

Land degradation in the Ovitoto region of Namibia: what are the local causes and consequences and how do we avoid them?



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Land degradation in the Ovitoto region of Namibia: what are the local causes and consequences and how do we avoid them?

A minor field study on the relationship between land degradation and rural populations in the Ovitoto region in central Namibia.

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Cover picture by Izabella Rosengren, 2010

PREFACE

This study has been carried out within the framework of the Minor Field Study (MFS) Scholarship Programme, funded by the Swedish International Development Co-operation Agency (Sida).

The MFS Scholarship Programme gives Swedish university students the opportunity to carry out fieldwork in a Third World country. The extent of the work can lead to Bachelors or Masters Degree. The studies focus on areas and issues of relevance for development problems, and are conducted in countries supported by Swedish development assistance.

Sida's main purpose with the MFS Scholarship Programme is to stimulate the students' interest in, and increase their knowledge about, as well as their understanding for, developing countries and development issues. The MFS scholarships provide the students with practical experiences of the conditions of development. A further aim for Sida is to strengthen cooperation between Swedish University Departments, Institutes and organizations in countries in Africa, Asia and South- and Central America.

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Lund, Sweden

I would like to thank my supervisor Jonas Åkerman, lector in Physical Geography and Ecosystem Analysis at Lund University. It was during his classes that my former restlessness found peace and I finally found out what I wanted to do with my life. His enthusiasm when teaching, as well as his exciting projects all over the world, made me think of him as the Indiana Jones that I someday wanted to become. His former projects in Namibia inspired me to apply for a MFS to further study the issue of land degradation and desertification. I would like to thank Johanna Bergman Lodin, my local MFS supervisor, for her enthusiasm over my work and for her help with finding related literature. Least but not last I would like to thank the Swedish International Development Cooperation Agency (Sida), who gave me the financial support necessary to conduct my thesis. Without the scholarship, the writing of this thesis would never have taken place.

Windhoek, Namibia

I would like to thank my local supervisor Patrik Klintenberg at the Desert Research Foundation of Namibia (DRFN), who gladly agreed on being my supervisor even though he lives a hectic life that few would survive. His willingness to accept me at DRFN laid the foundation to what would later become this thesis. Patrik and his colleagues were of great help during my stay, putting me in contact with key persons that I would never else have found. At DRFN I especially would like to thank Franciska and Faith for always answering my questions, no matter how busy they were. A person who has played a significant role in finding an appropriate study site and to who I owe a great deal is Bertus Kruger, former manager at DRFN and now Project Coordinator at the Agricultural bank of Namibia. Not only did he let me take part in his project in Ovitoto, he also acted as my local semi-supervisor, putting me in contact with the “right” people in the area. Through Bertus I meet Rudolf Katjivikua at Country Pilot Partnership (CPP), who kindly drove me back and forth between Ovitoto and Windhoek, as well as letting me join whenever there was an farmers activity that I should not miss.

Ovitoto, Namibia

I would like to point a great, great thanks to the villagers in Ovitoto. I will always think of them with gratefulness and happiness and I really hope that something good came out of my stay in the village as well. My most sincere thanks, however, goes to Ehrenfriede (embarrassingly enough I can not remember her last name) secretary of the Okandjira Farmers Association, who never left my side during the time I spent in the field. Without her help as a guide and interpreter, this study would have fallen flat to the ground. I would also like to thank Robert Kamunika, a teacher who welcomed me into his house to stay with him and Ehrenfriede during the time I spent in Ovitoto.

ABSTRACT

Half of Africa's population - more than 300 million people - is threatened by land degradation. In general, land degradation is initiated when people intentionally or accidentally disturb the balance in a already fragile ecosystem. Poor management practices such as overgrazing, puts pressure on land already close to exceed the limits of sustainability. Besides suffering from overgrazing issues, Namibia is the driest country south of Sahara and consequently very exposed to land degradation.

The objective of this study was to examine the effect land degradation had on farmers in the small communal area of Ovitoto, situated in central Namibia. The small area inhabits around 21 000 heads of cattle, which is around 15 000 units (=600%) above stocking rate recommendations. As a result, the area suffers from severe overgrazing. By interviewing representatives of the local population about potential land changes, a result was reached concerning the effect farmers have on land degradation and vice versa. The interviews were complemented by participant observations and analysis of reports and other relevant information.

Despite the local opinion, there has been no significant decrease in rainfall that could explain the drought-like conditions in Ovitoto. On the contrary, the last years have been wetter than usual. Half of the farmers, acknowledged the fact that the area is overstocked and also agreed that this is a likely cause of land degradation. However, non of the respondents seemed keen on selling their animals in order to put less pressure on the land. Together with overstocking, the absence of herding contributes to depletion of grazing, which created a downward ecological spiral, which is irreversible unless the farmers start to approach more sustainable farming methods.

SAMMANFATTNING

Hälften av Afrikas befolkning - mer än 300 miljoner människor - hotas idag av markförstöring och ökenspridning. De flesta forskare är överens om att markförstöring orsakas av mänsklig aktivitet som avsiktligt eller oavsiktligt rubbar balansen i redan känsliga ekosystem.

Namibia det torraste landet söder om Sahara, vilket följaktligen gjort att landet är mycket utsatt för ökenspridning och markförstöring, både naturligt och antropogent. Förutom brist på nederbörd har ohållbart jordbruk och brist på kunskap satt press på den redan stressade jorden, något som triggat markförstöring ytterligare.

Syftet med denna studie var att undersöka vilken effekt markförstöring har på jordbrukarna i det kommunala området Ovitoto, i centrala Namibia. I Ovitoto finns runt 21 000 djur, vilket är cirka 15 000 djur över beläggningstäthetens rekommendationer (= över 600%). Resultatet är att området lider av extrem överbetning, vilket urlakar jorden och gör den obrukbar. Genom att intervjua bönder angående områdets markförändringar drogs en slutsats om böndernas inverkan på markförstöring och vice versa. Intervjuerna kompletterades med deltagande observationer och analys av rapporter och övrig relevant information.

Trots den lokala uppfattningen har nederbörden i området inte minskat signifikant och kan inte heller förklara de ökenliknande förhållanden som är allt vanligare i Ovitoto. Tvärtom, så har de senaste årens nederbörd varit mycket riklig.

Hälften av bönderna höll med om att området är överbetat och överfyllt av djur, och var också överens om att detta var en högst trolig bidragande faktor till markförstörelsen. Desto mindre villiga var bönderna till att sälja sina djur för att låta jorden vila. Alltför många djur, avsaknad av herdebruk och utarmning av betesmarker har skapat en nedåtgående spiral, vilken kommer fortsätta såvida inte bönderna börjar anamma mer hållbara jordbruksmetoder.

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1. INTRODUCTION

The United Nations Convention to Combat Desertification (UNCCD), estimates that more than a third of the Earth's surface is semi-desert, that an additional 10% is man-made desert, and that further 19% is threatened by desertification. These drylands are home to around 20% of the world's human population. The main threats derives from more intensified land use, especially from the removal of the natural vegetation cover by farming, overgrazing and incorrect irrigation, worsen by drought (Swift, 1996).

Desertification occurs in all parts of the world with causes and consequences that depend on specific environmental, socio-economic and political features of the country or area concerned (Reynolds and Stafford Smith, 1992). Land degradation generally strikes harder in developing countries, where poverty is common, preparedness for disaster is low and the possibility to adapt is weak. This especially counts for sub-humid and semi-arid areas where the soil is used more intensely than in other parts of the world. Even during rain seasons, it is normal for these climatic zones to experience droughts, lasting from several weeks to months in duration (Johnson and Lewis, 1995).

Half of Africa's population - more than 300 million people - is threatened by desertification (Holtz, 2003). An appraisal of the vulnerability and adaptation strategies for this exposed continent is therefore interesting due to its extreme situation.

Most often, land degradation is initiated when people intentionally or accidentally disturb the existing balances in a system. Exploitation and/or poor management practices to meet specific human needs put pressure on land already close to exceed the limits of sustainability (Dent, 2007). The livelihoods for a vast majority of people in degraded regions depend on livestock farming. Hence, the loss of productive land poses an existential threat in these regions (Müller et al, 2007). However, it is important to mention that these people most often do not have the choice to think about sustainable farming, but do what they have to do to survive. In the end, the process of land degradation affects people, who are "much more victims than villains in the development of rangeland degradation" (Johnson and Lewis, 1995).

With a highly irregular average rainfall of 250 mm per year, and with only ephemeral rivers inside its borders, Namibia is the driest country south of Sahara and clearly very exposed to land degradation (Moorsom et al, 1995). As a legacy of the apartheid system pre-independence, around 40% of the land is owned by white commercial farmers, while the rest of the country is inhabited by communal farmers, representing more than 90% of the entire Namibia population (Seely, 1997). Considering that the small area set aside for agriculture along with population growth (0.9%/year) (CIA, 2011), the land, and the 70% of the Namibian population who is dependent on subsistence farming, is under severe pressure (Klintonberg and Seely, 2004). Consequently, the Namibian society is extremely vulnerable to desertification.

This study examines the effect land degradation has on farmers in the small communal area of Ovitoto, situated in central Namibia. The area covers 620 km², which is relatively small considering that there is around 21 000 heads of cattle (Kruger and Katjivikua, 2010), which is around 15 000 units above stocking rate recommendations. As a result, the area suffers from severe overgrazing and is therefore a perfect study site for land degradation and desertification questions.

