heyns *et al* 1998). Furthermore, the Water Act allows anyone to construct a dam as long as the storage capacity does not exceed 20 000 m³ and is approved according to the Soil Conservation Act (Heyns *et al* 1998). On the other hand, the state can remove such a construction if it is considered necessary for the division of water. An inadequacy with the Water Act is that it does not regard the natural environment as a user, only the landowner (Jacobson *et al* 1995).

NamWater (Namibia Water Corporation Ltd) includes board members from both the government, private sectors and different organisations. The Minister of Agriculture, Water and Rural Development designates each member. The primary aim of NamWater is to provide water of a suitable quality in adequate and sustainable quantities, to the most reasonable cost. Their mission is to abstract and distribute clean water, as well as designing plans for water shortages, regarding short, medium and long-term perspectives (NamWater 2001).

Land tenure

Namibia has a system of communal land and commercial farmlands. Communal land covers more than 40% of Namibia's total area (Lundgren 1999) with more than 1 million of the black population living within these areas, mainly in the north (Blackie 1999). Slightly above 40% are freehold land where fenced commercial farms are situated, which are predominantly

owned by the white part of the Namibian population (Adams & Devitt 1991). The rest of Namibia's land is owned by the state and is unsuitable for agriculture.

The Namibians have considered commercial farming as a more profitable land use system than communal farming, but on the contrary, the commercial farms are quite unprofitable and have only survived due to significant subsidies in the past and by low-interest loans from people in the commercial farms (Blackie 1999). Farmers in communal areas have only the right to use land and not to own. Although traditional ownership still prevails in the rural areas. Land is regarded as an ancestral heritage of the whole community and the traditional leader is a trustee who allocates or leases the land to members of the community (Lundgren 1999).

Individual tenure can be possible even in communal lands. A certificate, Permission to Occupy (PTO) can be issued from the government for commercial use. The permission has no time limit and ensures that no local chief can make claim of the land, which cannot exceed 5 ha (Lundgren 1999). An annual rent fee has to be paid to the Ministry of Lands, Resettlement and Rehabilitation.

Conservancies have been set up to protect wildlife without considering the locals' needs to use natural resources within the reserves. Centralised control of game laws and game utilisation transferred the authority from the local society to the central government. When local communities lost their privilege of wildlife they had no interest to maintain the state game considering they did not benefit from the conservancies at all. Poaching became a problem and law enforcement was paid little or no attention (Lundgren 1999). In 1996 new legislation was implemented in order to give residents on communal land more powerful rights over natural resources in their vicinity and to enable rural inhabitants to obtain income by new options (Lundgren 1999).

Case studies

Erweë

The mean annual precipitation in this area, is less than 200 mm. The water sources in the basin are the two ephemeral rivers, the Palm River and the Hoanib River, and groundwater sources that extracts from boreholes and springs. The settlements are located quite close to each other but they differ regarding ethnic and economy, social and water infrastructure. The Veterinary Cordon Fence south of Palmfontein Springs has a negative impact on the economy because it serves as an obstacle for cattle trade in the area. The fence is also an ethnic border between Damara and Herero homelands.

There are approximately 50 households and about 500 inhabitants in Erweë. There is a school with a hostel, a clinic, two shops and an Agricultural Development Centre (ADC). Erweë is connected to the national electric grid and the settlement is in a powerful development phase(Fuller & Koujo 2000). The population in Erweë is increasing since the area offers employment.

Figure 6. Map showing Erweë with surrounding areas (Fuller & Koujo 2000).

denna fanns i ursprunglig text (BH 25780 and BH 25781)

A 5 km long water pipe from Palmfontein to Erweë was provided by the state in the beginning of the 1980's. Neither the settlements at Palmfontien Borehole nor the ones at Palmfontein Springs have access to these boreholes(Fuller & Koujo 2000). The extracted water is stored in a tank, which is connected with a pipe network to the clinic, the hostel, the ADC and the teacher's house. The rest of the settlements in Erweë have access to water via a standpipe. Some of the pipelines are leaking and quite amounts of water are wasted this way.

Palmfontein Borehole consists of six households alone. When the inhabitants first arrived here they probably obtained their water from Palmfontein Springs, which is located about 4 km away. When the Veterinary Cordon Fence was erected in 1970 that came to an end. Today they receive their water from two boreholes driven by windmills (Fuller & Koujo 2000). The water is stored in an old concrete dam, probably constructed in the 1970s by white farmers.

Palmfontein Springs is situated north-west from Palmfontein Borehole and six springs are located there (figure 8). This is a quite young settlement established in 1988 and includes six households today. This settlement has no developed water supply system. They obtain their water from the ephemeral flows along the Palm River and the six natural springs. Without any supply security the locals are very dependent on these resources. They have not received any help from the government and were left out during the construction of the pipe to Erweë. Since the middle of 1990 the springs are drying up and they are forced to excavate springs and riverbed to find water. Only one spring is permanent but it is too small to supply enough water to both households and livestock in the dry season.

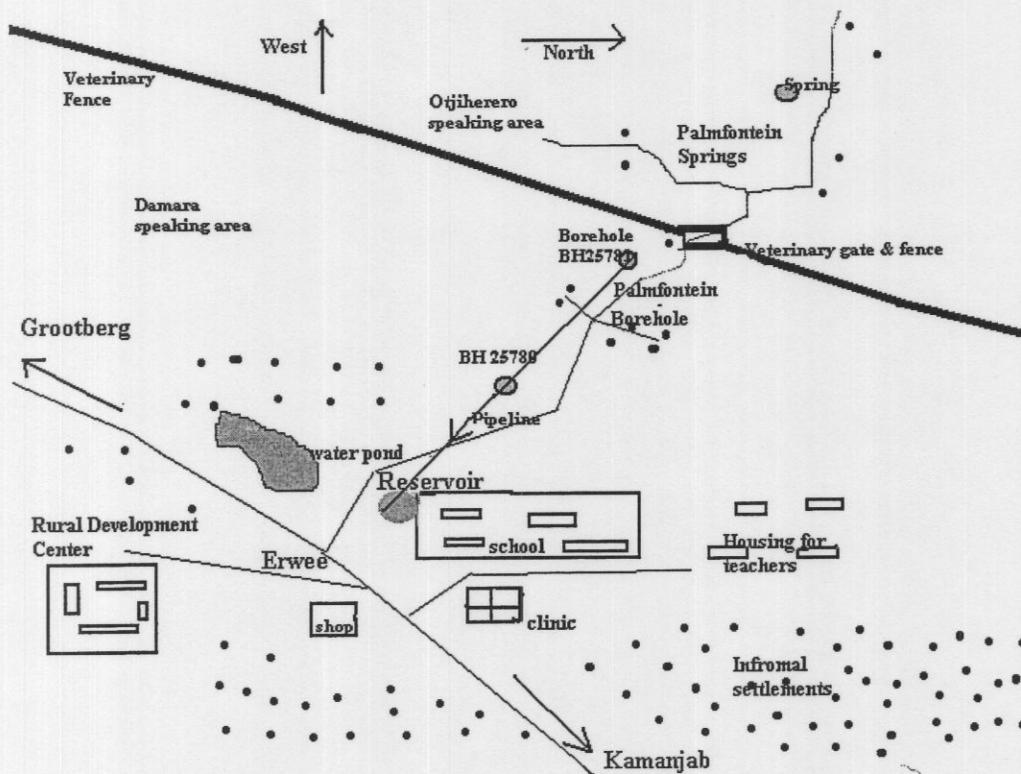


Figure 8. Map over Erweë with surrounding areas (Fuller & Koujo 2000).

There are differences in water utilisation between the settlements. Erweë, which have unrestricted accesses to water, uses much more than the other settlements. The settlements at the Palmfontein Borehole have their water sources in a distance of 5 minutes walking and the residents in Palmfontein Springs use very little water because they have to walk 15-60 minutes to obtain water. This reflects the living condition in the area, which are much more improved in Erweë and at the Palmfontein Borehole than in Palmfontein Springs.

Warmquelle

Warmquelle is community with about 72 household and 783 residents (Hoanib River Catchment Study 2000), of which most are Hereros. During the apartheid system, the community was a part of the Herero Bantustan, which is an all-black enclave in the Republic of South Africa with a limited degree of self-government (The Merriam-Webster Dictionary 1997).

Warmquelle receives its water, which is piped to the village, from perennial springs nearby, There are standpipes for the households' water supply. The ones living close to the standpipes tend to use more water than the ones that has to walk farther.

The nearest area around the village has a lack of ground vegetation because of the high number of livestock. The livestock gets their water from the springs nearby the village, or where there might be a leak on a pipeline.

In Warmquelle they carry on two types of agriculture; one for commercial use and one for domestic use. The commercial one was started with help from a Non-Governmental Organisation (NGO). It is mostly pepper and tobacco being cultivated there and the crops are sold with the help of the NGO. The community benefits from the income of the selling. Not every one of the residents in the community is involved, mostly because of the scepticism when the project started. There are people employed to run the cultivation, generally women and they are paid for their work. The crops are irrigated with water from a spring close by the Ongongo Community Campsite and are transported via pipelines down to the village. It is stored in a dam (figure 9) and from there the water is piped out to the field. The campsite uses the same water resource and so far there has been no dispute between them and the residents in Warmquelle over the amounts of water extracted. For the time being, the only water demanding facilities in the campsite, are showers.

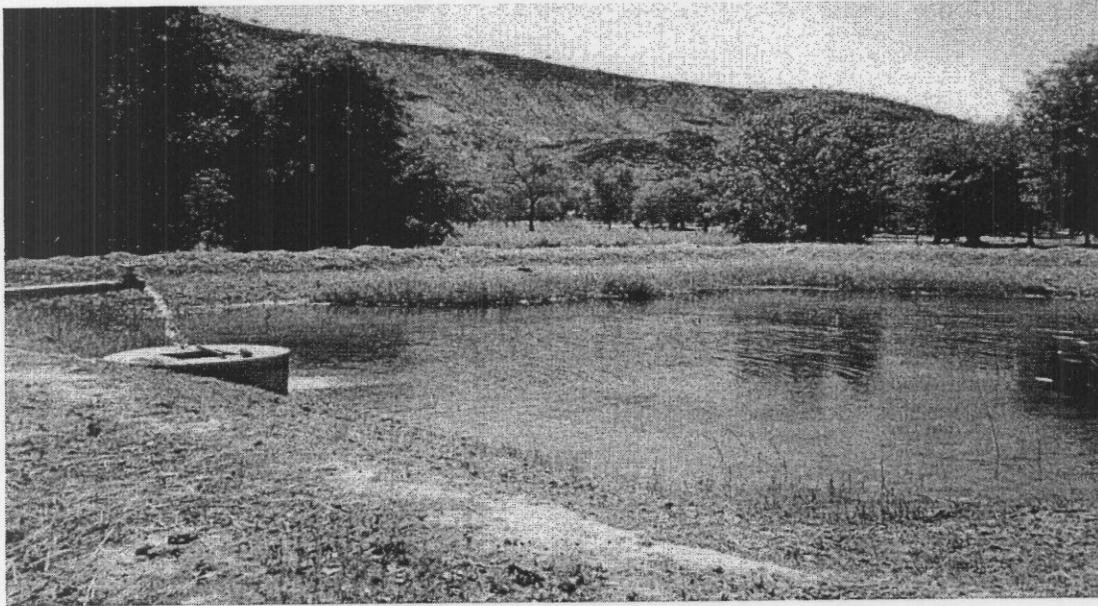


Figure 9. The dam for irrigating the commercial garden in Warmquelle, November 2001
(foto by Marika Bergkvist)

Furthermore, the individual households cultivate crops for their own use such as maize, tobacco and different kinds of seeds. For the irrigation of those fields, water is extracted from the springs closest to the village. Along the pipelines there are leaks, which have not been repaired. Consequently there is a waste of water during the transport from the spring. The water in the dam is lost due to the high evaporation.

It appears that no research has been done of how much water the aquifer holds and how fast the refill is. The normal idea among the people living in the community seems to be that there are no direct problems concerning the water. Their biggest concern seems to be grazing and the fact that they have to move their livestock further away from the settlement than they used to.

Seisfontein

Sesfontein serves as the capital of the western catchment community area, and the six springs at this settlement has given the community its name. Sesfontein is known for its fort, which was built by the Germans in 1886. The fort was built as a control point for keeping cattle diseases in check as well as to control arms smuggling and illegal hunting of big animals (Fort Sesfontein Lodge & Safari). In 1998, the population of Sesfontein constituency consisted of

263 households with a total of 2638 people living in the area (TRP Associates 1997 in Nghitila, 1998 p 25).

The community of Sesfontein has a clinic, a primary school, and a centre for agriculture development, a veterinary resource centre, a Police station, an administrative offices and facilities for livestock auctions (Nghitila, 1998).

The Sesfontein area has considerable groundwater resources, with groundwater influx from the plateau mountains. The water is accessed primary from a number of natural springs, boreholes and wells. According to Legget *et al* 2001 the mean daily consumption of water in Sesfontein is 60 L per capita and day. This is far more than the mean daily consumption in the most parts of the cathment. A study made in the area in 1997 observed differences in the human consumption between villages where water was available to the individual households in form of standpipes or taps compared to villages where only single water points are available for instance Warmquelle and Palmfontein Springs. According to studies made in the area, it appears that a great deal of water is lost through informal connections made by the communities without water pipe line. Large-scale extractions from informal connections affect the amount and also the water quality available to down stream users (Legget *et al* 2001 in Legget *et al* 2001 p 35).

Since the early 1960s and the early 1970s there has been numerous development plans for the Sesfontein area (Van Warmelo 1962, Fuller 1993 in Nghitila 1998 p 22). Particularly after independence a number of development strategies have been and still are being directed to this region. The developments projects are suppose to place emphasis on the social, economic and physical needs in the area, but there are many opposing and competing views and opinions on new development efforts. At the moment there is a conflict in the area, in the planning and establishment of a conservancy in the area.

According to Nghitila 1998 were the benefits from tourism the major contributor to the informal sector in the area. The contribution is in form of community camp fees, the sale of crafts and the employment of local guides by self drive tourists. The main tourist attraction the Fort Sesfontein does not have any community benefit scheme working, but it provides a small number of jobs.

Etosha National Park and surroundings

Etosha National Park (hereafter referred to as Etosha) in northern Namibia has an area of 22 915 km² (Auer 1997). It is frequently visited by tourists and has three camps/lodges. Each camp/lodge site includes facilities such as water toilet, shower and swimming pool (Ministry of Environment and Tourism).

About 4 800 km² of Etosha consists of a salt depression, the Etosha Pan (Nationalencyklopedin 1991). The accumulated salt originates from a now dried up lake formed by the Kunene River before it changed its course. The Ramsar Convention regards the Etosha Pan, including the Oponono Lake and the Cuvelai drainage, as a very important wetland (The Ramsar Convention on Wetlands 1995).

Approximately 45% of the population supported by agriculture and fishing in Namibia is dependent of this system of ephemeral rivers, including habitat as seasonally flooded grass plains and different kinds of savannahs. The Etosha Pan also contributes to a haven for several species of larger endangered mammals.

There are both perennial and seasonal waterholes in Etosha. Some of these are natural springs and others are drilled wells. In a surveyed area covering almost 1600 km² within Etosha, the density of perennial waterholes was 1 per 100 km² and the seasonal showed a density of 1 per 7 km² (Auer 1997). Several of the waterholes are highly saline with a maximum of salinity during the dry seasons in January and June – September.

The wildlife in the area can walk long distances in order to access grazing and water. This is also the best alternative for livestock. Commercial farmers around Etosha have to some extent adapted this form of rotational grazing, in fenced areas. Rotational grazing used to be common in the communal land, which are not fenced at all and allows people and livestock to move around freely. This form of livestock management is not practised to the same extension as before around Etosha. An explanation for this can be that areas with no access to water or only hand-dug wells, now have received reliable water resources such as boreholes, pipelines and canals from the Kunene River (Niemann 1999). Furthermore, much of traditional grazing areas have been fenced. As a result people have switched to a sedentary

lifestyle by the waterholes, which brings great strains to the surrounding environment from grazing livestock.

Another consequence of the above mentioned new water resources, is that people in the area becomes dependent of a well functioning co-operation between Angola and Namibia regarding water extraction from Kunene River. A risk for increased extraction from the Kunene River is the fact that the population north of Etosha has commenced irrigation, (Niemann 1999), of which they have no former experience. In addition, the soils in the area are unsuitable for irrigation.

Discussion of future scenarios

Erweë is growing and the strains on the water resources increase. The fact that Erweë do not have fees for water will contribute to overuse if nothing is done. The residents in Palmfontein Springs do no benefit from the pipeline to Erweë, but it affects their water availability. The future for the settlement of Palmfontein Springs is not promising and it will probably face more problems than Erweë. Unfortunately they are living on the wrong side of the Veterinary Cordon Fence and have no influence on the settlements on the other side. The administration is separate on both sides of the fence and there is no co-operation between the settlements. This will lead to a disadvantage, to not be able to focus on the entire basin, which is quite necessary. The three settlements are all in the same catchment depending on the same water resources. Some residents are negatively affected by the separated administration. This is a problem that should be solved before Palmfontein Springs has depleted their water resources. Moreover it seems to be a need for fees for water use and of course, education for the people in the area.

In Warmquelle there is no control of how much water that is used and no estimations of the amount of water in the aquifers. Moreover it is obvious that the proximity to a standpipe increases the water use of a household.

If more pastoralists move to the settlement, it will lead to the grazing areas becoming even less than now. Furthermore, irrigation will increase and so will the demand for water. If the water extraction from the springs gets to intense, then the springs might alter from being perennial to seasonal.

It is possible that The Ongongo Community Campsite will expand their business in the future.



Figure 10. Irrigation in the commercial garden in Warmquelle, November 2001 (Foto by Mamite Andersson).

To attract and cater for more tourists they might build facilities such as water toilets, washing machines and even a swimming pool. Water demand in the area could possibly increase greatly considering the open dam, the irrigated croplands (figure 10) and the leaking pipes in Warmquelle. Could that lead to a conflict between Ongongo and Warmquelle? Which one of the communities has the right to use the water? According to the Water Act it is the ones living next to the water resource that has the right to use, which in this case would be Ongongo. From an ethical perspective the issue gets trickier. Warmquelle has been using the spring for some time and its communal farmland is dependent on the water supply.

The situation for the people living around Etosha National Park could come to a disastrous ending in the future. The advantages of Etosha is, apart from endangered species being protected within the area, that wildlife have access to water holes of their own and does not have to compete with livestock and humans. Moreover the National Park brings job opportunities and is a source of income. However, tourists' visits are limited at the moment, but if the tourist industry increases, so will the water demand. Another issue that could possibly become true is what will happen when the waterholes become too saline for drinking? Likewise, what will happen when the people living in the proximity of Etosha have depleted their water resources? Or caused severe land degradation due to the lack of freedom to use a system of rotational grazing? In a worst case scenario a violent conflict might occur between Angola and Namibia over unsustainable extraction of water from the Kunene River.

References

- Adams, E. A., & Devitt, P., 1991: Grappling With Land Reform in Pastoral Namibia.
Available 2002-01-03: <http://www.odi.org.uk/pdn/papers/32a.pdf>
- Africa Adventurs Tuors and Safari. Available 2002.01.02 :
http://www.aas.com.na/about_namibia.htm
- Auer, C., 1997: Water Availability and Chemical Water Quality as Important Factors for Sustainable Wildlife Management in the Etosha National Park and for Domestic Stock in Farming Areas of Namibia. Included in: Research Discussion Paper, number 26, July 1997. Directorate of Environmental Affairs, Ministry of Environment and Tourism, Windhoek. Available 2001-12-20:
http://www.dea.met.gov.na/data/publications/pub_all.htm
- Blackie, R., 1999: Communities and natural resources: Trends in equitable and efficient use. Included in: Research Discussion Paper, number 29, January 1999. Directorate of Environmental Affairs, Ministry of Environment and Tourism, Windhoek. Available 2001-12-20: http://www.dea.met.gov.na/publications/pub_all-htm
- Bonniers Stora Lexikon, CD-Rom; Bonniers Lexikon AB
- FISonline, The Preferred Source for Global Business & Financial Information. Available 2002.01.02; <http://www.fisonline.com/b/country/nam.htm>
- FAO Aquastat Programme: Namibia, 1994. Available 2001-01-05:
http://search.britannica.com/frm_redir.jsp?query=namibia&redir=http://www.columbia.edu/cu/lweb/indiv/africa/cuvl/Namibia.html&isbol=0
- Fort Sesfontein Lodge & Safaris. Available 2002-01-07:
<http://mebers.aol.com/nrs97/sesfoifein/page3.htm>
- Fuller, B. & Koujo, F.: Divided by History, United by Water, Impacts of Waterdevelopment in the Upper Hoanib Catchment. Multidisciplinary Research and Consultancy Center, University of Namibia. Windhoek. 2000

General Information. Explore Info Africa, 1998: Available 2002-01-02:

<http://www.eia.com.na/dune/general.htm>

Geographia. Available 2002.01.02: <http://www.geographia.com/namibia>

Hamutenya H., 2001: Water and Energy. Southern African Development Community.

Available 2002-01-02:

<http://www.sadcreview.com/country%20profiles%202001/namibia/namibiaWater&Energy.htm>

Herero genocide - the facts and the criticisms. Available

2002.01.02: <http://www.sn.apc.org/wmail/issues/980320/BUS1.html>

Heyns, P., Montgomery, S., Pallett, J. and Seely, M., 1998: *Namibia's Water: A Decision Makers' Guide*. The Department of Water Affairs, Ministry of Agriculture and Rural Development and the Desert Research Foundation of Namibia, Windhoek. 173 pp.

Hoanib River Catchment Study, 2000: Community Information Pamphlet no.6, People living in the catchment; Desert Research Foundation of Namibia; Windhoek.

Hoanib River Catchment Study, 2000: Catchment: Population Numbers; Desert Research Foundation of Namibia; Windhoek.

Jacobson, P., J., Jacobson, K., M and Seely, M., K., 1997: *Ephemeral Rivers and their Catchment: Sustaining People and Development in Western Namibia*. Desert Research Foundation of Namibia, Windhoek. 160 pp.

Kaokoland and Damaraland. Available 2002.01.03:

<http://mzone.mweb.co.za/residents/sdelange/intro.html>

Legget, K. Fennessy, J., Schneider, S. 2001: Haonib River Catchment Study, northwestern Namibia. Occasional Paper no.15. Desert Research Foundation of Namibia, Windhoek.

Leggett K., Fennessy J. and Schneider S., 2001: Rainfall, water sources and water use in the Hoanib River Catchment, north west Namibia. Desert research foundation of Namibia. Windhoek. 40 p.

- Liljequist, G. 1970: *Klimatologi*. Generalstabens Litografiska Anstalt, Stockholm. Extract:
157-344 pp.
- Lundgren, H., 1999: Socio-economic effects of tourism and nature conservation in Namibia.
Swedish University of Agricultural Sciences, Uppsala. 71 pp.
- "Namib" *Encyclopædia Britannica Online*.
<<http://search.eb.com/bol/topic?idxref=480221&pm=1>> Available 2002-01-07
- "Namibia" *Encyclopædia Britannica Online*.
<http://search.eb.com/bol/topic?artcl=109713&seq_nbr=2&page=n&pm=1> Available
2002-01-03
- NamWater, 2001: Establishment. Namibia Water Corporation Ltd. Available 2002-01-04:
<http://www.Namwater.com.na/en.Org/Ops.asp>
- Nationalencyklopedin 1991: band 5, Etoshaslätten. Bokförlaget Bra Böcker AB, Höganäs.
658 pp.
- Nationalencyklopedin 1994: Band 14. Namibia. Bra Böckers Bokklubb AB, Höganäs. 658 pp.
- Nghitila, T.,M.,K. 1998: Integrating strategic Environmental Assessment (SEA) into Land
Use Planning of Communal Areas – A case study of Seisfontein Constituency in
northwestern Namibia. Master of Science Thesis, Division of Land and Water
Resources, Department of Civil and Environmental Engineering, Royal institute of
Technology, Stockholm 1998
- Niemann, S., 1999: Can Tradition Help to Overcome Current Problems? Indigenous water
resources management and water-utilisation in northern Namibia (former Ovamboland).
Available 2002-01-01:
[http://www.up.ac.za/academic/libarts/polsci/awiru/op31%20\(text\).rtf](http://www.up.ac.za/academic/libarts/polsci/awiru/op31%20(text).rtf)
- Nordisk familjebok, 1996: CD-Rom Corona & Scandinavian PC Systems AB

Revilio, B. & Revilio A., 2000: Namibia. New Holland Publisher (UK) Ltd

Social Sciences Division, 2001: Crops, Livestock and Tourists: Choices and Options in the Hoanib River Catchment; Multidisciplinary Research and Consultancy Centre, University of Namibia; Hoanib Data, Desert Research Foundation of Namibia. Windhoek 2001;

Schneider, S., Leggett, K., Fennessy, J., 2001: A Critical analysis of the Role of Community Researchers in the Hoanib River catchment Study, *Draft Paper*; Hoanib River Catchment Study. Desert Research Foundation of Namibia. Windhoek.

Strahler A.H., Strahler A.N., 1992: *Modern physical geography*. Fourth edition. Von Hoffmann Press

The Cardboard Box Travle Shop. Available 2002.01.03;

<http://www.namibian.org/travel.namibia.htm>

<http://www.namibian.org/travel.namibia/history.htm>

<http://www.namibian.org/travel.namibia/population/index.htm>

<http://www.namibian.org/travel.namibiapopulation/herero.htm>

<http://www.namibian.org/travel.namibia/nama.htm>

<http://www.namibian.org/travel.namibia/himba.htm>

<http://www.namibian.org/travel.namibia/damara.htm>

<http://www.namibia.addr.cim/travel/maps/namibiap.htm>

The Merriam-Webster Dictionary, 1997: Merriam-Webster, Incorporated, Springfield 894 pp.

The Ministry of Environment and Tourism. Northern Namibia. Available 2002-01-03:

<http://www.met.gov.na/norhtern.html>

The Ramsar Convention on Wetlands, 1995: The Annotated Ramsar List: Namibia. Available 2001-12-27: http://www.ramsar.org/profiles_namibia.htm

Utrikesdepartementet, 1999: Landstrategi Namibia. Regeringskansliet, Stockholm 18 pp.

Patrick Fox

Patrick Fox updates

[Handwritten signature]

Tourist Namibia – Africa for beginners

- But what are the potentials and their consequences?

Executive summary

1. Introduction

Tourism is the world's largest industry with 3.6 trillion USD in turnover and globally accounting for one in twelve jobs (Mastny, 2001). In 1999, international tourist spending abroad accounted for nearly 8 percent of world exports of goods and services, surpassing trade in such items as food, textiles, and chemicals. Mastny (2001) further concludes that tourism is also the most rapidly growing export in the services sector, representing more than 40 percent of world services exports. The industry keeps on growing and 2000 saw the increase in revenues by a staggering 7.4%. However, sudden un-predicted twitches indicate the fragility the industry has on countries becoming increasingly dependent on international tourism. As security is tightened, it is nevertheless viewed that the industry will keep on growing.

| ?

The industry took a leap as travelling was gradually made easier and cheaper and thereby accessible to such an extensive public. Many societies are thriving in its wake, and some societies are even upheld singularly due to the influx of cash through the tourism business. As an example, The Balears was a rundown region with limited prospects. The favourable location of the islands has however attracted a group with both money and interest in spending it on the islands. As a result, the islands have faced an incredible reconstruction phase, an influx of large funds and soaring prices on land and estates. This is a global phenomenon, but is this good or bad? What has this meant for the local population, and are they participating in this development and receiving a share of the profits. I.e., is the development being done on equal terms for givers and takers? Lately, the islanders have taken pride in protecting the environment and offering a clean countryside to be visited and walked through. Some of the tourism enterprises have furthermore taken to using a "green label" on their packages, referring to that the company is taking action in protecting the environment and educating travellers (pers. Comment) Berg, 2002).

Islands in the Western Mediterranean

under within period?

personal communication

It is estimated that within the tourism business, on average, 50% of the earnings "leak" out of the Third World to foreign owned businesses. Furthermore, in view of effects the September 11 attack has had on the industry, Mastny (2001) comments, "Now, more than ever, it is time to put issues of sustainability at the top of the global tourism agenda." She further argues her case with not only conditions of how the third world may keep more of the profits but in ways that countries can redirect their tourism activities to make them more socially beneficial and environmentally sound. It's especially significant in poorer countries that have few other options: for the world's 49 so-called least developed countries, tourism is the second largest source of foreign exchange after oil (www.worldwatch.org, 2001).

It is

Revenues from tourism have been especially important in the developing world and tourism is the only economic sector where developing countries consistently run a trade surplus. Namibia is no different to this case. But competition is high and each country will have to develop a specific agenda to attract tourists by. Namibia has a very peculiar environment which attracts a certain type of visitor. The Namibian Ministry of Environment and Tourism (MET) is currently undertaking far reaching measures which will decide on how best to make use of the limited resources.

In November 2001, a group of students from Stockholm University visited the North Western region of Namibia. This paper is a presentation of the author's thoughts on development potentials in the region taken into consideration the short stay, limited natural resources (in particular water), the fragile and striking landscape, and options available and open to stakeholders.

*ed: den konceptuella
in konceptuella
skolorna*

2. Objective

The objective of this essay is to give a brief overview of tourism potentials and examine the case of Namibian tourism development in the North Western region with special focus directed to the Tourism Master Plan. The goal is to highlight tourism potentials and attempt to discuss the consequences it may carry on the local population and natural resources, in particular water, related to observed cases visited during the field trip to the North Western area of Namibia in November 2001.

3. The Namibian experience

In 1991, the Namibian Cabinet declared tourism as a priority economic development sector in the country. Accordingly the First National Development Plan (FNDP1) for 1995 – 2000, spells out the needs and objectives for national tourism development in Namibia.