1.1 Objectives

The overall objective of this study is to investigate how land degradation affects small-scale farmers in rural Namibia. This involves interviewing representatives of the local population about potential

changes in land and vegetation diversity and observations and analysis of reports and other relevant information.

The specific objectives for this study is to investigate:

- How land degradation affects farmers in rural Namibia and vice versa.

In order to answer this overarching question, it has been broken down into four sub-questions:

- What is land degradation?
- Has there been any land degradation in Ovitoto? If so; what are the causes and consequences?
- How do the farmers cope and adapt with land degradation?
- How can the people/farmers prevent further and future land degradation?

The first question is of great importance, since there exists a vast numbers of definitions of land degradation. In order to even begin describing the causes and consequences of land degradation, its crucial to have a solid definition as a starting point. The second question aims to investigate if, and how affected Ovitoto is by land degradation. This was done through interviews, highlighting the farmers' opinions. The third question aims to find out how the farmers get through the day with the possibly changed environmental situation caused by land degradation. How do they cope and how do they adapt? The forth question is essential if the farmers want to stay in the area. The core concepts of this study are further discussed in the methodology.

1.2 Disposition

This thesis is split into six parts. The first chapter; the introduction, presents all necessary background as well as the objectives of the study. The second chapter presents the theoretical framework, which consists of definitions and more detailed facts about land degradation. The third chapter presents the methodology, followed by a presentation of the study site. The fifth chapter presents and analyzes the results of the study. This chapter is followed by a discussion and a conclusion, which in turn is followed by a list of references and appendixes.

2. LAND DEGRADATION – A CLOSE UP

Although massive conservation practices and technological interventions are taken place all over the world, destruction of this life-sustaining rangeland resource is increasing (Johnson and Lewis, 1995). Finding ways to break the downward spiral and investigate different land management options is essential to halt and reverse the effects of land degradation before the situation gets out of control. However, in order to discuss and fully understand the effects of land management and other factors leading to land degradation, it is essential to first examine the debated terms of desertification and land degradation.

2.1 The trouble of defining Land Degradation and Desertification

Mentioning *desertification*, people generally start to think of expanding deserts moving across landscapes, eating everything in its way. This is a popular myth, however, not a reflection of reality. It is true that the borders of most deserts expand and contract from year to year due of natural variations, but desertification is a combination of climate variations and unsustainable human activities (Reynolds and Stafford Smith, 1992).

The term desertification was first introduced in 1949 by the French scientist A. Aubreville in *Climats, Forêts et Désertification de l'Afrique Tropicale*, and describes the transformation of productive agricultural land into desert-like conditions (Helldén, 2005). Ever since, scientists have debated over the terminology, possible causes, indicators and the human aspect of land degradation. The debate has become a political question and the arguments over when, where and to what extent desertification is taking place, and who is causing it has often led to a battle of ideologies rather than to come to a scientific agreement. The general understanding, however, seems to concern two critical aspects. Firstly, there has to be a substantial decrease in the biological productivity, and secondly; the decrease will have to be the result of processes resulting from human activities (Reynolds et al, 2007). This terminology is very similar to the definition made by the UNCCD:

Land degradation means reduction or loss, in arid, semi-arid and dry sub-humid areas, of the biological or economic productivity and complexity of rainfed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from land uses or from a process or combination of processes, including processes arising from human activities and habitation patterns (UNCCD, 2007a).

Land degradation is often used as a synonym for the term desertification, which was explained in the same convention as “land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities” (UNCCD, 2007a). These two very similar views lead to the conclusion that the terms of land degradation and desertification are synonymous and are, thus, used synonymously in this report.

The term *drought* will in this study be used to define areas where rainfall has been below average for two years or more, causing serious hydrological imbalances that destroys farming production systems (Beinart, 1996).

2.2 Global initiatives on Land Degradation

Desertification received global attention in the 1970's, mainly due to an extreme drought situation in the Sahel (Helldén, 2005). At that time, it was seen primarily as a physical phenomenon, something that could be regulated by tree planting or irrigation. Today we know that land degradation results from complex interactions of biophysical, socio-economic and political factors. Environment and land use history of the specific region also plays a significant role in defining the initial conditions for each land use and ecosystem change (Seely et al, 2008).

The real breakthrough for global acknowledgment on desertification came with the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro 1992. The Convention to Combat Desertification was signed in October 1994 and came into force in 1996. The parliament of Namibia ratified the Convention in March 1997 (DRFN, 1997). The convention's main objective is to combat land degradation by managing dryland ecosystems in a sustainable way. It is as much a developmental as an environmental agreement, as it underlines the connection between human development and land degradation (UNCCD, 2007b). Disparities in income, food insecurity, health aspects and democracy get the same attention as land and water scarcity. The Convention gives priority to land degradation in Africa, primarily because of the continent's environmental and socio-economical vulnerability. As mentioned in the introduction, Africa is considered the most threatened region in the world when it comes to land degradation, and because of this, the resolution “Urgent Action for Africa” was adopted in 1994, as part of the Desertification Convention (United Nations (UN), 1994).

The Desertification Convention resulted in a number of National Action Programmes (NAP) that worked at a national level, well coordinated with other national environmental programs to prevent and mitigate land degradation. In Namibia the program to combat desertification was called Napcod

(Namibia's Program to Combat Desertification) (Bethune, 2003). From 2008 however, the UNCCD is implemented by the Country Pilot Partnership, housed at the Ministry of Environment and Tourism (MET) (MET, 2010).

2.3 Causes of Land Degradation

Identifying the level of human responsibility in situations where land degradation occurs continues to be debated over. A major problem is the connection between humans and nature, a connection that forms such a complex web that cause and consequence, and process and response often blurs into one. Despite the debates, scientists seem to have agreed that land degradation in drylands is caused by complex interactions between biophysical factors (meteorological and ecological variations) and socio-economic factors (human-related causes) (Reynolds et al, 2007).

However, the irony in food production systems is that land degradation most often is derived from trying to increase food production and security. Removing and ignoring variability in natural systems only leads to vulnerability when droughts re-occur. These misguided attempts to improve human conditions have had a negative impact on the environment, as insufficient attention is directed to the spatial and temporal consequences of new developments (Johnson and Lewis, 1995).

Drylands are particularly vulnerable to even the slightest change in climate, especially when it comes to changes in precipitation, or to quote an former expert at the United Nations Development Programme (UNDP): “in general, the drier the climate, the greater the rainfall variability and the higher the drought risk” (Intergovernmental Panel on Climate Change (IPCC), 2007).

According to the 4th regional assessment report (AR4) from the Intergovernmental Panel on Climate Change (IPCC), climate change will increase the frequency and magnitude of droughts in already dry regions (Boko et al, 2007). Global warming is therefore likely to result in increased occurrence of land degradation.

Another cause of land degradation is the land tenure system in developing countries. When structures in communal and commercial tenure systems fail to provide sufficient income, conflicts arises (Adams and McShane, 1996). Rising from such situations is a social dilemma in which several individuals, acting independently and in their own self-interests, will deplete shared limited resources in their own short-term selfish interests. The lack of long-term group interests increases the risk of the communal land being overgrazed and overused. The process can be described by the expression “tragedy of the commons”, meaning that the individual responsibility is limited when there is open access to the resource in question (Hardin, 1968).

It is important to separate land degradation from drought. Drought is purely the result of weather and climate systems, whereas desertification is the result of human actions. Nevertheless, droughts can trigger rapid land degradation and make the effects more severe and vice versa (Grainger, 1982).

2.4 Global effects of Land Degradation

Land degradation does, as mentioned in the introduction, undermine the productivity and complexity of drylands. Not only does it decrease plant diversity and reduce soil fertility, but also makes the soil more exposed to erosion. The downward spiral with long-term loss of vegetation, impoverishment of land and reduced food production serves a great threat to small-scale farmers, as they are extremely dependent on nature for their survival. Intensification of modern production systems remove buffers in favor of increased production. The removal of natures “shock absorbers”

makes it difficult for the nature to cope with unexpected random events (Johnson and Lewis, 1995).

The prices for food insecurity, decreased income and increased production risks are high. The concerned people are being forced to change their lifestyle when the traditional means of survival no longer can feed the household. This will most likely bring to a cultural and personal scar that can trigger a social breakdown (Johnson and Lewis, 1995).

2.5 Overgrazing by overstocking

Overgrazing is a process where repetitive and concentrated grazing during droughts tends to reduce the frequency of perennial grasses, most favored and palatable by ruminants. This pressure will deplete the root reserves and most likely kill the plant. Without allowing the plant to put “money” back into the “bank”, the plant will over time become “bankrupt” and die (Kruger and Katjivikua, 2010). A general rule of thumb is that not more than 50% of the plant should be removed during a single grazing period. If more than 50% is removed, photosynthesis will no longer take place and the plant will have to withdraw nutrition from the roots (Ward and Forbes Irving, 1999). This is illustrated in figure 1.



Figure 1: Ungrazed, correctly grazed and severely grazed grass plants. Figure by Rosengren, 2010.

This selective pressure along with poor management deteriorates veld condition and encouraged the expansion of species not nearly as palatable and nutritious as the original. One example is the annual grasses, which are generally more fragile and unpalatable than perennial grasses, and usually dies of after one life cycle. As a result, the land can support a smaller number of livestock. Perennial grass, however, contributes far more than annual to soil cover and stability through their greater root depth and organic production (Bingham and Savory, 1990).