The specific issue which attracts the tourist varies greatly to include sun and beaches, hiking, bird watching, climbing, biking etc. But what all tourists have in common in their quest of where to go is a memorable experience. In the competition that exists between sites and options, also in this trade, a central point of focus is to offer that special thing/experience that cannot be found anywhere else – to make use of its special assets and features.

The most popular destinations in Namibia are Swakopmund and Etosha, followed by Sossusvlei, the former Damaraland and the Namib Naukluft Park. According to the Ministry of Environment and Tourism (MET), approximately 50% of tourists visiting Namibia are, furthermore, on organised tours. It has also been shown that over 50% of tourists visiting Namibia are above 45 years of age. This therefore reflects that the Namibian tourism market caters largely for the older visitors. These tourists belong to a group that statistically can afford the long journey to Namibia which is, in relative terms, rather expensive – for non-African travellers (see Figure 1). Meanwhile,

backpackers, overlanders, motorcyclists and similar mid to lower budget tourists are said to be on the increase and will look for suitable accommodation to affordable prices.

The mystique of Africa, including [^]Safaris and wilderness, is nevertheless an issue that still lingers in the minds of people in the West. However, visiting virgin land with limited population densities are increasingly more difficult to achieve. Meanwhile, the average tourist is generally rather comfortable, and does not wish to make the trip into too much of a hardship and is reflected in the higher average age of the visitor to Namibia.

Namibia has among the best road infrastructure that is to be found in Africa, including its dirt roads. The commerce is, furthermore, such that all goods one would want to find in ones own shopping district at home is easily accessed in the country. All this at hand, Namibia indeed presents an option for travellers with the aim of roughing the journey, yet comfortably experience Africa as a beginner.

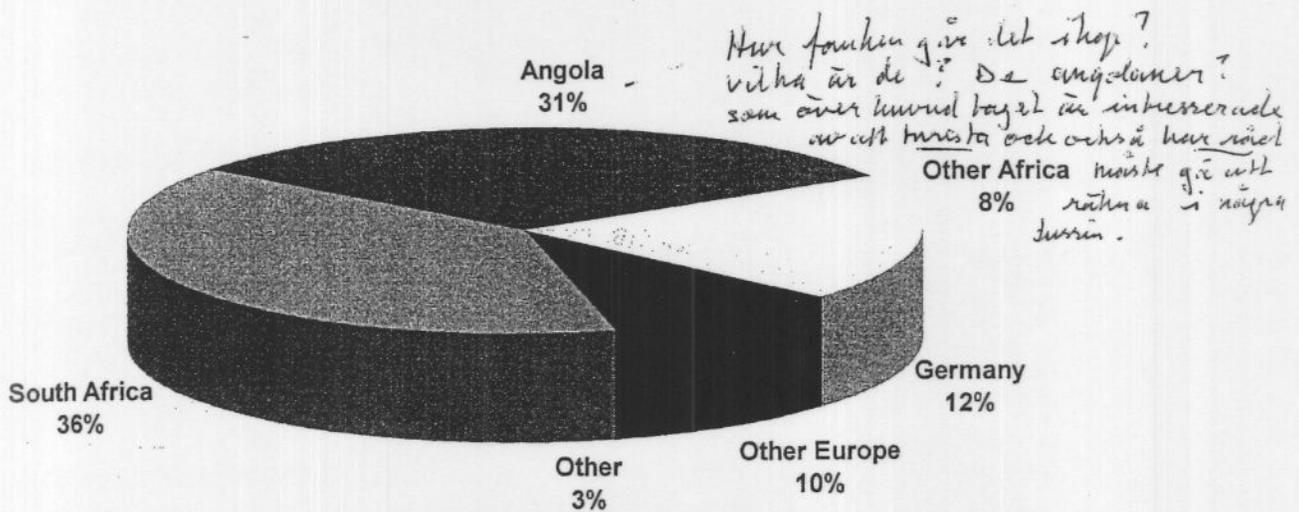


Figure 1: International Tourist Arrivals In Namibia By Country Of Origin For 1997 (Leisure, Recreation And Holidays) Source: Policy, planning and management information unit, Ministry of Environment and Tourism (1997).

The northwest region of Namibia has a very peculiar and frail but staggering landscape to exhibit. Meanwhile distance from Europe and the Americas, producing by far the greatest bulk of tourists, is far, and the journey requires at least 24 hours and is presently not among the cheaper routes to be undertaken. As seen in Figure 1, the large fraction of tourists originating from Europe and the Americas are hardly tapped from, and an issue is to make Namibia not only known, but also attractive to the tourist.

beskydder?

Går in i ihop m. de andra?

3.1. Policies

Jeg bygger in de del her er samme
omkring hakejoni som 3.2 og 3.3

The northwest of Namibia has experienced considerable tourism growth over the last decade. This growth has been effectively harnessed by the formal tourism products in the main centres and commercial farming areas. Although the communal areas have experienced similar tourism growth the residents have realised little return from wildlife and tourism over the same period. This, combined with the particularly sensitive environment of the northwest, resulted in the Kunene and Erongo Regions being identified by the MET as a priority area for effective tourism development planning. To this end, funding was raised through various supporters and stakeholders in the aim of producing a tourism master plan for the North-West Region of Namibia.

The three main objectives of the Master Plan are (MET, 1999):

- 1) To provide a physical, institutional, policy and management framework to guide the development of tourism in the North-West Region, for the primary benefit of decision and policy makers operating in the area.
- 2) To establish Community Based Tourism (CBT) as a key strategy for the conservation and protection of the sensitive environment which characterises the region, particularly its fragile ecology and cultural diversity.
- 3) To establish CBT as a key strategy for increased investment, control of resources and income generation by local communities in the development of tourism in their area.

The **Nature Conservation Ordinance No 4 of 1975** affords protection to various categories of plants and animals, as well as wetlands located within National Parks.

in house from
i hakejoni area

The overall objective of the draft act is:

"To make provision for the orderly, co-ordinated and harmonious development of the tourism industry; to ensure that benefits accruing from the industry are distributed over a broad range of beneficiaries; that tourism development ensures that previously neglected areas of the country receive priority treatment; to establish policy guidelines for the tourism industry; to spell out the powers of the Minister; to provide for the creation of tourism development plans and priority tourism zones and structures to manage them and matters incidental thereto."

This document contains the draft tourism policy for Namibia. The main role of the policy is to:

- Define and clarify roles and responsibilities amongst stakeholders
- Adopt a strategic approach to dealing with the prerequisites for success, key constraints and major opportunities for development.

The draft legislation provides (MET, 1999):

- A national Tourism Policy
- Clarification on the general functions of the Minister

7
6

- Regulation of tourism development, operation and activities
- National Tourism Development plans
- Regional Tourism Development plan
- Declaration and management of priority tourism zones
- Tourism concessions, application, granting concession and rights of conservancies in respect of tourism concessions

7

akhlak

Conservancies

An option involving s.c. conservancies has been promoted by authorities in order to let the rural population take charge of their own assets in the form of productive environmental protection.

"A conservancy consists of a community or group of communities, within a defined geographical area, who jointly manage, conserve, utilise and benefit from the wildlife and other natural resources in the area." (MET, 1999)

Conservancies can benefit financially through the consumptive and non-consumptive use of wildlife. This includes entering into joint-venture type agreements with commercial/formal sector tourism operations. Benefits generated are managed by the conservancy committee and distributed according to the conservancy's own equitable benefits distribution plan. As well as addressing the discriminatory provision of the Nature Conservation Ordinance of 1975, the Government hopes to provide incentive for improved management and conservation of wildlife and other natural resources through this legislation.

Communal land belongs to the State. The State holds communal land in trust for the benefit of the traditional communities residing in those areas and for the purpose of promoting the economic and social development of the people of Namibia.

*Di mana ke fin d
deklarasi vilka
alihan iyer an
land dlt fin
sedan dan du g
in pi de alih partisiene
egenhaper*

3.2. Ecotourism

The role of ecotourism, or responsible tourism in natural settings, is protecting and enhancing environmentally fragile areas. But at the same time, make nature accessible to the visitor. If done well, ecotourism can bring benefits to both local communities and conservation. The ecotourism sector has globally been growing even faster than the tourism industry as a whole (20% vs. 7%) during 2000 (Mastny, 2001). But Mastny (2001) cautions that some businesses are "greenwashing" their operations, (ab-)using the ecotourism label without actually changing their practices.

*En vederbygn
definition*

An approach in the promotion of ecotourism is the practice "high-value, low-volume" tourism which involves accepting fewer tourists who in turn will have to pay more per individual. Meanwhile, focus can be put on fewer in the aim of ensuring that the stay is made memorable to the visitor. The potential impact the tourist will have on the natural resources can thereby be limited. Game hunting in Namibia is one form of this, and is restricted to the game which is deemed necessary to cull.

Another form is to open up fixed paths to visitors through a fragile landscape from which detouring is not permitted. In the ~~Skeletal~~ Coast Park in north western Namibia a version of this is, according to MET, successfully practiced.

Koornkens?

From an environmental perspective, the north-western area of Namibia is different from all other areas in Namibia. Its ancient and recent history, its ecology and its current status differ which, in turn, mean that its current overall environment provides a development potential that differs from the potential of the remainder of Namibia (MET, 1999). Of all the areas of Namibia, this area is most attractive for tourism from the environmental point of view (MET, 1999):

be by den?

- **A geological wonderland:** Recent deposits of sand and calcretes cover much of Namibia, however, the northwest is different. Here much of the land is bare, because the harsh climate limits soil development and vegetation growth. As a result, an ancient landscape is visible on the surface. This landscape tells a story of collisions, fire flood and ice; the story of a landscape shaped by colliding continents, volcanic eruptions, glacial advances and retreats, inundation by seas, break-up of the Gondwanaland super continent, flows of molten lava and, finally, dissection by flowing rivers. This geological wonderland of broken, arid topography is found nowhere else in Namibia.

1. let me
turn it into a
more interesting
story?

- **Fragile and multi faceted landscape:**

- Thin and poorly developed soils vary greatly depending on the association with the diverse geology and include presentations of littoral sands including sand dunes close to the coast; soils, generally calcareous, thinly overlying a hard rock surface may be found further inland; thick deposits of sand loams and sandy clay loams to be found only within the floodplains.
- Rainfall is very low, erratic and variable ranging annually from 0 to 300 mm from west to east. Limited infiltration and large concentrated thunderstorms generate spectacular flash floods into sudden and temporal rivers. These phenomena combined with a very high potential evaporation reaching about 3000 mm generate a very fragile environment. Drought (defined as more than two years with rainfall lower than the long-term mean) is common. Rivers, both perennial as well as ephemeral, attract the attention of wildlife, livestock and people living in the area alike. From a wildlife and tourism point of view, as well as from the point of view of most people living in the study area, rivers are the most important environmental component of the landscape.
- Diverse and varied, meagre vegetation is a consequence due to the natural setting as described. Overall, the northwest falls into the Northern Namib, mopane savannah and semi-desert transition vegetation zones. Most important to the wildlife, domestic livestock and people of this low rainfall area, however, are the grasslands and the riparian vegetation associated with the ephemeral rivers.

with lions?

But lions
are not
in the
area
with
stone
honey.

- **Wildlife in the northwest:** Large vertebrates survive in the more arid, western portions of the northwest by being nomadic. Springs and wetlands are essential watering points to the mega-fauna found here and in few places elsewhere in Namibia outside of reserves. The populations of rhino, elephant, lion, giraffe and other wildlife within this area are unique in the world. Nowhere else does one find such a diverse assemblage of wildlife in such a dry landscape. At the same time,

nowhere else in Namibia does game exist in such a spectacular and varied topography. Moreover, the dissected escarpment of the northwest harbours a diverse, endemic fauna of birds, reptiles and invertebrates with a number of species found nowhere else in Namibia. Elephants and rhinos, and secondarily giraffe and lions, are the wildlife species which carry a heavy burden in the reputation of the north-western region. These have fluctuated widely in its abundance and/near extinction in the past few decades which ~~has included~~ ^{have seen} unrestricted hunting by military and professional hunters (MET, 1999). The Angolan war has later carried its share in the burden of decimating the wildlife stock. Wildlife numbers in the western part of the communal land in Kunene and Erongo Regions have increased dramatically since 1981. This has been due to the combined efforts of the MET, NGOs (eg. Rhino Trust), private sector and the commitment of local communities to farm with wildlife with a view to benefiting over the long term.

Learn
I have been
ref?
?

These communal areas are the only in Africa to have free roaming populations of black rhino. Prior to conservancies, community involvement in wildlife was structured through the Community Game Guard (CGG) system. This system is primarily NGO funded, and brings about a partnership between the MET, communities and NGOs.

? the existence was?
ref ?

These issues, as described by MET (1999), are natural settings in which study tours can be arranged. Induced by the sudden natural changes in the climate, different fauna and flora come and go using the potential and limitations of the surroundings for existence and survival. Furthermore, the dynamic successions of changes and reversals brought on by the special climatic conditions in the very fragile landscape permit for tourists in the form of students to participate and learn simultaneously within a limited period of time.

3.3. Community directed approach

In the cases presented above (section 3.2.) the trickle down effect to the local community has proven limited. Employment potentials are few and in particular the hunting option demands large investments and control, making it out of reach to the local community. In the plans and draft legislation presented by MET, emphasis is laid on developing low-impact Community Based Tourism (CBT) as a key strategy for conservation as well as the social and economic empowerment of local communities on communal land. This is reiterated in the Communal Area Conservation legislation (June 1996 - amendment to Nature Conservation Ordinance No 4 of 1975) and the Community Based Tourism Policy (June 1995).

Community based tourism (CBT) is a relatively new concept in Namibia and has not been able to keep pace with the increased demand and has in general not been able to meet private sector quality needs. The MET, NGOs, conservancies and to a lesser extent the private sector are striving to improve this through joint ventures, bed night levies and training.

4. The community is changing

Tourism development in a National and Regional context has been considered to provide perspective to developments within the communal areas. A further incentive is to provide ~~with~~ activities that include the young. Most parts of Africa are undergoing the same changes: that the young leave the country side and the traditional obligations of looking after the old (when that time comes) (Skjonsberg, 1988, Pers. Comm. Eriksson, 2000). The young are observed to abandon the old ways, and leaving the country side in an urbanisation movement. Communities are worried that the social system will collapse since the young do not wish to adhere to the old ways.

are v. im?

ref. ?

Relative to its total land ^{area} mass of 824 000km², Namibia has a small population, around 1.7 million. A mere 8% of the population, or 1.08 persons per km² inhabits the north western region. Using the intercensal population growth rate (1981 to 1991), one could see that population will nearly double within the next 15 years.

The north west region, (as already described), is very sensitive and needs conclusive protection plans in order to maintain its appearance which is presently the focus of interest for visitors. The natural resources at disposition are limited in this environment, and water so in particular. Wildlife and livestock depend on the same restricted resources, food and water, making a central task to decide at an early stage what is to be the main production aim. According to the Ministry of Agriculture, Water and Rural development (MAWRD, 1997) land with less than 100 mm mean rainfall is unsuitable for livestock farming. Nevertheless, during the past century an increased number of sedentary livestock has accumulated and livestock is a main contributor to the Namibian economy. Many rivers and water holes in the region are ephemeral, and some that were perennial have lately become temporary. This could indicate that the water resources are presently over-tapped by the multitude of activities including wildlife and human induced (agriculture – including grazing, irrigation etc. – and living requirements as well as development). Regular movements in and between catchments and their rivers are a normal part of life for animals. Developments that eliminate surface water and degrade vegetative resources make movement between resources difficult. Nevertheless, directives from MET conclude that the aim of wildlife on communal land is to diversify local economies and thereby spreading risk. The aim is not to replace livestock.

meaning?
ku ni g.?

del. f. im. en
Rueqani's husband
him
jjs "jamburuk
ack. buskops.
Shibet"

Resources

Having mentioned the fragility of the ecological system of the region, water is the most precious resource which provides limited development options. Not that water has the option of being stored untouched, but that it is managed in its most productive and sustainable form. Short-term management is not an option! The Water Act No. 54 of 1956 currently protects Namibia's water resources. The act covers a wide range of issues relating to protection of surface and subsurface waters from pollution and misappropriation. A major limitation of the Act, however, is that it does not specifically recognise downstream environments or an ecological reserve, upon which the livelihoods of many Namibians depend (MET, 1999). If applied, however, the law could, in principle, be used to maintain downstream flow for environmental needs. As

9. only

ephemeral rivers and their episodic flow are so important for the northwest, this latter possibility could be important but has not, to date, been invoked.

At present the MET is preparing a proposed policy framework for wildlife production and utilisation in support of biodiversity, conservation and economic development. This is the basis of the future "Parks and Wildlife Act" which will consolidate and replace all existing legislation. Similarly the work being undertaken on the White Paper for Tourism will encompass all existing legislation and policy related to tourism becoming the overall "Tourism Act". This indicates that strong emphasis is laid on the need for careful planning and controlled tourism development.

Wildlife

The tourism value of elephants and rhino is extremely high. They are indeed the highlight of most tourists' trips to the northwest. However, while rhino's tend to be shy animals and avoid humans, elephants regularly approach human settlements and tourist camps to drink water. Several tour companies offer special tours to see either elephants or rhino in the Kunene Region, reflecting the ability of these two animals to attract tourists (MET, 1999).

This increase in wildlife in the communal areas has associated costs for rural residents. Elephants have killed several people in the focus area, they continue to damage water installations and gardens, kill domestic stock and ~~in~~ reduce water quality and quantity in open springs. Grazing and browsing wildlife utilise the same areas (and resources) as domestic stock and competition results, particularly from springbok. Jackal ^{is} ~~pose~~ to be a problem animal to stock farmers through out the area and losses to predators are common in some areas. Surveys of local people living in areas with high wildlife concentrations and predators, still present a very positive attitude towards wildlife. A two-year trophy hunting concession was allocated by the MET in the focus area. Apart from meat, the local communities received little benefit and all trophy fees were paid to the central coffers and bed night fees to local tourism operators. Lately, two conservancies have since been registered and trophy hunting contracts have been signed by them. These fees will be paid directly to the conservancy committee, which will consult its members on the expenditure of the funds. This represents the first substantial step in allowing wildlife to compete (economically) with other land use forms on communal land. These two conservancies, if taken together, begin to provide a model of what can be achieved from the utilisation of wildlife and tourism on communal land. In these conservancies the first major step in economic sustainability has been taken (MET, 1999).

and

has ?

Campsites vs. lodges

While community campsites offer the option of limited investment, there is also limited gain to be harvested, as compared to for example lodges. Nevertheless, campsites require limited skills in ~~its~~ development and therefore promote the option of self-ownership by the community. Meanwhile, campsites also offer the budget and more adventurous travellers with an option to more expensive lodging. Implications on the environment need furthermore not be extensive. On the negative side, however,

then

is the potential of low spend tourist attraction such camps constitute. In view of this, it is difficult to promote the "high value, low volume" principle, with sufficient income generated to sustain an operation to live off. There are nevertheless entrepreneur effects to be looked upon as potential issues which include supply stores, catering, markets, artisans, etc.

*Here were del
the sin plants and
referrals*

In view of the above, it seems likely that individual campsites will have difficulty in self management and marketing, why a possible option lies in the promotion of the idea by a group of campsite owners together. It is estimated by MET that a mere 8 permanent direct and indirect jobs per 12 campsites are realistic to envisage in such an enterprise. Income to the community as a whole is thereby very small and impact on local unemployment minimal.

Lodges on the other hand have the capacity of generating a significant contribution to the local unemployment and may stimulate the local economy by means of increased direct and indirect expenditure in the region. The tourist visiting Namibia is generally attracted to the game viewing, bird watching and nature tours. There are niche markets catering for trekking, fishing and cultural tourism. Water hole development to attract wildlife, trekking opportunities and vegetation study tours are opportunities that may be operated. The investment such options demand is critical and includes not only the physical constructions, but also extensive training of guides and other personnel. Based upon information obtained through the visited sites during the field trip, it is not viewed that a community can undertake such an investment without outside assistance.

*Here marks
presents many
the host can
MET (1997) - ask how to
mer distribution*

Some sites which had been selected for lodge development, but remained uncompleted, were visited during the study tour. In one case, funds had been transferred to a local entrepreneur in order to complete the project, who in turn had chosen to disappear with the funds. In another case, cattle and elephants were competing for the same water hole. Whereas the location had the splendour of a natural setting required for a potential location, the water hole conflict, which had resulted in the loss of a number of cattle, remained unresolved and with it the entire enterprise.

Observations and discussion

The World Summit planned for Johannesburg, 2002, include^s a section whereby participating members will address the issues of economically and socially sustainable tourism in the third world - including that more of the incomes remain in the country of destination. There are strong indications that many rural societies targeted by tourism undergo radical changes which carry far reaching effects on the structure and development of a village. Changes are evident and part of dynamic societies. But no changes and unwanted changes tend to generate urbanisation movements, in particular by the youth, to urban areas where there are limited or no jobs to be found. Such movements have in turn shown to produce mass unemployment and an elevation of crime in its wake. Furthermore, the ones that left the village are often not welcomed back again, even if they wanted to. Meanwhile, unemployment on rural level leaves in its wake vulnerability and poverty and implies more pressure on the natural resource

base as a last resort for survival. These are national issues that need addressing parallel to the implementation of new industries.

For Namibia's rural population, central questions need answers in order for such tourism enterprises to go ahead. First of all, what level of tourism is accepted – if at all – by the rural communities? Curiosity and often ignorance by tourists is a combination that in many African communities have lead to a sense of foreign “prying” into their way of life. Secondly, what changes are viewed as acceptable in the local communities, for there will be changes in the wake of tourism? Thirdly, how are generated funds to be distributed among stakeholders in such a venture? And, fourthly, can rural communities survive on this parallel to the protection of the fragile environment including the wildlife.

The Master Plan for tourism development for the north west of Namibia describes to a great extent the environment and preconditions in which tourism opportunities may be developed. But it assumes that change and development in some form is a must, and therefore tourism, with good reason, is viewed as a serious option. Meanwhile, the fragile environment, being the setting for the envisaged development, may not fare well in view of the changes tourism will bring about, and rural communities may loose their identities altogether. The price tag to be borne by tourism development may well be very high and the potential far-reaching changes induced may be unacceptable to the communities. It is therefore in the view of the author that it is important that community members, including the young generations, are carefully consulted prior to marketing and launching of the region as a tourism destination.

*How behavior
nag na plan
customers visit
for for all the
shall be see however
rehabilitation dishwash*

It should be noted that there is an opportunity in the tourism sector for young to be encouraged to take up other work than what would be available to them had they remained in the village. Across the African continent, there are signs an urbanisation process where the young leave the villages in favour of the fast life in the cities. It is described by Skjonsberg (1988) how the young discuss among each other of searching for opportunities in Zambia by obtaining some sort of specialised training such as driving vehicles etc. The accomplishment provides with the incentive of a feeling that life is not wasted and that something is accomplished before the body is “wasted”. This is a common picture in many African societies where the young are restless and do not feel like abiding nor following the old ways. In Burkina Faso, many young have left for the Ivory Coast to work on plantations to make some money, or gone to dig for gold in Guinea. In The Gambia and Senegal, young men leave for the coastal areas in hope of attracting the attention of tourists who for various reasons accept to support the individual through schooling or give money on regular basis without conditions. These forms of economical refugees are nevertheless difficult to control and such refugees are easy to both manipulate and abuse since the exchange of goods is often not accomplished on equal terms.

*Nag an saraw
rehabilitation hill down
fringe?*

As in many regions, the population is increasing, and higher population density is generally viewed as a problem to the fragile environment. Especially since the region envisaged for development coincides with communal land – which is also the land used for grazing and possible farmland. So there is an obvious conflict in the development of the north western region. It is of national interest to reduce urbanisation in order to maintain cultural values and a living rural area. But increasing population densities in the rural areas lead to potential erosion of the fragile

*Pis taen den
(sakit-sakit na
-mu-mu-shyokto
-i den hin lechen)*

environment including human expansion at the cost of reduction of wildlife and further depletion of a limited water resource.

Tourism has definite and often measurable impacts on the environment and socio-cultural aspects of a region. These impacts are more significant when one considers that much of tourism's appeal relies on the quality of the environment itself. It is therefore viewed that much weight be put on the education and information spreading to tourists. It is also a form through which the experience for the tourist is enhanced by providing deeper understanding and hence participation. Education and information need to be given on the region's environmental and social fragility, and expected behaviour of the visitor. Educating tourists is furthermore a critical finding from the MET master plan (1999), which propose that tourist information should include directives on how to behave and act in order to ensure long-term sustainability. Currently, it states, tourists visiting the area are, in general, naïve about the environmental and social susceptibility of the region. Visitor education may be achieved through a visitor code-of-conduct displayed on signboards located in key areas within the study area and/or through brochures disseminated to all visitors to the region and displayed at all accommodation/campsite establishments. Much information on how to protect the environment and specifics on how to save on water etc. can be promoted. Such basic information may, furthermore, carry beyond the borders of the region and the nation and be incorporated with Agenda 21 of the Rio Conference and be brought forth as an example at the Johannesburg conference 2002. The potential spin-off effects, if well promoted, are enormous and could thereby present the North Western Namibia with the niche activity which makes the location special.

Meanwhile, in order to maintain as much of the tourist expenditure in the regional economy as possible, and hence maximise the regional tourism spin-offs, it is essential that community members be encouraged to develop industries which support the local tourism industry. This may be performed through supplying fresh fruit and vegetables to tourists and tourism facilities and artefacts, but also providing with laundry or other outsourcing services. This way, expenditure will be increased locally and with that the contribution to the regional economy in improved.

se kommuniken
ovan

Slutsatser? (vilka bör stå i relation till "objectives")

References

- Mastny, L., 2001. Travelling Light: New Paths for International Tourism. Worldwatch institute Paper 159.
Skjonsberg, E., 1988. Change in an African village. Kumarian press inc.
MET, 1999. Master plan for tourism development in North western Namibia. Ministry of Environment and Tourism, Windhoek.

den skrivs
de i original
?

Internet:

www.worldwatch.org

Personal ^{communication} Comments:

- Berg, Helene. 2002 Destination manager for Fritidsresor on Mallorca.
Eriksson, 2000. EU resident representative Burkina Faso.

Värdigt ja håller. Särskilt sådana av vetenskaplig karaktär. Jag skulle ju gärna sett sådana med fokus på Namibia. MET 1999 är ju en rapport (en plan) och inget vetenskapligt dokument. ¹² Jag håller den något diskutörande avsett.
... och håller att en ... om forskningsmetoderna ...

Stockholms universitet
Institutionen för Naturgeografi och Kvartergeologi
Vattenresurser och vattenkonflikter 10p, HT-01

Vattentillgång och slutanvändning bland intressenter i Hoanibs avrinningsområde

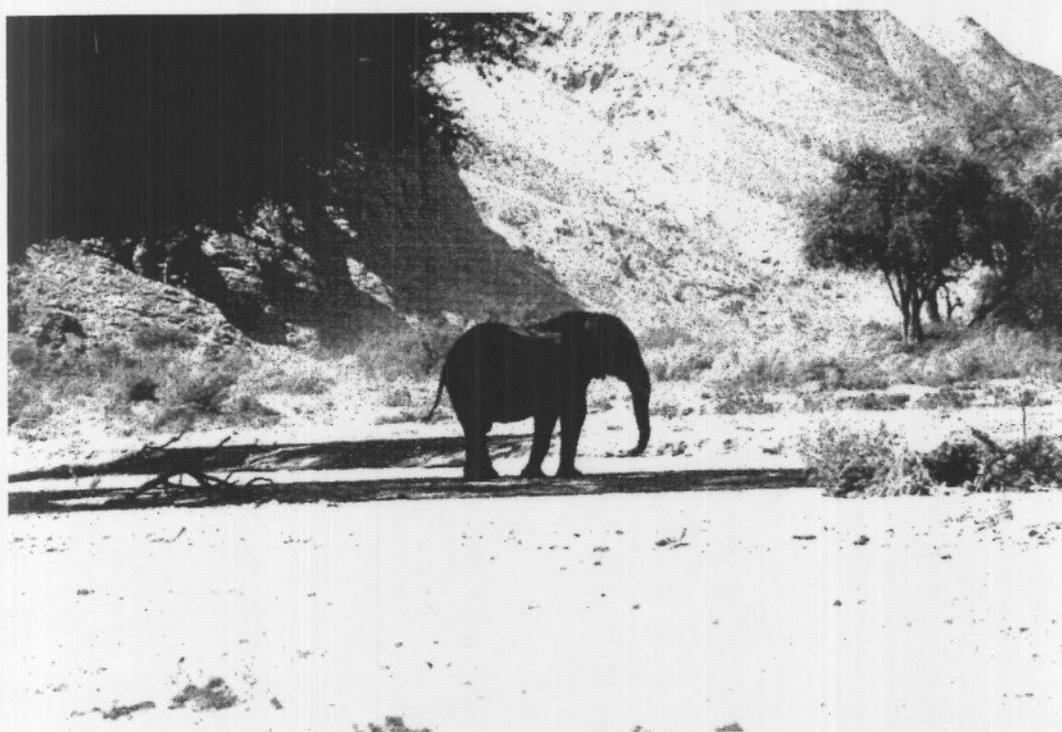


Foto: Anja Riise

Ett Projektarbete av:

**Erich Fischer
Håkan Larsson
Jonny Nilsson
Anja Riise**

Abstrakt

Hoanibflodens avrinningsområde ligger i nordvästra Namibia, som är det torraste landet i Afrika, söder om Sahel. De efemära floderna och de naturliga källorna har under alla tider tjänat som livsviktiga oaser i det karga landskapet, för såväl människor som djur.