Overgrazing will consequently result in a net reduction in production capacity of the land. This will leave less organic material to accumulate, resulting in fewer minerals available for plant growth. The final result is lower grass productivity, which results in poorer livestock conditions and in a reduced income for the farmers (Kruger and Katjivikua, 2010).

Another problem due to overgrazing is the animals trampling of the soil. This may cap the soil, decreasing infiltration, increasing water runoff, and eventually causing erosion, which, in turn, will cause crashing crop yields, abandoned land and even migration. This is especially common around water points, as the animals visit these places when they are thirsty (Bingham and Savory, 1990). This is a contributing factor to erosion and leaching around the water sources (Johnson and Lewis, 1995).

2.6 Bush encroachment

Even though the driving factors behind bush encroachment are diverse and complex, most scientists agree that bush encroachment is highly associated with grazing pressure from livestock. These animals not only deplete the grass, but also put high pressure on the land. This enables the bushes to outlive grasses and engross soil and soil moisture (Kruger and Katjivikua, 2010).

Grasses are fast-growing plants with roots in the upper soil layer. It is generally accepted that grass can outlive woody species for water and nutrients, but in the subsoil however, the woody vegetation has a nearly exclusive right to any water that infiltrates. When grasses are removed due to overgrazing, the amount of moisture penetrating the soil will increase and trigger the growth of woody plant species (Hipondoka and Versfeld, 2006). This phenomenon is called *bush encroachment* (figure 2).

The impact of overgrazing and poor management practices seems to be particularly severe during dry seasons, since there seems to be a greater negative effect on the grass than in rain periods. A hot and dry climate may also favor the shrub component of the savannas, making bush encroachment a serious threat. (Britton et al., 1981).



*Figure 2: Bush encroachment in Ovitoto.
Photo by Rosengren 2010.*

3. METHOD

The results of this thesis are based on fieldwork conducted in the area of Ovitoto in central Namibia from November 2010 to January 2011. The study is qualitative and applied as a way to structure and systematize the data gathered both in the field and in literature. The collecting of material, question formulation, literature study and analyses have all been done continuously. A qualitative method was used as a way to process the data collected through interviews.

The methods used are mainly semi-structured interviews and participatory observations. The analysis of the results is done both during and after the field study in order to better understand the degradation situation in the area. The main part of this study consists of answers from the interviewees, conducted in Ovitoto and in Windhoek, complemented by participant observations. The observations were made to gain insight in how the farmers organize and live their lives and also how they cope with land degradation. However, as not all material was relevant for the study, sections as personal life etcetera were excluded from the paper.

3.1 Semi-structured interviews

The results presented in this paper are based on 16 individual interviews, 15 in Ovitoto and one in the city of Windhoek, capital of Namibia. The last interview, number 16, made with Bertus Kruger, project coordinator of Agribank in Namibia, is not included in the interview table, as he served more as a moderator than an interviewee.

The original plan of using a semi-structured interview-technique, worked out very well, even if the original pre-made questionnaire had to be modified several of times due to difficulties in translation and new inputs. I choose the semi-structure approach since it allowed me to hear the individual views and perspectives of the farmers (Klintenberg et al, 2007). It also allowed me, as an investigator, to be flexible and follow up any unexpected topics raised by the interviewees. The pre-made questionnaire has more served as a guideline, and the interview questions were modified during time, depending on who was interviewed, time available and other factors.

The interview-guide was created while in Windhoek after long and thorough discussions with my supervisor. It was based on research questions and theory, altered back in Sweden before departure and on site in Windhoek. The questionnaire was divided into separate parts with separate sub-questions, each with the purpose of gaining additional information about the main subject. Each section started with a broader, general question, followed by more specific sub-questions. The questionnaire was divided into nine “headlines”, i.e. (1) Introduction, (2) Role in Society, (3) Occupation, (4) Natural Resources, (5) Livestock, (6) Land Management, (7) Water, (8) Finances, and (9) Adaptation. The questions used simple language and were formulated as clear as possible to avoid misunderstandings (which of course happened, but not that very often) and to avoid asking leading questions. Not all questions were directly linked to the overall objective, but were simply required in order to understand to what extent land degradation influences the livelihoods of the rural population. The final questionnaire can be found in appendix A.

Each interview started with a formal presentation of me and the purpose of my study. Since Namibia is a relatively liberal country when it comes to freedom of press and speech there was no need to inform the respondents about anonymity (Utrikespolitiska Institutet (UI), 2010). In fact, many of the Herero people are very keen on getting their voice heard. Nevertheless, I always asked for permission to record the session, with the explanation that it would help me to focus on the discussion rather than taking notes. The interviews continued with inquiring basic data about the interviewee, before moving on to questions that focused on the aim of my study, also partly mentioned above.

The focus of this study has been on people whose main source of income is generated by livestock production in the reserve of Ovitoto. When conducting the interviews I always had an interpreter with me, since most of the interviewees only spoke *Otjiherero*¹. This interpreter also happened to be the secretary of Ovitoto Farmers Association, as well as my hostess. No appointments were made for the interviews, the respondents were asked there and then if they wanted to participate. This method was successful and we were only denied an interview once, simply because the respondent was too busy. Instead, she asked us to come back the day after. Even though the method was good, some interviews were harder to conduct than others. It was, for example, harder to interview and connect with the older farmers than with the younger. This was probably due to several factors, but my interpreter explained that the elders just were not interested in new, unready projects. It is also important to consider how I being a white, educated woman and a foreigner affected the interviews. However, for me it was not a problem, and it did not seem to be so for the respondents either.

Although the interviews turned out fine in the end, there is always the problem with filter interpretation. By using an interpreter there is a risk that significant words and meanings get lost in translation. However, the interviews conducted in English did not have this problem, since these nine respondents could express themselves very well in English, I would even stretch to say very good. In cases where the question were not fully understood, the question was rephrased in the best way possible.

Wanting to get a clear image of just how severe the problem with land degradation is, and at the same time get a more varied view of the area, the sample of 16 interviewees includes persons from not only Ovitoto, but also persons from different development and research organizations.

The interviews were between 30-60 minutes long, held either at the farmers homestead in the village or on the stairs of my interpreters house. The plan was to conduct more interviews but due to my interpreter's ordinary schedule and upcoming holiday seasons, this turned out to be a difficult task. The ages of respondent farmers varied from 29 to 77 years old. Out of these respondents 12

¹ The language spoken by the Herero people.

were male and three were female. The male surplus is due to the fact that Herero tradition normally does not allow female livestock farmers.

3.2 Participatory observation

In order to collect sufficient data for my study I stayed two weeks in Okandjira, one of 19 villages that constitute the reserve of Ovitoto. Before I left to Okandjira I did as much research on the area as I possibly could, just to be prepared. In Ovitoto I conducted my fieldwork mainly in the form of interviews, but also through participant observations.

Participant observation is a research strategy widely used by scientists all over the world. The aim is to establish a close relationship with a given group of individuals and their practices through involvement with people in their native environment. The research could involve a range of methods such as direct observation, participation in the everyday life and community discussions (King, 2002).

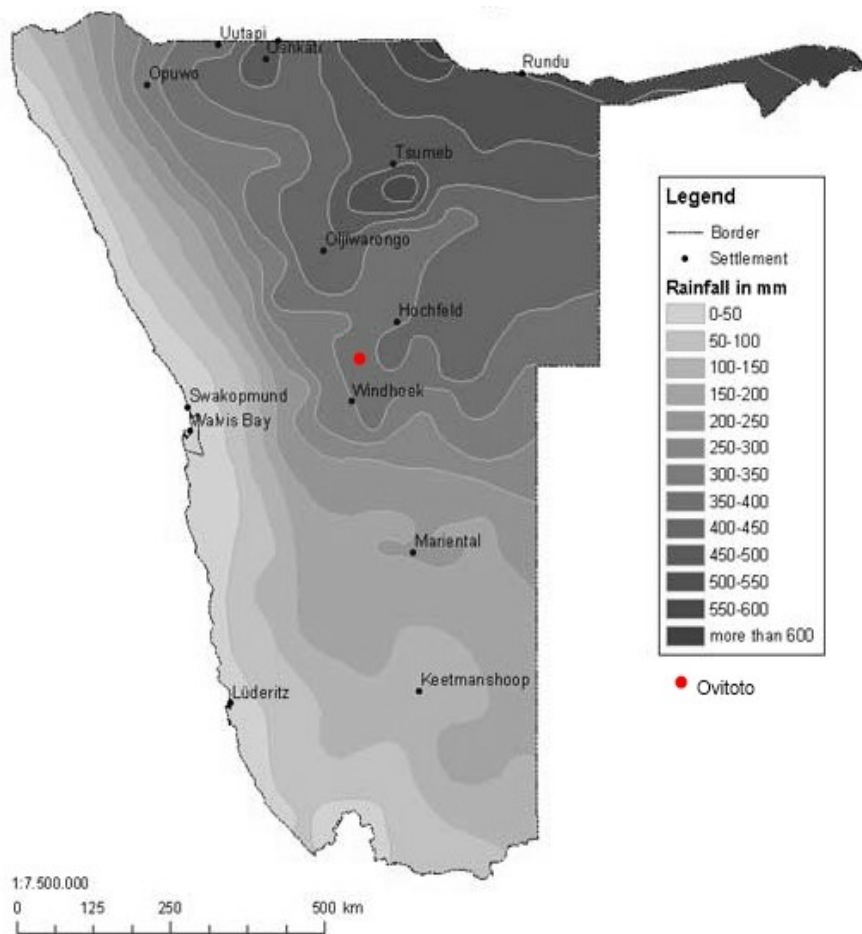
Unfortunately, it was somewhat harder to participate in any of the physical practicing such as cattle rearing, than I originally thought. The reason for this is that the farmers do not practice any cattle rearing. The farmers of Ovitoto originally belong to a nomadic tribe, famous for herding their livestock. However, a few decades ago they became resident, stopped herding and started to let their animals roam around freely, without anyone looking after them. And that is the situation today, making it very hard to participate in any kind of actual “farming”. Although I did not participate in any herding activities, I still got a glimpse into the everyday life in a small village in rural Namibia. This was an equally well working method, as the purpose of field studies is to contribute to new perspectives and deeper understanding. It also means being a part of a learning process, something that the observer/student could participate in a way to unite theory with everyday practices.

The observations included participating in everyday routines and conversations, conducting unstructured unrecorded interviews and feeding the animals. My involvement in the everyday life made it possible for me to discuss directly with those who spoke English. As the observations were done constantly during my time in the village, they are not included in the reference list. Neither did I use a specific “observation-guide” or take any notes during these observations, since I felt I wanted it all to blend in before I drew any conclusions. This means that most of the thesis, including the results, was written while still in Namibia, with the observations relatively fresh in mind.

4. STUDY AREA

4.1 Namibia

Namibia is a country in South West Africa, bordering Angola in the north, Zambia and Botswana to the east and South Africa to the south. The country covers an area of approximately 824 000 km², an area almost twice the size of Sweden. Along the Atlantic coast we find the long, narrow Namib Desert, one of the oldest deserts in the world. Besides the desert, most of Namibia consists of a wide plateau of savannah, with an average height of 1 100 meters above sea level. Where the plateau gradually falls to the east, the land merges into the Kalahari Desert that continues on to Botswana. All together the deserts cover around one third of the total land area (UI, 2010).



Namibia is the most arid country south of Sahara and has a mean annual rainfall of around 250 mm/year. However, because of the highly irregular rainfall, the “annual average” does not always give the true and spatially coherent picture (see figure 3). But generally the rain season runs from November to April, whereas the dry season normally extends from May to October (Klintonberg et al, 2007). The temperature at the central plateau can reach as high as 37°C and as low as -2°C during the hottest and coldest months respectively (Namibia Weather Network, 2011). Due to the cold Benguela Current that runs along the coast, temperature is generally milder by the sea.

Figure 3: Location of Ovitoto (red dot) and annual mean rainfall in Namibia (Directorate of Environmental Affairs, 2002).

The current also affects the rest of the country as it reduces evaporation and precipitation and causes fog to sweep in from the ocean (Klintonberg et al, 2007). Due to Namibia's low and irregular rainfall, perennial rivers can be found only at the northern and southern borders (Kunene, Zambezi, Okavango, Chobe and Oranje River), with a distance of 1 500 km apart. On the other hand, rivers that flow after rain, also known as ephemeral rivers, can be found throughout the country (Mendelsohn et al, 2002).

Namibia has a population of around 2 100 000 people. The black, white and mixed population makes up 87,5%, 6%, 6,5% of the population respectively. The median age is 21,7, something that is a consequence of the HIV/AIDS epidemic that kills more than 6 700 people per year. More than 50% of the population lives in the poor northern third of the central plateau. The deserts are close to uninhabited, besides from a few small-scattered desert tribes. There are around 10 large tribes in the country, the majority being Ovambo. Other tribes are the Kavango tribe (9%), Herero (including Himba) (7%), Damara (7%), Nama (5%) and Bushmen (2%) (CIA, 2011).

4.1.1 History

Namibia has a turbulent history, not only due to German colonization and South African leadership, but also socially. Archeological findings indicate the country has been populated for at least 25 000 years. The original population is believed to be the now heavily decimated San people, who lived as hunters and gatherers. Around the 13th century, the San population was pushed south by pastoralists from further north (Damaras and Namas), a people with origins in East- and Central Africa. The

nomad Hereros and the Ovambos migrated to Namibia, also from the north, between the 15th and 16th century. Europeans “discovered” the country in the 18th century, and in 1884 Germany declared the region as a German protectorate. The black population were pushed away from their land and put in reserves, which only covered a tenth of the country's total area. The Germans started confiscating cattle, mainly from the Herero tribe and being the proud people that they are, the Hereros soon declared war against the Germans 1904-07 (see Ovitoto history). This resulted in a division of the country - the sparsely populated south with little or no agriculture, and the densely populated north - a division still obvious today (U.S Department of State, 2011).

Being a German colony until 1919, the country became incorporated by South Africa the same year. 1964, South Africa announced their Odendaal Commission, introducing complete territorial apartheid and a country divided into tribal homelands and white commercial districts. The best farming land, the mineral rich areas and the cities were reserved for the white population. In 1966 the UN dissolved South Africa's mandatory over what was then called South West Africa. To further enhance the regions claim for independence the region took the name of Namibia, after the Namib desert (UI, 2010). In 1971 the International Court of Justice declared the occupation illegal and after years of internal fighting the country claimed independence in 1990. The leader of South-West Africa People's Organization (SWAPO) Sam Nujoma, who had led the party in exile for decades, became the country's first president (Häggeborg and Tillander, 2009).

After the millennium, droughts, floods and the spread of HIV/Aids created chaos in the Namibian agricultural productivity and made the country dependent on emergency aid (Häggeborg and Tillander, 2009). The HIV/Aids epidemic has reduced the lifespan of an average person by 18 years (61 years in 1991, 52 years in 1998 and 43 years in 2000). The loss of productive workforce has damaged the economy of Namibia and destroyed households through loss of income and reduced availability of domestic and farm work (El Obeid et al, 2001). Today, investments in education and healthcare have stabilized the economy, but the situation is far from sustainable as the rate of population growth is among the highest in Africa (CIA, 2011).

4.1.2 Economy

The economy of Namibia is integrated with the economy of South Africa and mainly builds upon the country's rich assets of minerals. However, Namibia's economy is heavily dependent on the earnings generated from primary exports in a few vital sectors, including fishing and agriculture (U.S Department of State, 2011). Together these sectors cover most of Namibia's income, giving the country a relatively high Gross Domestic Product (GDP) for an African country (US\$6 900/inhabitant). However, this is a deceptive view, as more than 55% of Namibians have to survive below poverty line (<US\$2/day). 34.9% of the population even has to survive on as little as \$1/day. This makes Namibia one of the “worst” countries in Africa when it comes to differences in income. Around 2/3 of the total income goes to the 1/10 of the population, all of them pretty much comprised by the entire white elite (CIA, 2011).

Even though Namibia has had less of political and economical scandals than many other African countries, development is slow. This is mainly due to the lack of an educated workforce and the government has a hard time dealing with the 51,2% (2008) large unemployment (CIA, 2011).

4.1.3 Agriculture

The majority of Namibians who populate communal areas are small-scale farmers who live off and from the land without owning it. They are directly or indirectly dependent on agriculture to survive. Because of the dry climate, most of the sector relies on commercial and communal livestock

farming, concentrated mainly to the northern and central parts of Namibia. Commercial farming is the production of livestock for sale and widespread distribution, whereas communal farming is farming for household consumption. About 80% of the commercial livestock products are exported, mainly to South Africa. The livestock sub-sector is the single largest contributor from the agricultural sector to the Gross Domestic Product (Hunter, 2004).

After independence Namibia faced the complex and emotional land reformation question, legislated by the former South African apartheid government. In the SWAPO government's 1989 election manifesto the party committed itself to transfer land from those who had "too much" land to the landless majority (de Vries and Lewis, 2009). This was to be done by the government's land reform policy "willing seller, willing buyer", meaning that the government buys off land from commercial farmers to re-settle poor communal farmers (U.S Department of State, 2011). At this time, 52% of the agricultural farmland was owned by (mainly) white commercial farmers, who made up 6% of the Namibian population. The remaining 94% of the population had to live off and from the resulting 48%, often living in the ethnic reserves in north and central Namibia. More than 20 years later, however, reformation is moving slowly, mainly since commercial farms play an important role in the economy of the Namibia. In 2004 communal farming sector comprised of 41% arable land, mainly occupied by the Namibian black population. Due to population density and lack of resources, the agricultural productivity is still very limited and farming is often practiced under primitive conditions (Hunter, 2004). Commercial agriculture is practiced by around 4 000 farms, mainly owned by the white population. These farms contribute to around 65% of the agricultural output of Namibia (UI, 2010).

Two lines of argumentation determine today's debate on land: equality and justice on one hand, and the productivity of the agricultural sector on the other. The fact that the land reformation system is slow and only benefits a small percent of the population has made the locals questioning the SWAPO government's commitment to the system and its political will to challenge the rich small elite. In Windhoek alone, less than half of the residents benefit from the formal land tenure system. Approximately 18 000 families (at least 25% of the city population) live in informal settlements without any permanent tenure. The situation in the rest of the country is similar (if not worse) than in Windhoek, with more than 70 000 families living in informal settlements, and the majority of freehold land owners not having access to matriculation registers and services (de Vries and Lewis, 2009).