Eftersom nederbörds mängden här är för liten för att jordbruk ska löna sig har boskapsskötsel varit basen i ekonomin. Sedan veterinärstängslet sattes upp 1948 har dock export av kreatur från området blivit näst intill omöjlig. Idag har boskapen fortfarande stor betydelse; men mest som statussymbol. Borrhål, vattenledningar och dammar har gjort att det numera är möjligt att leva stationärt med boskapen, till skillnad från förr då de flesta av människorna var nomadiserande eller seminomadiserande pastoralister. I många samhällen har vattenkonsumtionen stigit enormt sedan tillgängligheten blivit större.

I områden med naturliga källor har vattenuttaget alltid varit högt och här bedrivs ofta ett vattenslösande jordbruk. Brunnar medför att stora mängder boskap och människor samlas kring samma vattenkälla, vilket gör att landområdet runt om degraderas och att källor och brunnar sinar. Lösningen brukar vanligen vara att borra nya brunnar vilket i sin tur orsakar vattenbrist för de som bor nedströms. Den växande turistnäringen sparar ej på några resurser då det gäller att göra gästerna nöjda.

Det har dock beräknats att turismen är en av de mest lönsamma näringarna sett till genererad inkomst per liter använt vatten.

Att skydda naturresurserna genom att bilda *conservancies* har börjat bli modellen i Namibia. Många i Hoanibområdet är positiva till denna utveckling om det medför att de än en gång kan få tillgång till viltet. Om invånarna själva har ansvar för naturtillgångarna kan de bättre ta hand om dem och optimera nyttjandet. Det som behövs är främst utbildning (särskilt kring vattenfrågor) och politisk stabilitet men även investeringar samt en nationell handlingsplan är vad som krävs för att få igång en hållbar utveckling i Namibia.

Abstract

The Hoanib catchment is situated in the dry north-western part of Namibia, the driest African country south of the Sahel. The ephemeral rivers and natural springs have always served as important refuges in the barren landscape, for the people as well as the animals.

Since rainfall is not sufficient for agriculture, cattle breeding is traditionally common in the area. When the veterinary fence was put up in 1948, the export of livestock ceased and cattle are now mostly a status symbol. Boreholes, pipelines and dams have made it possible to live a sedentary life with the cattle, whereas earlier the life of the nomads or seminomads. The water consumption has seriously increased since the access to water resources had become better.

In areas with natural water springs the water consumption has always been large. Wells are often surrounded by settlements and cattle, which leads to land degradation and dried up springs. As a consequence new boreholes are drilled ending in water problem for the whole downstream area. The increasing tourism industry uses even more water resources to satisfy the large demand of the tourists. However, the tourism seems to be the most effective sector, when calculated as generated income per litre water.

Recently the conservancies were formed in order to protect the natural resources. The people in the catchment have higher interests to organize the use of the resources if they themselves are responsible for them.

The needs for the a sustainable development are a better education, especially about water problems, a stable political situation, financial investments and a national action plan.

Innehåll

<u>Inledning</u>	4
<u>Områdesbeskrivning</u>	4
<u>Klimatet</u>	5
<u>Vattendragen</u>	7
<u>Helhetssyn</u>	7
<u>Historik</u>	8
<u>1900-talet</u>	9
<u>Det moderna Namibia</u>	11
<u>Conservancies</u>	12
<u>Naturtillgångar</u>	13
<u>Vattnet</u>	13
<u>Viltet</u>	14
<u>Utveckling</u>	15
<u>Jordbruk och boskapsskötsel</u>	16
<u>Erwee</u>	16
<u>Warmquelle</u>	16
<u>Sesfontein</u>	18
<u>Markdegradering</u>	19
<u>Turism</u>	20
<u>Vatten</u>	20
<u>Sesfontein</u>	20
<u>Hobatere</u>	21
<u>Etosha</u>	21
<u>Elephant Song Camp</u>	21
<u>Ekoturism</u>	22
<u>Sammanfattning och diskussion</u>	22
<u>Referenser</u>	25

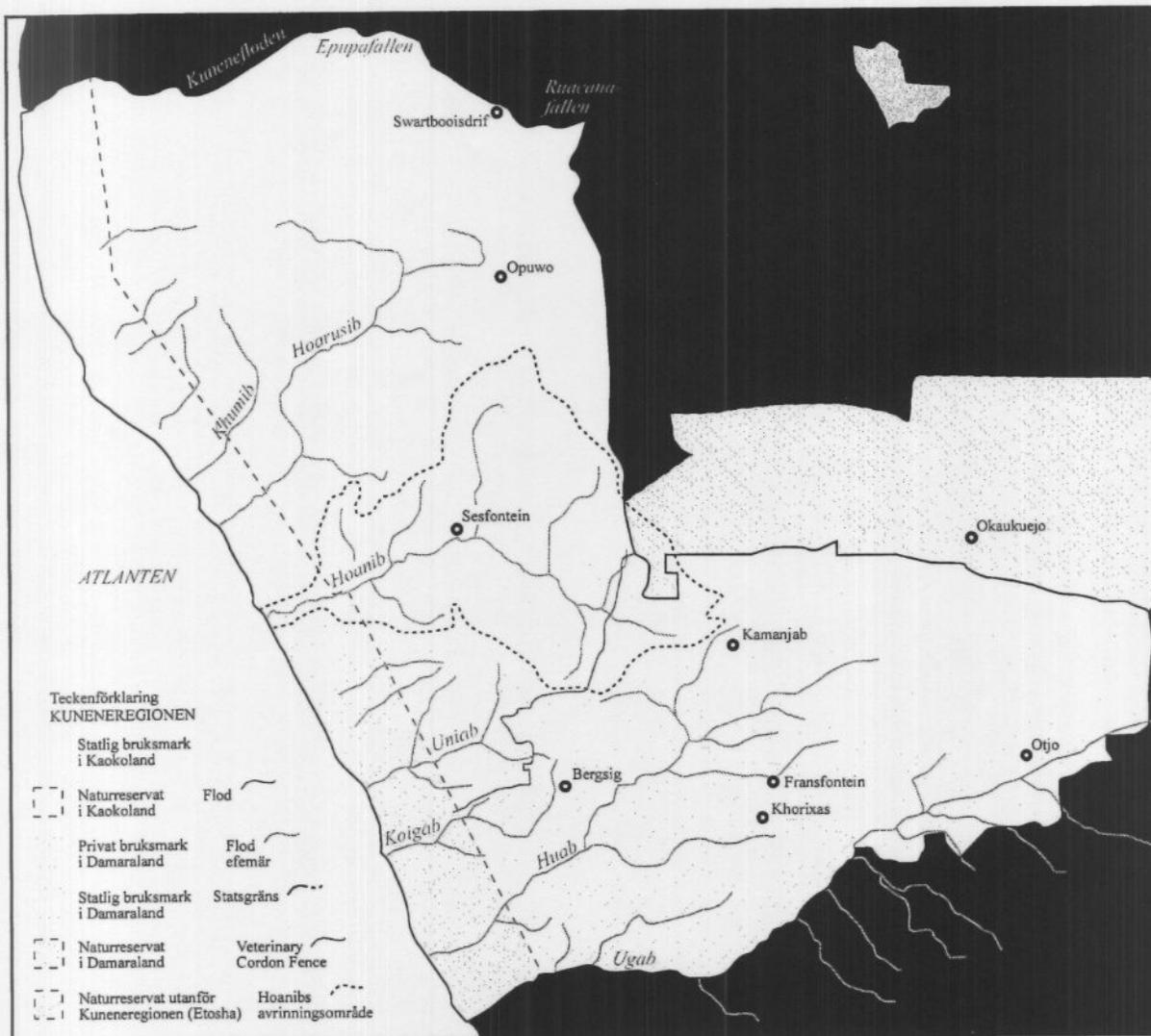
Inledning

Syftet med detta projektarbete har varit att reda ut hur vattnet används i Hoanibflodens avrinningsområde, samt vilka dess användare är. Då befolkningen ökar kommer även efterfrågan på vatten att öka; något som kan bli ett problem om resursen inte utnyttjas effektivt och hållbart, d v s där det gör mest nytta för så många som möjligt.

Då en fältkurs till området genomfördes i november 2001 i samarbete med DRFN (Desert Research Foundation of Namibia) är det "guidernas" (Fennessy, Klintenberg och Schneider) information samt egna observationer som ligger till grund för arbetet där ej annat anges.

Områdesbeskrivning

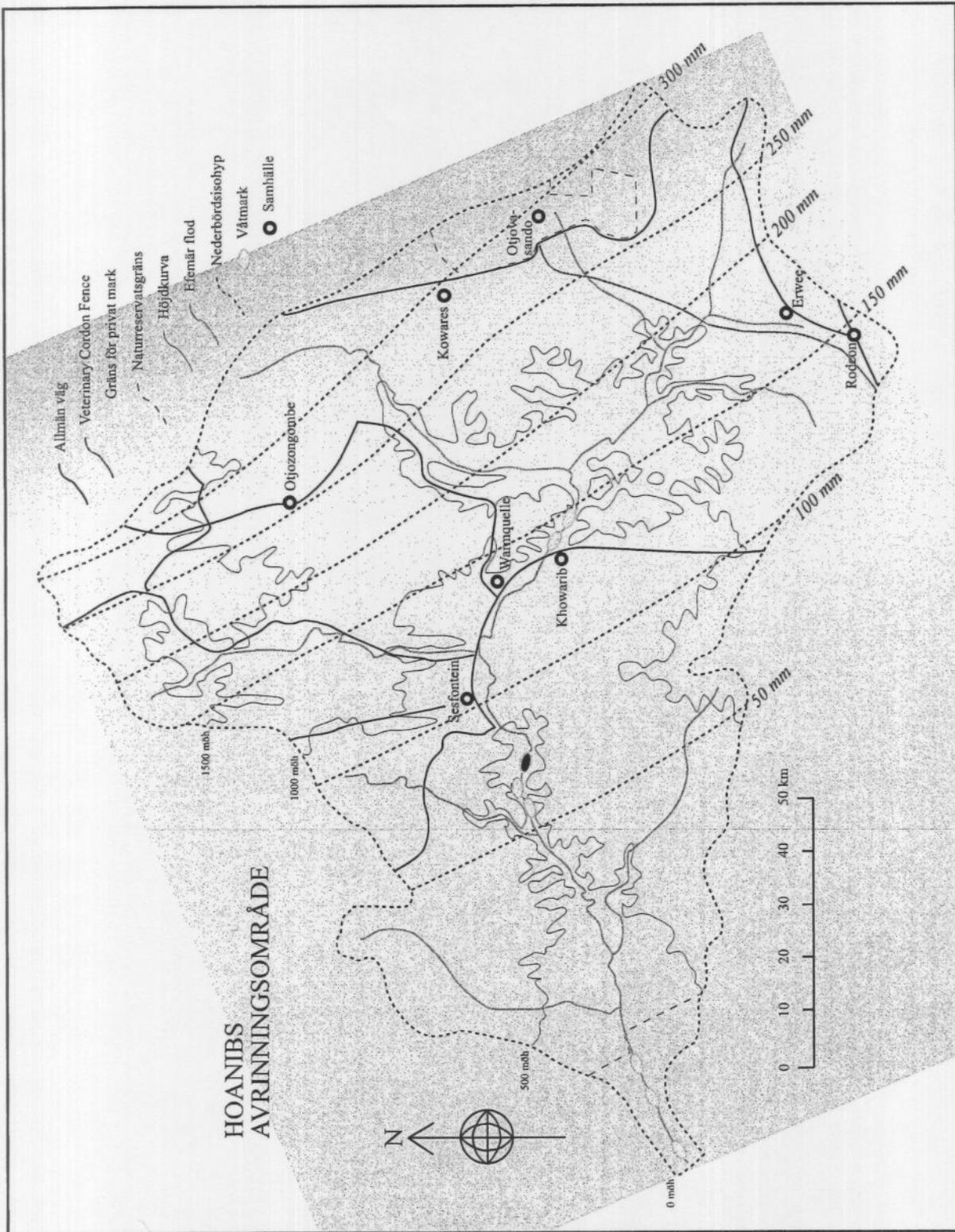
Hoanibflodens avrinningsområde ligger i den nordvästra delen av Namibia (se Fig.1) och sträcker sig från den karga Skelettkusten in till Etosha Nationalparks västra delar. Ungefär 6% av området är skyddat i Nationalpark (*Skeleton Coast Park* och Etosha) och 3% är privat mark, resterande andel är *communal* (Jacobsen et al., 1995).



Figur 1: Karta över Kunenerregionen (Håkan Larsson)

Klimatet

Klimatet är aritt och nederbörden i de östligaste delarna av avrinningsområdet ligger kring 350 mm/år. Nederbördsmängden avtar sedan successivt västerut för att uppgå till endast 0-50 mm/år vid kusten. Den begränsade regnmängden beror på att regnen, som kommer från Indiska Oceanen långt bort i öst, har hunnit falla ur på dess långa väg västerut över kontinenten mot Namibia. Dessutom ligger Namibia i ett område som domineras av en högtryckscell, samt har den kalla Benguelaströmmen utanför Namibias kust en torkande effekt. En avdunstning på 83% gör att den lilla regnmängden ter sig än mindre och endast 1% går till grundvattenbildning medan ca 14% tas upp av vegetationen (Heyns et al., 1998). Längre inåt land är det mer stäppliknande förhållanden som råder för att sedan övergå i Mopanesavann.



Figur 2: Karta över Hoanibs avrinningsområdet (Håkan Larsson)

Vattendragen

I nordvästra Namibia är alla de västgående vattendragen efemära, vilket innebär att där rinner vatten endast under en kort tid, under regnperioden (november-mars) strax efter häftiga skyfall längre in i landet (Jacobsen et al., 1995). Trots att vattentillgången är både oregelbunden och opålitlig är den dock livsavgörande för de djur och människor som lever i området. Vid de tillfällen det rinner vatten i floderna fylls grundvattnet på och ger växter och djur kring flodbädden en möjlighet att överleva ännu en torr tid. De linjära oaser flodbäddarnas växtlighet utgör, möjliggör överlevnad i det karga landskapet och har alltid varit avgörande för områdets invånare (Pallet, 1997). Där berggrunden ej ligger så djupt kan vatten sippra fram i naturliga källor, varifrån det mesta av vattnet i området utvinns. På vissa ställen i de större flodbäddarna som t ex i Khowaribklyftan rinner det ytvatten ett par km, i princip året om, p g a underjordiska flöden och på sådana platser kan även våtmarker bildas



Figure 3: En linjär oas (Galleriskog); (Foto: Anja Riise)

(Rice och Gibson, 2001). Vid större källor, som har ett relativt högt och konstant flöde, har människor bott under tusentals år, vilket de otaliga arkeologiska fynden vid t ex Sesfontein och Warmquelle vittnar om (Jacobsen et al., 1995). Dessa källor är än idag viktiga för samhällena i dessa torra delar av landet.

Helhetssyn

Alla handlingar påverkar ett system, att avstå från att handla är också en handling. Ett avrinningsområde är ett system där aktiviteter uppströms får effekter nedströms, historien ligger till grund för framtiden och förändringar fortplantar sig som ringarna på vattenytan.