4.2 Ovitoto

Ovitoto is a communal area mainly inhabited by a Herero population. It was appointed in 1923 by the Native Reserve Commission of South-West Africa. The area is situated approximately 45 kilometers southeast of Okahandja, which in turn is situated around 70 kilometers north of Windhoek. It covers an area of approximately 627 km² and all together consists of 19 villages (figure 4). The reserve borders commercial farms in all direction and is therefore completely land locked. The total population in the reserve is estimated to be around 6 000, but no exact number exists. What makes population estimation difficult is the fact that many people are not permanent residents in the area, and can be regarded as "migrant workers". They only return weekly or monthly from employment elsewhere (Kruger and Katjivikua, 2010).

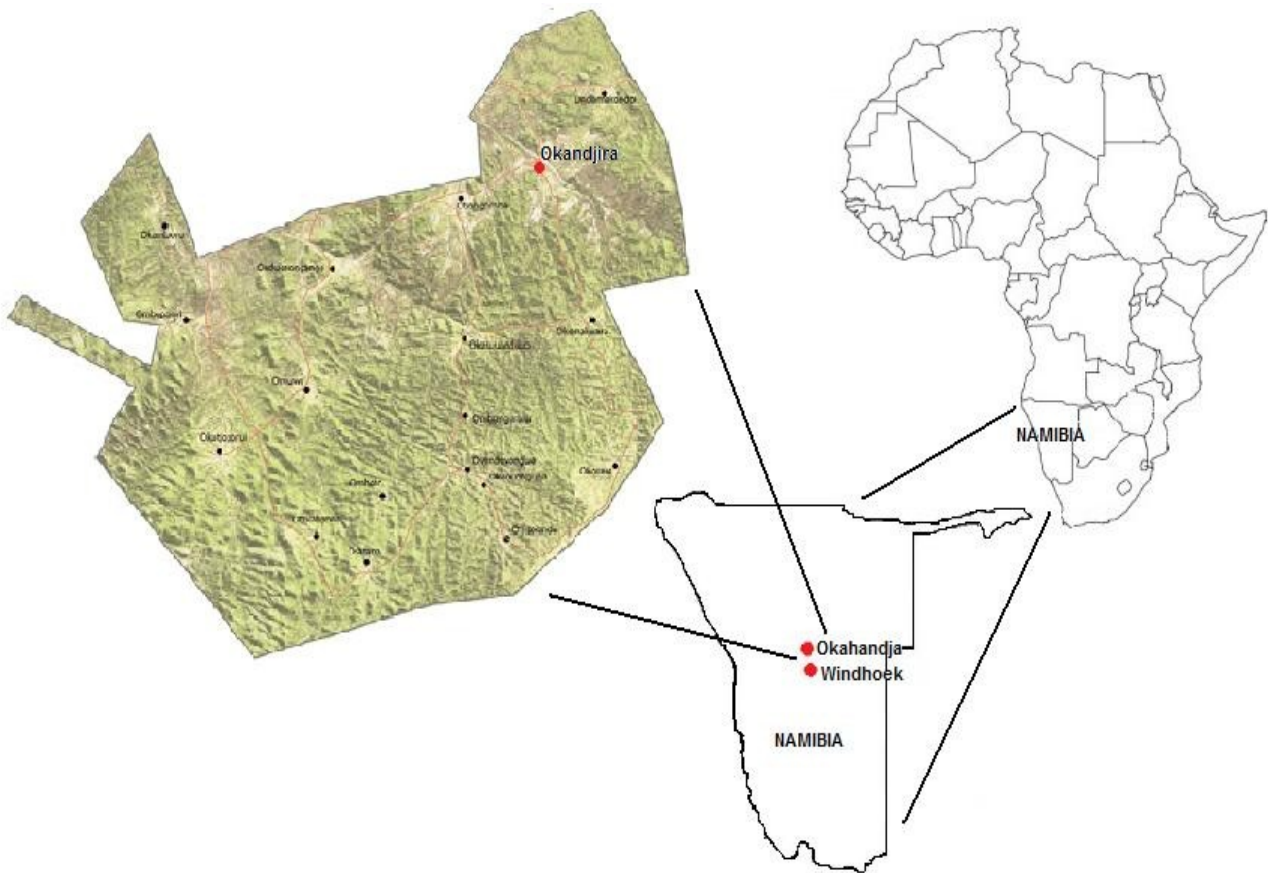


Figure 4: Ovitoto communal land with main village Okandjira (BioMed Central, 2006 and Namibian Association of CBNRM Support Organization (NACSO), 2008)

97% of Namibia's soils have clay content of less than 5% and thus have a very low water holding capacity. Considering soils and rainfall, only about 1% of the land surface is considered to have medium to high potential for rainfed and irrigated crop production. Ovitoto is no exception. The vegetation is classified as “central mountain veld” with shrubs and small trees covering main parts of the area. Because of the mountainous terrain, the dominant soil type is shallow lithosols (Sweet, 1998).

The annual rainfall is around 500 mm (see figure 5). From October 2008 to June 2009 a total of 502 mm was recorded in Ovitoto (recorded by the farmers themselves). From September 2009 to May 2010 the total annual rainfall recorded was 519 mm (Kruger and Katjivikua, 2010). The temperature is typical for inland semi-arid regions, with hot days and colder nights (Mendelsohn et al, 2002).

There are no perennial rivers within the reserve so the villages get most of the water from nearby dams. Unfortunately, the dams do not provide enough water to irrigate crops, making large scale cropping out of the question (Ward and Forbes Irving, 1999). It is estimated that during the wet months the Swakopport Dam, situated around 50 km outside Okahandja, supply around 60% of the total demand, and in dry periods around 30%. Each village has at least one water pump that should be managed by the local Water Point Committee, a locally engaged committee that is in charge of the maintenance and payment regarding the water points in the village. However, misuse and bad managements impede the water flow and make the water supply a highly irregular natural resource (South-West African Directorate of Water Affairs, 1979).

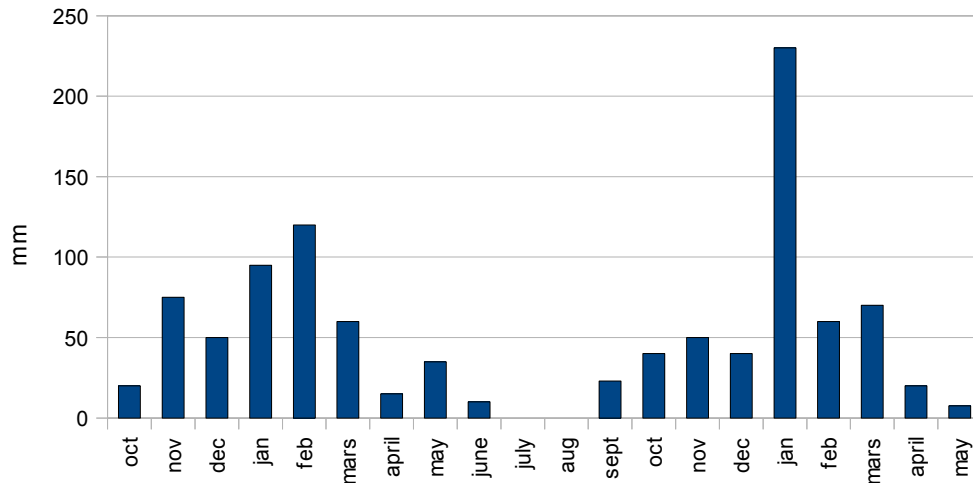


Figure 5: Total monthly rainfall from October 2008 to May 2010 (Kruger and Katjivikua, 2010).

4.2.1 History

Hereros migrated to Namibia from East Africa several centuries ago. They reached the Kunene River in around 1550. After having resided in Kaokoveld for around 200 years, severe drought forced the Herero to migrate south. However, not all were keen on following, which caused the tribe to divide, leaving the Himba and Tjimba tribes behind. They reached Swakop River at around 1750 and continued moving east towards Okahandja during the 19th century (Hoole and Berkes, 2009).

In 1884 Germany proclaimed Namibian territory, and started confiscating Herero land and livestock. In an attempt to end these confiscations, Herero and the Nama tribes declared war against the Germans in 1904. The German revenge was devastating. The war lasted three years and under General Lothar von Trotha and his infamous “proclamation of extermination”, the Herero population was nearly extinct. This resulted in over 80 000 people dead, mainly on the Herero side. Left without land and cattle, the survivors fled into Botswana. When South Africa took over the administration in 1915, the refugees began to return and were gradually allocated in reserves (Mendelsohn et al, 2002). As if the Herero had not suffered enough for one lifetime, there was additional misery under the South Africa control. During this time the area of European-owned farms increased by 346%, which consequentially increased livestock density and land pressure in the small areas the Herero were restricted to. This became a particular problem when the increased farm areas prevented people in the reserve to traditionally herd and rotate the animals in order to find grazing. The Ovitoto Reserve was proclaimed and its borders defined by the government in 1923 (Wagner, 1957).

4.2.2 Herero Lifestyle

The Ovitoto communal area is predominantly inhabited by a Herero population, who were originally a nomadic cattle-breeding people whose main income derived from livestock production. However, since the nomadic movements in the reserve are restricted, not to say impossible, most of the people have now erected permanent houses in the area. There has also been an apparent change in the type of livestock ranched, from cattle to mainly goats and sheep (Ward et al, 1998).

Still, some tradition values have survived. It is, for example, still extremely important to own livestock, some might even say that it is their culture. Having a large number of cattle is an important status symbol, since wealth is measured in number of animals and not in money at the

bank. According to the Herero it is impossible to be Herero without animals. Unfortunately the people of Ovitoto are now starting to pay the price for their traditions, as the excessive number of livestock has led to the land being severely overgrazed. The main issue of the area is that the farmers have no control of their livestock numbers or grazing regimes, although many farmers acknowledge the problem of overgrazing. Maintaining animals for longer periods in a land that only should be used seasonally inevitable result is land degradation (Johnson and Lewis, 1995).

4.2.3 The problem

Namibia is a naturally dry country (figure 6), and its indigenous species are well adapted to its harsh conditions. Even the people who lived on the land in the past adapted their lifestyle and farming methods to fit in with these circumstances, moving constantly according to where water and grazing were available (Ward and Forbes Irving, 1999). But in little over a century, nomadic groups such as Herero, have lost power and territory to an expanding agricultural economy. This expansion invariably seizes the best areas and leaves the farmers with less desirable land (the more arid the district in which this process takes place, the more destructive and rapid is the impact on the surrounding environment).

Table 1 shows the total number of livestock in Ovitoto 2008-2010, and was provided by the Kambekura Farmers Association. A survey done in May 2010 by Kruger and Katjivikua, estimated the current stocking rate to be around 18 ha/Large Stock Unit (LSU). According to Meissner (1982), a Large Stock Unit is the equivalent of a bovine of 450 kg, whose mass increases by 500g per day on grassland with a mean energy digestibility of 55%. Goats/sheep are recalculated into large stock units (LSU) by dividing the total number by 5,25 (one head of cattle equals 5,25 goats) (Klintenberg and Seely, 2004). Kruger and Katjivikua also estimated the recommended carrying capacity in Ovitoto to around 3 ha/(LSU), which leaves the area 600% overstocked. This clearly exceeds the general capacity rule to stock at 80% of average capacity in order to have at least 20% forage reserve for drought years (Grainger, 1982). The total area of Ovitoto could in reality hold 3 465 LSU's, but does currently hold 21 148 LSU's. The consequence is 17 683 LSU's too much. With no chance of expanding the area, the animals are confined to smaller and smaller grazing areas and the farmers are forced to maintain their animals in the same place for a longer period of time. The result is land degradation in an excessively pressured land (Kruger and Katjivikua, 2010).



*Figure 6: Land degradation in Ovitoto.
Photo by Rosengren, 2010.*

Table 1: Livestock numbers in Ovitoto from 2008-2010 (Kruger and Katjivikua, 2010).

Year	Cattle	Goats	Sheep	Horses/donkeys	LSU
2008/2009	18090	8909	2376	764	20735
2009/2010	18353	9948	2330	749	21148

5. RESULT & ANALYSIS

Hot and dry, Ovitoto represented itself to be a harsh area, were people truly worried about the overgrazing situation. As a result, the villagers seemed eager to get started with a new project and had previously visited the city of Opuwo in northern Namibia to study how the people there

Box 1: Sustainable Land Management in the Opuwo Region

Planned grazing through herding (PGH) is a project in Opuwo for improving rangeland management system. It signals a shift from interventions based on de-stocking animal numbers according to defined carrying capacities (which is often socially unacceptable in communal areas) towards addressing the frequency of grazing and the subsequent impacts of perennial grasses (CPP, 2009).

The first step in the PGH project is to convince the livestock owners to combine their smaller herds into one big “village herd”. A few, of many, advantages of having one single, larger herd are:

- Animals are not allowed to roam freely and are under constant supervision, reducing predation and theft
- Large herds of animals could, by their concentrated, break up capped soils or trample moribund grass material into the soil
- Herded animals can be rotated systematically to allow for short and intensive grazing periods, followed by long and effective recovery periods.
- Herded animals can utilize areas away from the water source, allowing denuded areas around the water source to recover.
- Key areas can be rested during growing season to ensure drought feeding or provide fodder for animals with specific requirements (sick, pregnant animals etc.) (Kruger and Katjivikua, 2010).

The second step is to form a grazing committee that defines which grazing area to be used, this must also be approved by the traditional authority). The third step is to establish a grazing- and a land use plan. The aim of the plans is to get the animals to the right place at the right time for the right reason, taking into account social, economic and environmental factors.

The project in Opuwo has proven successful. The delegation of rights to communities over resources and decision-making has yielded a number of encouraging results that show much promise for this type of innovation. The establishment of various instruments of community-based management within the community, such as farmers associations and water point committees, represent an innovative way of facilitating this process (CPP, 2009).

There are several useful examples of how this approach can be achieved. It is shown that communities have been able to generate their own information through local level monitoring and sustainable land management, based on collected information. This could, for example, include the combination of herds and the application of rotational resting practices as well as the extension of water points to under-utilized areas to allow a more even utilization of the rangeland (Bingham and Savory, 1990).

Planned grazing allows local level land use planning, which can decrease conflicts between grazing and cropping. A reduction in livestock losses, theft and human wildlife conflict problems relating to predators has also been reported. Soil capping is broken and improved soil cover results in increased annual grass production, with an increased recovery in perennial grasses expected (CPP, 2009).

practiced sustainable herding. For more information about this project, see box 1.

5.1 Community Structure

Farmers with less than five years “active livestock farming experience” forms a small majority. Only one of the respondents claims to have been a farmer for more than 50 years. However, he was 77 years old, so that may not come as a surprise? Within a time span of 10-50 years, the remaining farmers pretty much represent every decade between these ages (see table 2). What seems to be a common factor is that almost all of the respondents grew up with animals around them and has been

involved in farming animals since they were kids. However, the question “how long have you been a farmer”, that is to say; practiced farming with their own animals, and not “how long have you practices farming”, I choose to not include this period of time in the final result.

Table 2: Name, age and gender of the respondents. When referring to the respondents, the number of the interviewee will be typed within a parenthesis. Table by Rosengren, 2010.

Interviewee	Name	Age	Sex
1	Elisabeth Muharukua	57 years	F
2	Gerard Kapanda	29 years	M
3	Erna Tjibo	24 years	F
4	Othniel ”Shunna” Kangumine	38 years	M
5	Sigfried Maneke	43 years	M
6	Lucas Ngatajosi	77 years	M
7	Christophine ???	43 years	F
8	Zackharias Kandarike	43 years	M
9	Othniel Tjikundi	56 years	M
10	Ehrenfried Kazondunge	55 years	M
11	Eliphas Katemutima	42 years	M
12	Israel Kokura	39 years	M
13	Robert Kamunika	37 years	M
14	T.B Uahongorn	50 years	M
15	Develias Ngatjiisike	38 years	M

13 of 15 farmers stay permanently in the Ovitoto reserve. For most of them the village that they live is not the same as the one they work in. Seven of the 15 respondents live in Okandjira and six of the respondents live in other villages within the reserve. The remaining two respondents live in Windhoek and visit their village houses in the weekends. The conclusion is that the majority of farmers have lived in Ovitoto all their lives.

Most of the interviewees have one or more employees who take care of the livestock (besides themselves). In many cases the employee is someone within the family. A minority says they take care of the animals alone, or with the help from his wife or other relatives. However, this is not the same as an employment since these people do not get paid, and I have chosen not to include these persons as “staff”.

5.2 Business or culture?

13 of 15 farmers say the main reason for keeping livestock is to make a living: ”We didn't go to school. Nowadays people are more educated and can get money in other ways to send their children to school and keep themselves clothed” (7). Seven of 15 claimed it to be because of traditional and cultural purposes, such as gifts at weddings and funerals. Keep in mind that several respondents picked more than one answer. Keeping livestock is a large part of the Herero culture and works as a status symbol, so for many of them the answer was obvious: ”The number one reason is tradition. We cannot live without animals. If you are Herero and you don't have cattle people think there is something wrong with you” (14).

Five of 15 farmers keep animals as a food source, from which they get their daily milk and butter. At special occasions they sometimes slaughter a goat to celebrate. In good years some of the farmers even have enough milk to make *Omahare* (a yoghurt) and Herero butter to sell.

Only two of 15 respondents claim that the animals have no other value except their business value (see chapter 5.8).

5.3 Animals and overstocking

The number of animals kept by each farmer varies from 12 to 224 (see table 3). The total number of livestock of all the respondents are 1 393 animals. The mean number of animals is 92, which is somewhat higher than what the majority, nine of 15 farmers, hold (12-91 animals). The remaining part holds between 116 and >200 livestock units, with 224 being the largest number of animals. 15 of 15 respondents holds goats and 13 of 15 holds cattle. Seven of 15 owns horses or donkeys, which are mainly used as draught power or transport.

Table 3: Number of livestock per interviewee. Table by Rosengren, 2010.

Interviewee	Cattle (<i>Simmental/Brahman</i>)	Goats (<i>Anglo Nubian</i>)	Sheep	Horses/donkeys	Total sum
1		6	6		12
2	5	7			12
3	17	21	3	1	43
4	20	8			28
5	25	10	15	6	63
6	70	50		2	122
7		153	9		162
8	35	160	29		224
9	53	14	1	7	75
10	160	25	18	2	205
11	30	30	8		68
12	70	20	1		91
13	60	50		6	116
14	10	20		2	39
15	52	65	16		133
Total:					1393

Keeping sheep is not as popular as keeping goats since: “Unlike goats, sheep do not eat leaves, so at this time of year (dry season) they have to walk very far to graze and will most likely be eaten by predators or get lost” (15).

Eight of 15 farmers recognize the problem with overstocking, but claims that the problem lies in the small size of the area rather than the number of animals: “The area is too small and overstocked, which makes the competition for grass and water even harder” (3). Those farmers who did not blame the size of the area, blamed the lack of rain as a cause of land degradation: “Without rain the sun burns away the food for the animals” (8).