Klimatet som format miljön i regionen styr en karg regim som gör naturen här känslig för störningar då skadors återhämtning kan ta väldigt lång tid. Låg och variabel tillgång på nederbörd eller vatten återspeglas på den lokala ekologin där den efemära floddalen utgör ett linjärt ekosystem, vilken skär genom den arida miljön. Som resultat av den hårda miljön har området utvecklat många endemiska arter och speciella landformer av högt estetiskt värde till

gagn för exempelvis turistaktiviteter. Dock är bara en liten del av Hoanibs floddal naturskyddad och det allra längst nedströms, i *Skeleton Coast Park*, vilket medför att negativ påverkan uppströms kan få enorma konsekvenser (Rice och Gibson, 2001). Högt uttag av grundvatten och uppdamning av ytvatten uppströms leder till minskade vattenresurser nedströms där en redan kraftigt ansträngd tillgång på vatten råder. Det innebär bland annat att antalet svämmningstillfällen blir ännu färre, utan någon påfyllning av flodfårens grundvattenmagasin som är av existentiell betydelse för många av ekosystemets arter. Ett exempel är det livsviktiga anträdet (*Faidherbia africana*) som nedströms är av stor betydelse för både djur och kultur. Anträdet skänker mycket mer än bara skugga då dess lövsprickning och frökapsfällning sker under torr tidens kulminering, till skillnad från andra arter. Det innebär att viltet här har tillgång till foder när andra foderkällor sinar och det med högre proteininnehåll jämfört med torrt gräs. Anträden skördas även av den lokala befolkningen för att ge näring till tamboskap. Vidare kan anträdet med fördel kombineras med spannmålsodling på grund av dess förmåga att förbättra jordens kväveinnehåll. Det finns ca 4 000 anträden utmed Hoanibs flodfåra som vart och ett kan skördas på 50-150 kg frökapslar/år i foder till djuren. Men höga vattenuttag uppströms håller på att förändra denna bild och anträden nedströms minskar i antal.

För att få bukt med den negativa utvecklingen behövs ett helhetsperspektiv för att väga in alla intressenters rättigheter och skyldigheter, samtidigt som de inblandade kan upplysas om hur deras handlingar inverkar på omgivningen och vad deras ansvarstagande betyder för framtiden. Då ligger det nära tillhands att göra avrinningsområdet till den administrativa enheten, utan att för den skull förlora i samarbete med intilliggande floddalar. Namibias konstitution klargör att staten aktivt ska verka för att lösa den här typen av problem och utgöra en integrerad del i arbetet (Artikel 95): "*The state shall actively promote and maintain the welfare of the people... policies aimed at... maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of Namibians, both present and future..*".

Historik

Inblandade intressenter i Hoanibs avrinningsområde är av vitt skild natur som privata farmare, boskapskötare på allmän mark, olika etniska grupper, turistsektor, vilda djur och natur för att nämna de främsta. För att beskriva deras inbördes relationer och ställning i samhället är en

kortfattad historisk betraktelse på sin plats. Tidens gång medför att förändringar är oundvikliga på grund av vädrets variationer, livets påverkan och inte minst mänskliga handlingar. Förändring är oundvikligt medan utveckling är subjektivt och av kontroversiell art. I området finns många bevarade hällristningar, t ex vid Khowarib, med varierande åldrar, upp till några tusen år gamla (många runt 1'000). Syftet med dem var möjligen att erhålla jaktlycka och att de uppfyllde något av shamanismens kontakt med gudavärlden, när konstnären var försatt i trans (Rice och Gibson, 2001). Hällristningarna fyllde troligen en central roll i de tidiga sanfolkens jägar-samlartradition när olika grupper träffades säsongvis. De levde ett nomadiserande eller seminomadiserande liv utmed flodfårens lopp med säsongsvisa boplatser, inom olika delar av området, från floddalens mellersta region ända ut mot mynningen i havet. Ett faktum som förklarar varför flamingon har avbildats rikligt långt in i ökenlandskapet vid exempelvis Twyfelfountain.

Folkgrupper kom vandrande i vågor under 1500-talet och efter San uppträder Damara vilka slog sig ned i vad som ibland benämns Damaraland, Herero i Kaokoland och Ovambo i Etoshaområdet (Rice och Gibson, 2001). Gränsen mellan Damaraland och Kaokoland utgörs av Hoanibflodens huvudfåra. Damara och Herero beblandar sig med varandra utan hinder över deras etniska gränser. Hererofolket var seminomadiserande och snart drog många av dem vidare söderut. De som fortsatte söderut är de som idag kallas Herero och de som stannade kvar i Kaokoland kallas nu för Himba. Himba är det folk som behållit mest av sina traditioner, mycket på grund av livsrummets ofruktbarhet och avsides belägenhet. Bismarck hade egentligen ingen önskan om tyska kolonier, men för att skydda tyska handelsintressen i området och för att erhålla politiskt stöd på hemmaplan auktoriserade han det tyska protektoratet Sydvästafrika 1884 (Iliffe, 1997).

1900-talet

Etosha Nationalpark proklamerades för första gången 1907 som världens största viltreservat, motsvarande ca 80 000 km², och täckte då den nuvarande parken (22 912 km²) som också hängde samman med *Skeleton Coast Park* inklusive området däremellan med floden Ugab som gräns i söder och Hoanib i norr. Järnvägstransporter var förutsättningen för etablering av vita farmares verksamhet på södra Afrikas högland (Iliffe, 1997). Höglandet visade sig vara lämplig miljö för de europeiska bosättarna och deras boskap. Runt 1910 reserverades mark utmed järnvägslinjer för européer och området blev en europeisk bosättningsregion. När

Tyskland förlorade första världskriget övergick Tyska Sydvästafrika 1920 till FN:s kontroll. Som del av policyn fick Sydafrika det administrativa ansvaret och Kaokoland delades i tre reservat för Himba, Herero och Tjimba (Rice och Gibson, 2001). 1925 kunde ingen handel längre bedrivas norrut eller österut av olika politiska skäl, varför regionen marginaliserades. Detta tillsammans med att stora landområden söderom förklarades neutrala eller boskapslösa och många människor förflyttades härifrån, inklusive vita farmare som hade vägrat att frivilligt lämna området 1920, förvärrade läget ytterligare.

Så sent som 1970 förlorade stora markområden sin status som viltreservat då Etoshaparken splittrades, för att istället bli Homelands (Kaokoland och Damaraland). Detta skedde i den sydafrikanska regimens anda eller som de uttrycker saken ”att uppnå en policy av separat politisk utveckling (apartheid) för de olika etniska grupperna i dåvarande Sydvästafrika”, efter rekommendationer från Odendaalkommissionen från 1962 (Rice och Gibson, 2001). De ekologiska implikationerna av dessa rekommendationer och deras genomförande 1970 efter massiv internationell kritik har blivit signifikanta. Sedan Direktoratet för Naturbevarande förlorade sin jurisdiktion över Damaraland och Kaokoland har området översvämmats med boskap, i en miljö som bara har begränsade möjligheter och utrymme för den typen av markutnyttjande. Introduktionen av över 170 000 nötkreatur och mer än 600 000 får och getter i området norr om *Veterinary Cordon Fence* (även kallad Röda linjen) har krävt sin tribut.

Sydafrikas politik syftade också till att kontrollera regionens köttproduktion till de vita farmarnas favör. I det sammanhanget passade det in med ett stängsel som kunde begränsa och kontrollera boskapens rörelser i regionen, varför Kaokoland och delar av Damaraland hamnade norr om *Veterinary Cordon Fence* och Kaokoland förklarades som karantänzon (Rice och Gibson, 2001). Från 1948, efter en mul- och klövsjukeepidemi, isolerades boskapen här, från att vara en självklar del av landets centrala köttmarknad. Karantänstiden för boskap från Kaokoland är 21 dagar för att få exporteras söder om stängslet. Kaokoland hindras alltså från att fullt ut delta i den formella ekonomin vilket effektivt även kraftigt hämmar områdets utvecklingsmöjligheter och integrationen i den nationella ekonomin. Odendaalkommissionens hemlandskonstruktion medförde dock nya infrastrukturer som ofrånkomligt fortfarande påverkar och utvecklar den lokala ekonomin. De nya lokala regeringsstrukturerna och sociala inrättningarna fick effekt på den lokala ekonomin och området moderniserades. Men det dröjde till 1980-talet innan människorna här tog del av utbildningssystemet i någon större utsträckning, särskilt gällande Himba. Himbafolkets socioekonomiska lojalitet ligger

fortfarande i det traditionella systemet, vilket gör dem väldigt oberoende ekonomiskt, sett i ett nationellt perspektiv.

Det moderna Namibia

Sedan Namibias självständighet 1990 utgör Damaraland och Kaokoland en gemensam politisk enhet i form av Kuneneregionen med staden Opuwo som huvudort, som ännu inte har ens ett bankkontor (Rice och Gibson, 2001). De traditionella systemen håller nu snabbt på att kollapsa i takt med att de unga i väldigt begränsad omfattning för traditioner vidare och istället försvinner iväg till städerna. Att de flyttar till städerna är inget problem om de återvänder efter en tid, vilket de generellt inte gör. Tidigare skickade de hem pengar alternativt andra medel till familjen, något de nu normalt inte har råd med, vilket slår hårt mot den gamla strukturen. Det finns flera faktorer bakom samhällsförändringen och de mest framträdande är utbildning, lönarbete, turism och att många av de unga nu drömmer om en framtid bortom hembyn, ifrågasätter traditioner och invanda sociala strukturer som blir alltmer otidsenliga i en föränderlig värld. Traditioner i alla kulturer alltid varit föränderliga. Ytterligare en komplikation är att individen i Himba- och Hererotraditionen har dubbelt ursprung med materiell arvsrätt på matriklansidan medan samhällsposition och religiös ställning ärvs från patriklansidan, kombinerat med individens allt större rörlighet. Boskap och extern påverkan med ett monetärt system undergräver det traditionella systemet, särskilt i stadsmiljö. Boskap fungerar traditionellt som valuta för Herero och Himba i Kuneneregionen, varför man i ett seminomadvaneperspektiv alltid försöker optimera resursernas utnyttjande i en karg och oförutsägbar miljö.

Oavsett hur mycket eller lite västerländsk livsstil invånarna här har tillägnat sig har även de mest traditionella tagit till sig och omformat vissa aspekter av västerländsk kultur. En av de mest omdanande innovationerna för livet här är borrhål efter vatten, vilka förändrar den naturliga ordningen både miljömässigt och socialt (Rice och Gibson, 2001). Ekologin i regionen påverkas negativt av den växande och inte längre lika rörliga boskapsbesättningen. Pojkar och unga män förlorade sin roll i det traditionella samhället som herdar när områdets rovdjur mer eller mindre försvann på 1960 och 1970-talen, vilka istället söker sig till avlönat arbete på annat håll företrädesvis i någon av städerna. När boskapshjorden väl behöver flyttas kan det således vara svårt att hitta någon som kan göra det, för barnen som traditionellt utgör familjens fåraherdar fram tills puberteten, kan vara bortresta för att delta i skolundervisning.

Både kunnsende og arbeidskraftsunderskott leder till ytterligere minskad boskapsrørlighet og ãn vãrre brister i kreaturens skøtsel med økat tryck på miljøn som føljd. Med andra ord finns det goda fõrutsãttingar att på lokal eller regional nivã engagera individerna fõr att skapa ett nytt samhãllssystem.

Conservancies

Conservancy-systemet bygger i stor utstrãckning på CAMPFIRE-modellen som ãr utvecklad fõr att skydda vildmarken i Zimbabwe (Rice og Gibson, 2001). En stor skillnad ãr att samhãllena i de torra nordvãstra delarna av Namibia inte kan dra nytta av kommersiell jakt i sãrskilt høg utstrãckning og erhãlla nãgra stõrre inkomster den vãgen dã storviltet hãr inte fõrøkar sig lika snabbt, plus att de ãven vandrar øver grãnserna mellom olika *conservancies* till andra typer av omrãden.

Ett *conservancy* har ingen legal jurisdiktion øver marken og kan inte hindra nãgon frãn att nyttja omrãdet, varfõr turismen hãr tenderar att vara okontrollert med de konsekvenser det fãr fõr den kãnselige miljøn og den stress det kan medfõra fõr de vilda djuren (Rice og Gibson, 2001). Bãde namibier og sydafrikaner ser denna vildmark som sin egen dãr de fãr leva ut sin ãventyrslusta efter eget gottfinnande.

Ministern på *Ministry of Environment & Tourism* (MET) har utlovt en proklamation fõr viltets bevarande i omrãdet og p g a en vãxande turism hãr ãr viltet og landskapsmiljøen en alltmert integrert del av regionens ekonomi, på vilken mãnniskornas framtid beror (Rice og Gibson, 2001). Hur god deras framtid kommer att se ut beror sãledes till stor del på hur syntesen mellom natur og kultur kan samordnes till nytta fõr alla, i regionen inblandede, parter. Lokalbefolkningen ãr positiv till conservancy-idén bara de ãter kan fã tillãtelse att jage vissa av djuren som traditionelt har jagats fõr mat. Idag kan de istãllet bli arresterede og fãngslade bara de skjuter en kuduantilop. Boskap ãr en del av deres kultur og mãnga av kreaturen betraktes ogsã som helige varfõr en viss mængd bõr tillãtas; de menar att de dør med sin boskap og utan boskap finns ingen framtid. Framtiden beror på regnen, om de kommer.

Naturtillgångar

Vattnet

Staten subventionerar kraftigt allt som är förknippat med vattenfrågor. På privata jordbruk gäller det motsatta: det är markägaren själv som står för alla kostnader; för borrhål, infrastruktur, underhåll osv. Detta medför att jordbrukare och boskapsägare är motvilliga att köpa sin egen mark.

Inom Hoanibs avrinningsområde finns några större våtmarksområden samt ett stort antal naturliga källor, som rinner fram där berggrunden ligger ytligt (JACOBSON ET AL., 1995). Dessa områden är viktiga för både människornas och djurens uppehälle, såväl tamboskap som vilt. På en del platser försörjer detta vatten konstbevattnade trädgårdar och ger människorna möjlighet att odla grödor för försäljning.

Många brunnar borrar i områden där det är relativt tätbefolkat. Både att borra efter grundvatten samt att försöka förhindra de efemära flodernas vatten att försvinna genom anläggning av dammar och sedimentdammar medför stora konsekvenser för de som lever nedströms. I slutändan påverkas vattentillgången även för de som bor uppströms om överutnyttjande sker. Eftersom avdunstningen är väldigt hög från dammar, förloras mer vatten från en damm än vad skulle vara fallet om allt vatten tillåts sjunka ned i sedimenten och bilda det viktiga grundvattnet. För att detta system skall kunna upprätthållas är det viktigt att



Figur 4: Borrarbrunn med vinddriven pump; (Foto: Anja Riise)

vattendragens flöden får fortsätta rinna och att brunnar borrar med måtta, så att ej det vatten de som lever nedströms behöver används upp av de som bor uppströms och källorna slutligen sinar (Jacobsen et al., 1995).

Djurlivet blir naturligtvis också lidande. Den ökande konkurrensen med tamboskapen om vattenhål och betesmark, blir allt mer påtaglig. Många djur tvingas söka sig till nya områden medan andra anpassar sig till människans närvaro. Elefanter är i regel ovilliga att ge upp sina gamla vattenhål och betesmarker vilket leder till en ökad konflikter med boskaps- och jordbruksägare. Det kan idag kanske inte klassas som ett stort problem men det finns anledning att höja ett varningens finger. Å andra sidan utnyttjas vattenhål som grävs av elefanter ofta av boskap och borrade brunnar kan konstrueras så att elefanter m fl kan utnyttja dem utan att skada de dyrbara rören och pumparna. Samarbete mellan olika intressenter är en bra lösning.

Viltet

Från och med 1970 när landområdet på Hoanibs södra flodsida inte längre skyddades som nationalpark startade en tjuvjaktsepidemi som inriktade sig på Kuneneregionens megafauna, med elefant och svart noshörning i spetsen (Rice och Gibson, 2001). Allra värst var det under slutet av 1970-talet fram till början av 1980-talet. Det var många högt uppsatta civilanställda ur Sydafrikas försvarsmakt som jagade troféer illegalt. Även gerillasoldater och illegala gäng som drev långt söderut i sin hänsynslösa jakt på elfenben och noshörningshorn, som omsattes på den svarta marknaden, och en ovanligt svår torka fick katastrofala följder för viltet i regionen. Samtidigt förföljde många boskapsägare lejon, leopard, hyena och sjakal genom jakt och förgiftning för att hindra att deras djur blev offer för dessa rovdjur. Detta främst i de östra delarna av avrinningsområdet för i de västra delarna var det ändå bara viltet som klarade sig i den knappa tillgången på föda. Slakten och viltets försvinnande fick många att vakna upp och förändrade många människors attityd för att få slut på den illegala jakten och lösa problemet. 1983 fanns det bara ca 300 elefanter och ca 40 svarta noshörningar kvar i hela Kuneneregionen. 1960 fanns det över 100 000 svarta noshörningar i södra Afrika vilka år 2000 hade reducerats till färre än 2 000 st, varav ca 500 st finns i Namibia.

1983 reagerade många gräsrotter, NGO:s och statliga myndigheter, främst *Namibia Wildlife Trust* (NWT), för att stoppa den illegala jakten och började inrätta viltreservat eller s k *conservancies*, till nytta för många av regionens vilda arter och deras lokala habitat som annars skulle ha förstörts. Genom *Auxiliary game guard programme* samarbetade statliga departement med Herero- och Himbaöverhuvuden (Rice och Gibson, 2001). Programmet var en föregångare till *communal based conservancies* där lokala stamöverhuvuden valde ut

stammedlemmar som sedan utbildades och tränades av NWT och andra officiella ledare, vilka sedan utrustades och avlönades av *Endangered Wildlife Trust* (EWT). Deras primära uppgift var att meddela myndigheterna när illegal jakt förekom någonstans i området, med en officiell ställning i systemet, enbart deras närvaro förhindrade utan tvekan många potentiella jakttillfällen. Efter ett drygt år hade fler än 60 personer fällts för illegal jakt.

Stamöverhuvudena har ändå en dubbel roll när de försöker se till sin egen boskap samtidigt som de är med att rädda viltet inklusive rovdjuren. De har idag hjälp av fyrhjulsdrivna bilar när de ska se till sina boskapshjordar, som är delade på olika håll i grannskapet för att optimera resursutnyttjandet. För övrigt är det rovdjur och giftiga djur som ligger bakom byarnas placering ute på öppna platser, utan skugga, för att undvika vad som kan gömma sig bland trädens skuggor.

Senaste decenniet har viltet åter ökat och giraffer har exempelvis placerats ut i regionen från västra Etosha (Rice och Gibson, 2001). Till skillnad från boskap kan giraffer, springbock och oryx klara sig långa perioder utan att dricka och klarar dessutom att rena och livnära sig på vatten med högt mineralinnehåll. De är även nomadiserande och rör sig över stora områden. Zebror och elefanter är också väldigt mobila men behöver daglig tillgång på vatten, båda dessa djurarter kan gräva efter grundvatten i en torr flodbädd. Sedan viltvårdssamarbetet mellan MET, *Save the Rhino Trust* (SRT), lokala myndigheter och den lokala befolkningen startade har noshörningarna mer än fördubblats och den illegala jakten har avtagit exponentiellt. Initialt anställdes många av jägarna av SRT på grund av deras kunskap om noshörningarna för att komma till rätta med problemet.

Utveckling

Utveckling innebär ofta att ta ställning till ett dilemma och ett väldigt kontroversiellt ämne är stora och många små dammar i denna känsliga miljö, ur både sociala- och naturvårdsaspekter, där Epupaprojektet är ett aktuellt närliggande exempel (Rice och Gibson, 2001). Det politiska etablissemanget välkomnar vattenkraftverkens skapande av arbetstillfällen och genererandet av elektricitet, som även kan ge exportinkomster. Det medför dock också negativa effekter för turism, sociala traditioner, naturliga flodhabitat, värdefull jordbruksmark och ekologin nedströms, som påverkas kraftigt.

För att erhålla en hållbar ekonomisk utveckling måste naturtillgångarna och då särskilt vattnet utnyttjas på ett hållbart sätt, då denna vara är den begränsande resursen. Det har visat sig att de mest ekonomiska näringarna (genererad dollar/liter vatten) är fiskodling och turism (Heyns et al, 1998). Detta innebär att om den verkliga kostnaden för det vatten som används inom olika sektorer tas med i beräkningarna skulle dessa två vara vida överlägsna. På att vattenbristen i det här området är väldigt stor, är fiskeodling kanske inte det bästa alternativet.

Jordbruk och boskapsskötsel

Erwee

I Erwee som är ett litet samhälle i sydöstra delen av avrinningsområdet, 150 km från kusten, kommer vattnet från en våtmark ca 2 km bort. Vattnet leds därifrån i ledningar och förvaras sedan i tankar. Vattenförbrukningen ligger på ca 2,5 miljoner liter per månad vilket medför ca 120 liter/person och dygn! Vattnet är avstängt under dagen och många låter därför kranarna vara öppna och mycket av svinnet beror på detta, samt illegala anslutningar och uppkopplingar. Sedan 1990-talet har några källor sinat och nu finns bara en källa som för vatten året om. Mellan våtmarken och Erwee ligger två farmar som försörjs med vatten från vindkraftsdrivna brunnar. Vattnet är gratis och tillgången är säker på kort sikt, dock kan samhällets framtida vattenförsörjning anses kraftigt hotad.



Figur 5: Våtmarken varifrån Erwees vatten hämtas; (Foto: Anja Riise)

Warmquelle

Warmquelle är ett samhälle beläget i de centrala delarna av Hoanibflodens avrinningsområde, ungefär 125 km från kusten. Hererobefolkningen på ungefär 600 personer livnar sig huvudsakligen på jordbruk och boskapsskötsel. Även om nativiteten är hög har invånarantalet i princip varit oförändrat de senaste åren eftersom många yngre människor väljer att flytta in till städerna för att söka arbete.

I det intilliggande berget i öster finns ett antal naturliga källor vars vatten leds in till staden. De naturliga källorna används till att ge hushållen en säkrad vattentillgång och till dricksvatten för boskapen, men den största delen av vattnet används till jordbruket.

Innan vattentillgången, i form av borrhåll och vattenledningar, var utbyggd låg vattenanvändningen på ungefär 15 liter per person och dag. Då vattenförsörjningen blivit säkrad har vattenanvändningen ökat till ungefär 60 liter per person och dag (Legett et al., 2001).



Figur 6: Chiliskörd i Warmquelle; (Foto: Anja Riise)

varav chilin är mest inkomstbringande. Chilin exporteras till Zimbabwe och tobaken till Sydafrika. Staten har, som ett led i satsningen på konstbevattningen i Warmquelle, förbundit sig att garantera jordbrukarna en marknad för deras produkter. Som följd av detta odlas de grödor som ger högre avkastning än andra traditionella grödor som vete och andra spannmål.

Bevattningen sker två gånger om dagen; på morgonen och på kvällen. Tron på att vatten är en oändlig resurs verkar vara utbredd. Avdunstningen i den här delen av Namibia är omkring 3'000 mm per år, dvs ungefär tio gånger större än den faktiska nederbörden. Det kan således anses vara något oklokt att bevattna under den tid av dygnet då solen skiner som kraftigast och avdunstningen är som störst.

Ett stort område vid Warmquelle har odlats upp och på de konstbevattnade odlingslapparna planteras tobak, majs, tomat, chili, kryddor och vattenmelon. Kvävefixerande träd har planterats för att även ge skugga och vindsydd. Projektet är NGO-initierat, vilka även står för tekniskt underhåll, infrastruktur och utbildning. I princip allt som odlas säljs till städerna,



Figur 7: Tobaksplantering, Warmquelle; (Foto: Håkan Larsson)

Det första intrycket av de konstbevattnade odlingarna vid Warmquelle är att det är ett lyckat projekt. Grödorna som odlas är valda med omsorg, de är avsedda att säljas och de är garanterade en marknad. Vad är då problemet? Vattenuttaget är inte reglerat, inte heller verkar det bekymra någon hur stort uttaget är eller hur mycket vatten som det är försvarbart att pumpa upp ur marken eller leda bort från en naturlig källa. Att bevattna under den tid på dygnet då avdunstningen är som störst, de läckande slangarna och den för övrigt ganska oförsiktiga vattenanvändningen vittnar om att satsningen på konstbevattningen inte har föregåtts med relevant utbildning beträffande vattenanvändning. Det ekonomiska värdet på det som odlas är inte i paritet med det egentliga priset på vatten. Det är uppenbart för varje besökare som kommer till Warmquelle att samhället har fått ett ekonomiskt uppsving av odlingarna och det är därför rimligt att anta att odlingarna kommer att utökas. Vattenuttaget kommer således säkerligen att öka i framtiden. Bevattningsprojektet i Warmquelle skickar felaktiga signaler och utvecklingen är synnerligen oroväckande. Den ökande vattenanvändningen har gjort att de redan små vattenresurserna blivit än mer ansträngda. Det finns tydliga tecken på att vattnet från naturliga källor och borrhål börjar att sina. Ett antal anaträd har dött och även andra träd och växter som är beroende av grundvattnet börjar uppvisa liknande tendenser; mycket tyder på att grundvattennivån i Hoanibakviferen har börjat att sjunka (Jacobson et al., 1995).

Sesfontein

Ungefär 25 km väster om Warmquelle ligger Sesfontein. Sesfontein påminner i mångt och mycket om Warmquelle men förefaller vara ett något mer urbant samhälle. I Sesfontein ligger



Figur 8: The Lodge, hotell inrymt, det gamla fortet; (Foto: Håkan Larsson)

en veterinärklinik, ett jordbrukscenter och ett hotell, The Lodge, inrätt i ett gammalt tyskt fort. Här ligger även en internatskola med ungefär 1'000 elever. Även omkring Sesfontein är marken uppodlad och konstbevattnad.

Jordbrukarna i Sesfontein har alla varsin jordlott på vilken de odlar allt från spannmål för husbehov till mer kommersiella grödor, för försäljning.

Fallet Sesfontein är än mer bekymrande än fallet Warmquelle. Samma invändningar som för Warmquelle är i stort sett applicerbara men det förefaller som om läget här är än värre. Redan har ett par källor sinat (varje uttorkad källa är anledning till oro) och inga planer på ett mer restriktivt vattenanvändande kan skönjas – det förefaller mer troligt att odlingarna kommer att utökas.

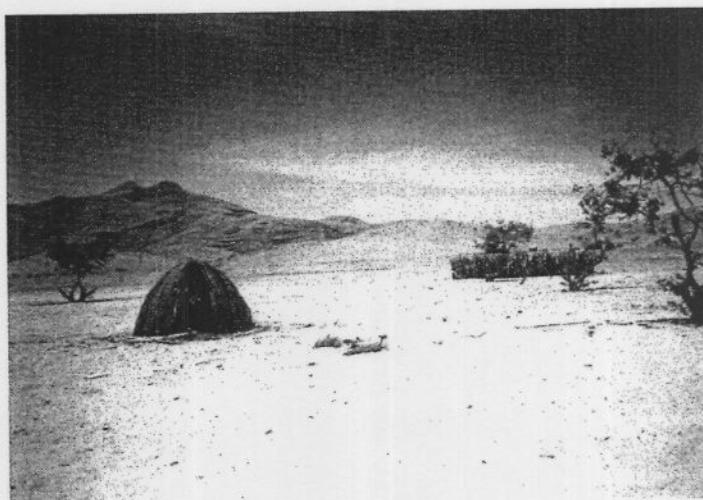
Tillgång till vatten ses som en rättighet och det är därför svårt att börja ta betalt för sådant som idag är, mer eller mindre, gratis.

Markdegradering

Jordarna i Hoanibflodens västra avrinningsområde är huvudsakligen siltiga, näringsfattiga och av alluvialt eller colluvialt ursprung (Jacobsen et al., 1995). Ofta är jordarna kalkhaltiga och har hög salthalt; detta medför att de är dåligt lämpade som jordbruksmark. Jordmånens beskaffenhet gör att den är känslig för yttre påverkan, från överbetning eller trafik. Då det tunna vegetationstäcket avlägsnas blir jordarna mycket känsliga för både fluvial och eolisk erosion.

Redan idag finns tydliga tecken på att ekosystemen har tagit skada av att grundvattennivån har sjunkit. Över stora delar av Hoanibs avrinningsområde har vegetationen fått det allt svårare att överleva och ett stort antal av de viktiga anaträden har också dött.

Tidigare, under år av torka medförde inte bara vattenbristen minskande växtlighet utan också minskande boskapshjordar, vilket på så sätt minskade trycket på vegetationen. Idag med allt fler borrhål har boskapen en säkrare tillgång på dricksvatten vilket medför att hjordarnas bestånd inte minskar som tidigare. Detta gör, även under perioder av torka, att trycket på betesmarkerna består. Som resultat av kontinuerlig överbetning och nedtrampning, särskilt runt vattenhål, har stora arealer degenererat till formliga öknar, med Sesfontein som



Figur 9: Markdegradering utanför Sesfontein; (Foto: Anja Riise)

ett tydligt exempel. Vilda hovdjur är till skillnad från tamboskap bättre anpassade till det torra klimatet, de tar effektivare tillvara på de tillgängliga resurserna och därigenom begränsas den negativa påverkan på livsmiljön. Det ökande trycket på betesmarken har lett till att erosionen i området har ökat och vegetationen får allt svårare att återhämta sig. Termen för detta är inte, som tidigare vedertaget, ökenspridning (*desertification*) utan den korrekta termen är i stället markdegradering (*land degradation*).