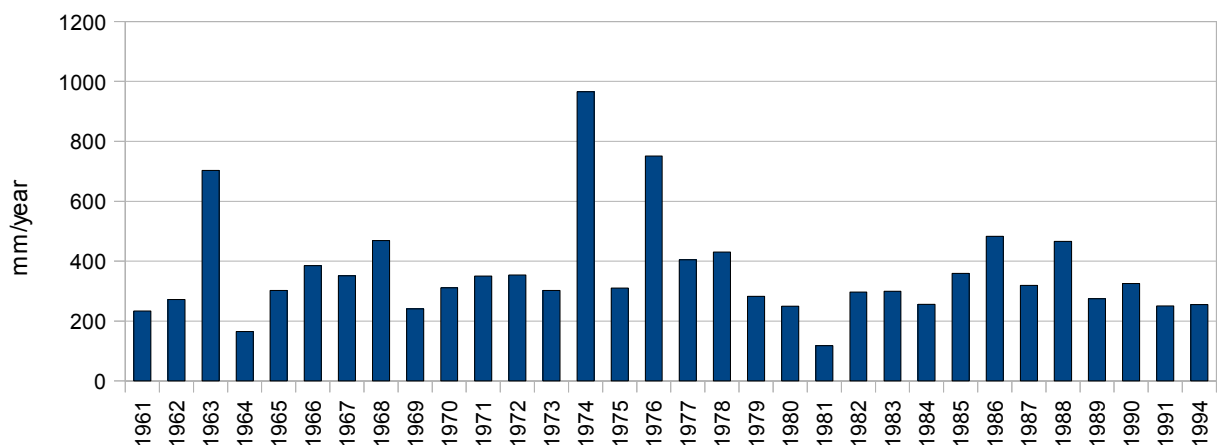


Figure 7: Rainfall data for Okahandja 1961-1991 and 1994 (data provided by Patrik Klintonberg).

One farmer expresses his worry about the increased human population that, inevitable, will increase the number of animals: “The village is about to turn into a city and there isn't enough space for that” (5). When mentioning food scarcity, most of the respondents associate this issue with an increased number of droughts and not with overgrazing: “There is not enough food because of drought” (7).

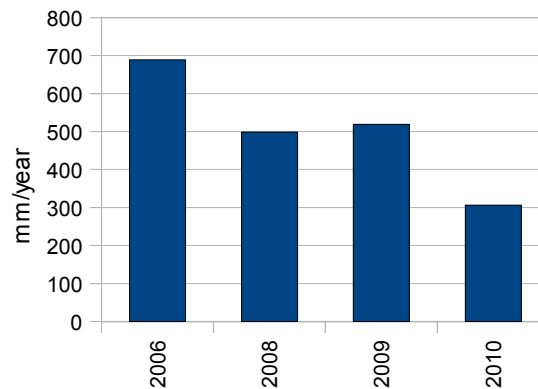


Figure 8: Rainfall data for Windhoek 2006- 2010 (Namibia Weather Network, 2011).

Looking at the rainfall data tables, both from the village of Okahandja, located around 45 kilometers from Ovitoto (1961-1991 and 1994), and from Windhoek (2006-2010) in figure 7 and 8, it is visible that there has been a slight decrease in rainfall. If this is due to climate change or not is impossible to say within the scope of this study. A big limitation in investigating further is also the fact that significant rainfall data is missing between the years 1994-2006, both for Okahandja and Windhoek. This makes it difficult to distinguish any trend that might have occurred in the precipitation during these years.

Another farmer mentioned the lack of fences being a significant problem. Since Ovitoto is a communal area there are no ownership structures, which means no defined borders between different grazing areas. Consequentially, the animals' graze wherever and whenever they want. As a final statement, one of the farmers mentioned the choice of animals as a possible contributor to land degradation:

Some farmers own a lot of horses and donkeys that, when grazing, pulls up the grass to get to the roots, instead of cutting it off at the soil surface as the ruminants do. A few years ago this problem did not exist and it was easy for the grass to grow back even with very little rainfall (14).

The project coordinator of Agribank Namibia, Bertus Kruger, backs up this statement:

The donkeys have teeth similar to humans and pull the grass out of the soil because they want the roots. This is killing the grass. Ruminants put their tongue around the grass and cut it off with the bottom teeth, which makes the impact on the grass much less direct. Ruminants also consumes less than donkeys and horses.

5.4 Lack and loss of natural resources

All respondents mentioned grass/forage as the main natural resource they depend on in order to support their livestock. Forage includes grass, leaves and pods from different palatable trees in the area, such as the *Acacia erioloba* and *Acacia karroo*. 11 of 15 respondents also mentioned water as an important factor to keep the animals alive: “We are using the boreholes, but they generally dry up towards the end of the dry season” (13). Four of the respondents do not think that the water situation in Ovitoto is such a big problem. This could easily be explained by the fact that these people lives in villages with working water pumps, and thereby have access to more water.

A increasing problem due to overgrazing is bush encroachment, something that have not escaped the respondents: "There is to much change in the vegetation with more bushes are growing in the area" (15). Four of 15 respondents agree that bush encroachment seriously affects forage availability: "Not only does bush encroachment outrival grasses, but it also, due to its impenetrability, makes it impossible for the animals to reach the grass that is left" (12).

Seven of the 15 respondents thought that the amount of rainfall had decreased over the past 10 years. One respondent, however, did not agree and meant that the rainfall varied from year to year. This statement is more accurate when comparing it to national annual rainfall data, which states that there has been no significant decrease in rainfall over this area during the given time. Only 3 of the respondents thought a step further and said: "The area is overstocked. The changes does not depend on lack of rain", by which they meant that the farmers are unwilling to see that the changes in the environment do not depends on a change in rainfall, but on them, in many cases practicing bad land management.

5.5 Livestock and land management

Despite grazing being close to non-existing during the worst periods, farmers rank the current livestock conditions to 2-3 on a scale from 1-5² (see figure 9). The explanation is simple; the farmers buy grass for the animals when times are bad, however, not all of them can afford to buy nearly enough to feed all of them, leaving the majority of the animals in a tragic condition. One lucky farmer have the funds to move all or some of his animals to a commercial farms when the communal grazing gets scarce, but this is something very few farmers can afford.

Current livestock condition according to the respondents

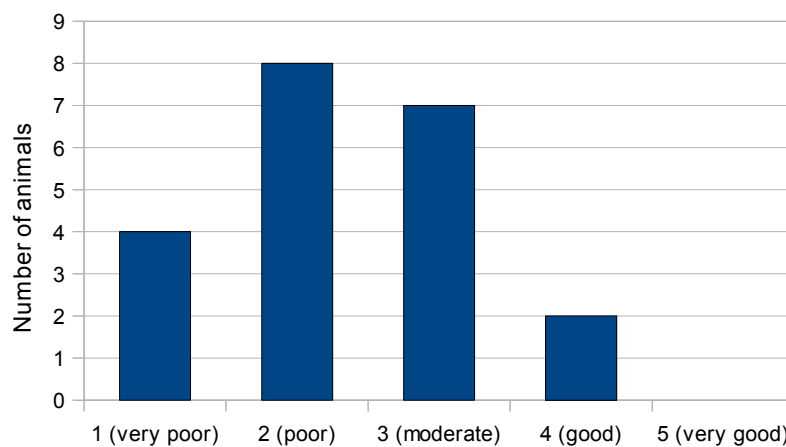


Figure 9: Current livestock condition according to the respondents. Figure by Rosengren, 2010.

However, one of the farmers has hit jackpot and borders a former re-settlement farm. He now lets the animals graze there since "the owner has moved away and the fences are broken, something we, at the moment take advantage of (13)".

Most of the respondents agree that sheep struggle the most to adjust to starvation-mode. This is likely due to the fact that sheep, unlike goats who also eats leaves, have to survive on scares grass resources. Five of 15 respondents claims the livestock condition to have been somewhat better the past years: "Last years conditions were much better, I would even say very good compared to this year" (7). When I ask why the conditions have changed so drastically they answer: "Last year I planned ahead and got some extra forage, but this year I was not financially prepared" (14). Some farmers also sold a few animals to keep the remaining ones alive. However, this doesn't seem to be

² 1=very bad, 2=bad, 3=moderate, 4=good, 5=very good

very popular and only a few other farmers practice this way of thinking.

All but two of the respondents let their animals roam around free and only one of 15 farmers practice rotational grazing. According to this farmer, this system makes the livestock condition to always stay between 2-4. The lack of rotational grazing systems is something that worries Israel Kokura, chairman of the Ovitoto farmers association: "We don't practice rotational grazing as we should. We only direct the animals in different directions depending on the availability of grass in that specific area".

As a consequence of letting the animals roam around free, five of the 15 respondent farmers mentioned theft as a major problem. One farmer used to own cattle and horses, but due to theft she now only has 12 goats left. Theft is a big, never-ending problem, something that is confirmed simply by looking in the newspaper where livestock theft is reported on a near daily basis.

The land management strategies used in Ovitoto are of very basic kind. There is little or no demand for advanced technology, since the majority of the animals roams around free and graze within 2-4 kilometers from their home villages. But despite the relatively short distance, only one respondent have her livestock herded. She, along with the farmer that moves his animals to a commercial farm have the highest, respectively the second highest number of goats of all of the respondents, something that might reveal the effectiveness of the herding system? But even if most of the animals are not looked after on an hourly basis, around half of the farmers claim to practice some kind of system to keep an eye on the animals. Whether on a daily or a weekly basis this could, for example, mean that the animals are habituated to come back to the kraals to get supplements or to feed their calves.