Turism

Turismen håller på att bli en allt viktigare näring i Namibia, sedan självständigheten 1990 (Rice och Gibson, 2001). Landets rika djurliv är den huvudsakliga orsaken till den kraftigt ökande turismen i landet. För tillfället räknas turismen som landets fjärde viktigaste näring efter gruvarbete, fiskeindustri och jordbruk (Jacobsen et al., 1995). Även inom Hoanibflodens avrinningsområde blir turismen en allt viktigare inkomstkälla och den medför också en avsevärd ekonomisk avkastning.

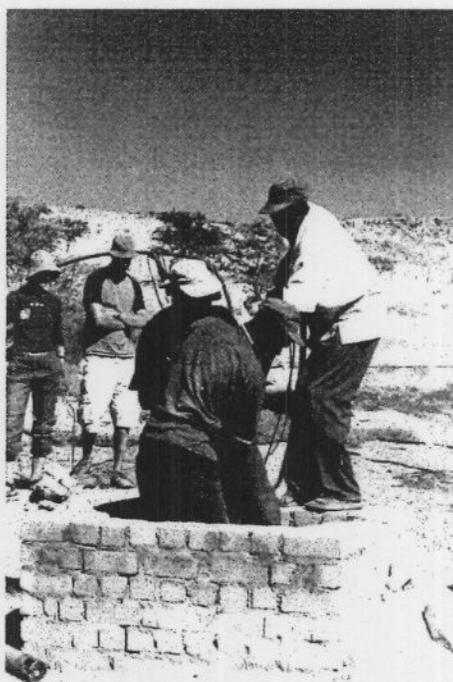
Vatten

Turismen är en relativt vattenkrävande näring räknat per besökare – även ekoturister finner det angenämt att vila på en grön gräsmatta efter ett dopp i poolen. Många uppskattar också de bekvämlighetsinrättningar som de är vana vid hemifrån som t ex duschar och vattentoaletter. Dessutom dras de vilda djuren till källorna och våtmarkerna för att dricka och dessa platser utgör även vackra övernattningsplatser för äventyrslystna turisterna. Dock gör tamboskapens och människornas närvaro vid dessa vattenhål att viltet drar sig undan och väljer att inte utnyttja dem, vilket både djuren själva och turismen blir lidande av. Om de ekonomiska aspekterna tas i beaktande märks det snabbt att vattenanvändningen från turistindustrin är ett mycket bra (lönsamt) sätt att använda vatten. Räknat i genererad dollar per liter vatten är turismen vida överlägset t ex jordbruket. Tankeväckande eftersom jordbruket är Namibias tredje viktigaste näring (Jacobsen et al., 1995).

Sesfontein

I Sesfontein, där ett gammalt tyskt fort gjorts om till hotell, förhåller det sig precis som på många andra turistanläggningar i Namibia; att det ej sparas på resurserna för att tillgodose gästernas behov och önskemål. The Lodge är ett litet hotell med omkring 20 sängplatser. En

konstbevattnad gräsmatta, fontäner som drar till sig traktens fåglar, rabatter, en swimmingpool, samt rum utrustade med duschar, toaletter och rinnande vatten erbjuder gästerna en vistelse med vatten i överflöd, trots att vatten är den stora bristvaran i landet. Anläggningen har en egen brunn för att tillgodose den med en pålitlig vattentillgång. Vid tidpunkten för besöket hade hotellets första borrhål, som var 60 m djupt, sinat för sex år sedan och det nya 17 m djupa borrhålet hade problem med pumpen. Att borra brunnar innebär höga kostnader med tanke på att kostnaden ligger på ungefär N\$ 1'000 per borrhål meter.



Figur 10: Pumpen repareras; (Foto: Ania Riise)

Hobatere

Även campingplatser kan visa sig bjuda på ett överdåd av vatten, vilket gäller exempelvis Hobatere strax utanför Etoshas västra entré. Här finns ett stort antal vattenkranar, duschar och vattentoaletter vid de olika campingplatserna, helt utan några som helst vattensparande konstruktioner. Att Hobateres lodge också använder avsevärda mängder vatten får ses som mer än en kvalificerad gissning.

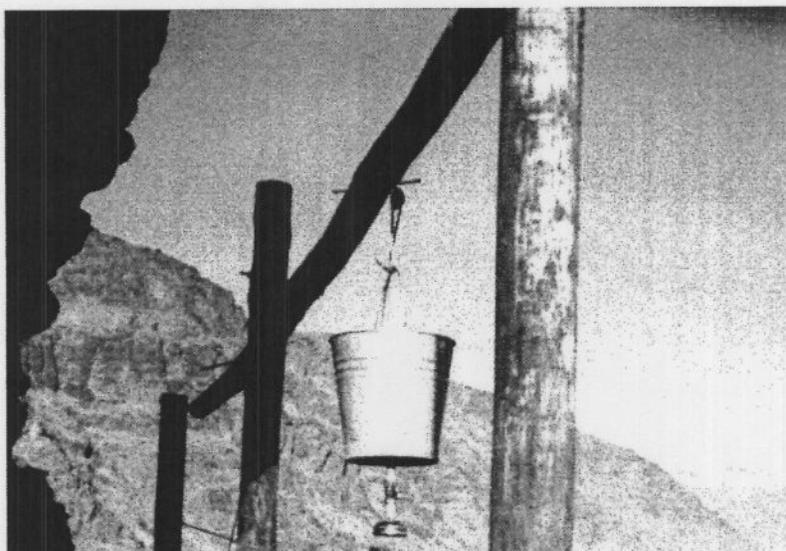
Etosha

En del större turistanläggningar, som t ex Okaukuejo i Etoshas nationalpark, har infört vattensparande toalettalternativ på prov. Detta gäller just här en urinoar som fungerar utmärkt helt utan vatten samtidigt som den är odörfri och ekologisk. Denna sparar tusentals liter vatten per år. Att de statligt drivna nationalparkerna inför vattensparande alternativ måste ses som en stor fördel då detta kan bli förebilden för övriga anläggningar, t ex det närliggande Hobatere.

Elephant Song Camp

Vid Elephant Song Camp vid randen av Hoanibs flodfåra består duschen av en hink som fylls på med vatten av gästerna själva och bidrar till att två personer kan få en dusch med hjälp av endast en hink vatten (ca 10 liter). Torrtoaletterna här och på ett flertal andra campingar (t ex Ongongo och Anmire) med fantastisk utsikt ger mer njutning än en vattentoalett.

Förhoppningsvis inser de ansvariga att mer rustika platser som dessa äger mer charm än de gräsmattebeklädda lyxalternativen och låter bli att installera mer moderna bekvämligheter, även om fler turister och mer pengar strömmar till.



Figur 11: Hinkdusch i Elephant Song Camp; (Foto: Håkan Larsson)

Ekoturism

Vattenkonsumtionen på en ekoturismcamping klaras på mindre än 60 liter vatten/person och dygn, energin kan komma från solceller som driver kyl, frys, kommunikationer och belysning samtidigt som lokal arbetskraft kan anställas. Dessutom bör turisterna upplysas om hur de bäst uppför sig ute i vildmarken och i kontakter med folket vid exempelvis inköp och tiggeri. Viktigt är att förändra attityder från kolonialt präglad syn till ett mer medmänskligt och deltagande perspektiv.

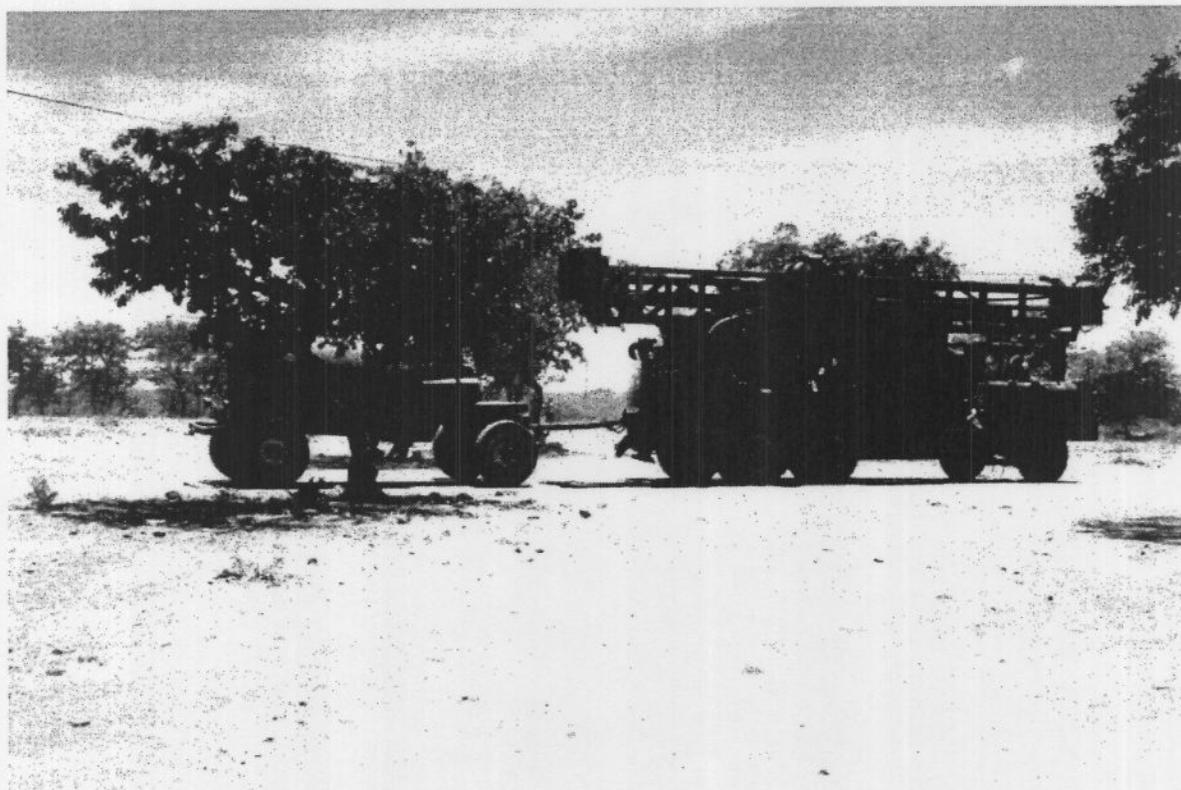
Visserligen betalar turisterna dyrt för de vattenkrävande faciliteter som en del turistanläggningar erbjuder och de antas dessutom förvänta sig dessa bekvämligheter. Dock skulle många knappast bli överraskade om det, i ett ökenland som Namibia, ej fanns gräsmattor och badmöjligheter på hotellen. Många campingplatser och liknande i bl a Europa och Sydafrika (Krügerparken) använder sig av myntduschar och andra vattenbesparande anordningar, vilket till fullo accepteras av gästerna.

Sammanfattning och diskussion

Att odla i ett torrt land som Namibia är betydligt dyrare än att importera basvarorna, om vattenkostnaden tas med i beräkningarna. Enda grödan som egentligen skulle vara värd besväret är vindruvor för vinproduktion, inte ens tobak eller paprika kan bli lönsamma om vattnet ej var gratis. Därför är turismen en näring att räkna med och värd att ta på allvar.

Frågan är vilka som tar del av vinsterna från den ökande turismen? Att The Lodge är den stora vinnaren i Sesfontein råder det kanske ingen tvekan om; hotellet är ofta fullbelagt och nyinvesteringen i det nya borrhålet tyder på en tro om en ljus framtid. Kanske är det dock mer tveksamt huruvida den övriga delen av samhället har vunnit någonting på turismen just här. Samhället i stort har egentligen inte någonting att erbjuda som inte redan erbjuds på The Lodge; souvenirer, mat och bar t ex.

Ett stort problem för en hållbar utveckling av markanvändningen är bristen på samordning. Det finns idag ingen regional eller nationell plan för hur markanvändningen ska utvecklas. Den normala lösningen är att många beslut fattas lokalt vilket ofta visar sig vara kortsiktiga och kostsamma lösningar. Den vedertagna lösningen på ett ökat vattenbehov har hittills varit att borra nya borrhål. Våtmarkernas vatten avleds i allt högre grad till olika samhällen för att användas till både konstbevattning och boskap (här är den nya pipelinen till Erwee ett skräckexempel). Allt fler källor och våtmarker, som tidigare har haft permanent ytvatten, har idag blivit säsongsbetonade.



Figur 12: Borrigg på väg, snart ett nytt borrhål... ; (Foto: Håkan Larsson)

Med en kontrollerad och skonsam utveckling av turismen kan denna dock ge ett betydande antal arbetstillfällen och inkomster som gagnar även naturen, då denna ges ett värde. De vilda

djuren och ekosystemen är annars lätta att glömma bort då diskussionen om markanvändning förs.

Eftersom CAMPFIRE-modellen är utvecklad för helt andra förhållanden än de som råder i Namibia anses en annan lösning vara bättre. En biosfärpark eller någon form av multianvändningsområde, på allmän mark, vilket framkastats från flera håll. Där skulle olika näringar samsas på ett hållbart vis, inbegripet både *conservancies* och andra kulturyttringar. En långsiktigt hållbar lösning är en nationalparkskonstruktion där staten reglerar lag och ordning men där lokalbefolkningen fortfarande har tillgång till det skyddade området för t ex bete, dock under vissa inskränkningar som ett begränsat antal djur och efter vissa rörelsemönster. En modell som bygger på denna grund framkastades på 1980-talet med lokalbefolkningens gillande men omsattes aldrig i praktiken. Turister och lokalt boende måste mötas för att utbyte ska kunna ske som gagnar regionen, t ex till lokala *community restcamps*. Om boskapen minskas finns det utrymme för viltstammen att växa och med det kan turister i hög utsträckning lockas att spendera pengar här som med hjälp av en biosfärpark kan komma det lokala näringslivet till godo i högre utsträckning.

Förutsättningar för en god framtid är utbildning till alla och regional politisk stabilitet som kan locka till både privata och offentliga investeringar. Det behövs en nationell plan för markanvändning och fördelning av vattenresurser. Utöver detta krävs bättre utbildning i vattenfrågor och mer kunskap om hållbart utnyttjande av vattenresurserna. Om en högre kunskap skall uppnås och attityder förändras gällande vatten i Namibia kan det även vara av vikt att även de rika företagen, farmarna, gästande västerlänningarna m fl, vars höga levnadsstandard befolkningen vill uppnå, också respekterar vattenbristen.

Referenser

Heyns, P., Montgomery S., Pallett J and Seely, M., 1998: *Namibia's Water A Decision Maker's Guide*. DRFN och DWA (The Departement of Water Affaires), Windhoek, Namibia.

Ilfte, J., 1997: *Afrika Historien om en kontinent*. Historiska Media, Lund.

Jacobson, P.J., Jacobson, K. M. och Seely, M., 1995: *Ephemeral Rivers and their Catchments*. Desert Research Foundation of Namibia. DRFN, Windhoek, Namibia.

Legett, ., Fennessy, J. Och Schneider, S., 2001: *Rainfall, water resources, and water use in the Hoanib river catchment, North West Namibia*. DRFN, Windhoek, Namibia.

Rice, M. och Gibson, C., 2001: *Heat Dust and Dreams*. Struik Publishers, Cape Town.

Pallet, J., 1997: *Sharing Water in Southern Africa*. DRFN, Windhoek, Namibia.