5.6 Grazing

11 of 15 farmers say they would rank the current grazing conditions to one on a scale from 1-5³ (see figure 11). The unanimous answer is that there is no grass, and what little that does exist is too far away. Namibian grazing is also low on phosphate, which makes it necessary for the farmers to buy supplements (licks and minerals) for the animals (Metzger, 1994).

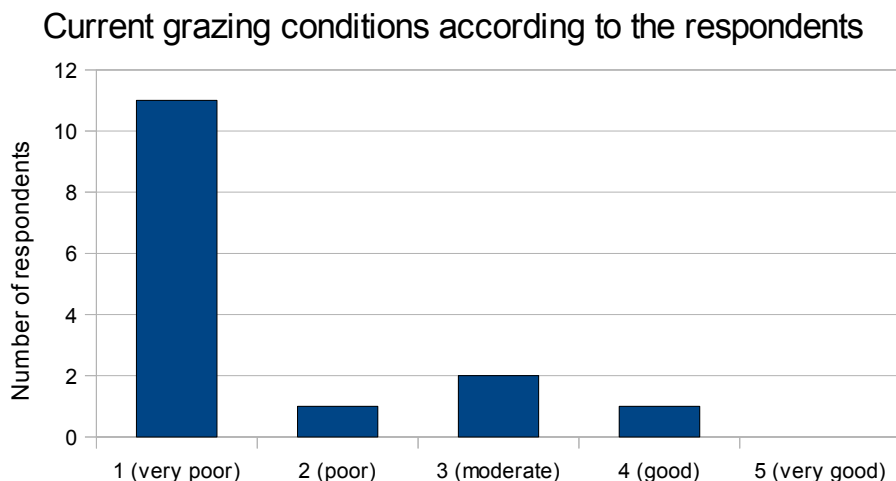


Figure 11: Current grazing conditions according to the respondents. Figure by Rosengren, 2010.

A large part of the problem is the increasing distance from water points to palatable grazing: "There is no grass by the water sources due to the larger number of animals that come here to drink". Only two of the farmers rated the grazing to 3, with the explanation that they border fenced off

³ 1=very bad, 2=bad, 3=moderate, 4=good, 5=very good

resettlement farms, which means that they basically have gotten more land. One farmer tells me that he knows of a “secret grazing spot”, to where he takes his animals when there is a little grass: “Normally the grass there is good, but this year its a bit problematic because other farmers have started to take their animals to this plot” (4). Eight out of 15 respondents claim that grazing conditions have decreased steadily during the last three years. Israel Kokura, chairman of the Kambekura Farmers Association, does not agree: “Sometimes the grazing goes from good to less, sometimes from worse to bad. Its all in the mind of the farmers, because the main factor during these changes is the way you farm”. Johnson and Lewis (1995) confirms this statement and says that fluctuation in livestock numbers tend to follow the annual rainfall pattern, and as seen further down in the result, rainfall have not changed significantly.

5.7 Water

According to most of the respondents, the water is not enough due to dried up boreholes and bad maintenance. 14 of 15 interviewees gets the water from local water points. A local Water Point Committees should maintain these boreholes, but Israel Kokura adds that this is not always the case.

Water is a huge problem in our village. The water in the boreholes is so scares that we only allow the people in the village to use it. The animals have to find water at another water point 5 km from here (11).

This means that for most of the time, livestock has to rely on natural water points, such as dams and rainfall ponds to quench their thirst, a method that could be very uncertain considering that the amount of rainfall is, as stated, extremely variable in these areas. One farmers claims that there are to few water points in relation to the number of animals: “We have close to 900 animals in the village, but only one water point” (15). The villages with an existing Water Point Committee have a relatively well working system where the villagers pay a monthly fee to the committee to be able to use the water see table 4). The fees varies from village to village, from N\$4-N\$2 per large stock unit, and from N\$0,5-N\$1 per small stock unit. Five of the farmers also pay a monthly fee for personal use, a fee that stretches from N\$4 and up.

Table 4: Water fees for each respondent (N\$/animal/month). N/a stands for data not available. Table by Rosengren, 2010.

Interviewee	Cattle	Goats/Sheep	Horses/Donkeys	Additional fee/Comments
1				Pays a total fee of 30\$/month
2	n/a	n/a	n/a	
3	n/a	n/a	n/a	
4	2	0,5	2	
5	2	0,7	2	
6		0,7		
7		1		
8				Installed a private pump. Pay N\$300/month
9	2,5	0,5	2	
10	4	1,5		
11	2,8	1		
12	n/a	n/a	n/a	
13				Pays a total fee of N\$100/month
14	2	1	2	
15	2	0,7		Pays additional N\$4/month/household

Some of the villagers pay a monthly lump payment of N\$30-N\$100, which covers both the human and livestock consumption. The money is put on a village account opened by the committee, where everybody contributes and whenever there is a problem, or they need to buy diesel, funds are taken from that account.

Asking one of the farmers how much she pays for water, she tells me that they no longer pay the fee. The for this is the lack of a local Water Point Committee: “When we started there was a committee doing everything, but when they left people were left on their own. They have no one to decide for them” (1). Now she buys her own diesel and fills the pump up herself. One of the more wealthy respondents gets his water directly from the national water company *NamWater*. He bought a private pump for N\$6 000 and now pays a monthly fee of N\$300, which covers the water consumption used by both people and animals. The reason for this, he says, is because he did not want to share water sources with the other villages, as they sometimes do not pay for the diesel that runs the pump: “The animals will suffer because other people doesn't pay. I cannot afford to run the pump by myself” (8).

5.8 Finance

The lack of water in Ovitoto has made livestock the number one resource base. Overgrazing is often of less concern than having enough animals to maintain viable herds in the aftermath of drought. In years with plenty of rain, the herds are allowed to increase, but when the first signs of drought appear, farmers are reluctant to reduce stock numbers: “I do not like selling. I want to increase the number of animals. The more animals you own, the more money you have and the better life you live” (13). And so the drought-stressed pastures become overgrazed and degraded. But due to lack of sufficient income, all but one of the respondents have been forced to sell livestock annually.

Between the respondents, the individual farmers sell 4-50 animals per year, which leaves an average of 16,89 animals sold per farmer, per year. According to Israel Kokura, the average number of animals sold per year in the Ovitoto area is around 5 000, which means around 400 animals per month. All respondents agree that the best time to sell is when the price is high. Although this is a very reasonable answer, I would have appreciated if it was just a bit more specific. But after a few follow-up questions, everyone seems to agree that the best time to sell is when the animals are in their best condition, which means June, at the end of rain season. Israel Kokura means that the price depends on what kind of species you sell: “The very best cow known for its meat is a cross-breed between the *Brahman* and the *Simmental*. This breed is very well adapted to the arid conditions present in the region, with the endurance from the Brahman, but the size of a Simmental”. Around half of the respondents says that they make most money by selling weaners (a young animals that just stopped suckle): “Weaners born in December and kept for seven to eight months do not taken much from your pocket either, as they get all their food from the heifers” (12).

Still, the farmers do not seem to follow any kind of system when selling the animals: “We only sell when we need money. And we always need money” (4). This method has proven itself less successful, as most of the buyers rather purchase a large number of animals at once, rather than just one animal there and then. “The ministry are trying their best to educate us to sell all animals at once, but we normally does not sell until we are in great need of money” (15). This method also means that most of the farmers are in such a desperate need of money that they are forced to sell when livestock condition is bad and price low (see figure 10): “We own the animals, but someone else owns the prices” (15). Bertus Kruger agrees: “Farmers are trying too market the animals, but usually they market them



Figure 10: Weaner at an auction in Okandjira.
Photo by Rosengren, 2010.

too late, when animal conditions are bad and the prices too low". In general, the relationship between the farmers, potential buyers and the national meat board seems to leave room for improvement:

When the animals are fat the price is low, and when they are thin the price is high. When the buyers see that the animals are getting fat they decrease the kilo price for their own benefits (10).

5.9 The Future

5.9.1 Coping with droughts

To assess the time and duration of a drought is extremely difficult, and it is hard for the farmers to know for how long they will have to cope with decreasing natural resources. One of the respondents try to cope in his own special way: "We pray that god will bring rain, because buying grass is not enough" (8). But by the recent looks of it, it does not seem like the prayers reach any higher power.

A majority of the respondents, however, are a bit more realistic. 12 out of 15 respondents say they buy forage for the animals, but that they struggle very hard: "It is the most difficult time. At the moment I cannot afford to feed all the animals so the food I am buying is normally for the animals who is sick or pregnant" (13). This means that the majority of the animals are left to feed on the non-existing grass in and around the villages, which makes them subject for starvation. Five of 15 farmers sell livestock to survive. Only one of the farmers says that he moves his animals to other, lush locations, where there is more grazing.

All respondents claim to not get enough help during the toughest periods of droughts: "The government used to subsidize the farmers, but not anymore. I do not know why? Maybe the government does not want to help us?" (1). Another respondent says:

Sometimes we get help from the government. They assist us with grazing areas, transport and rents, but this is very rare. In order to get any subsidies we have to prove we have done everything we possibly could first (14).

However, two of the farmers mentioned the Ovitoto Farmers Association as a great source of help. They tell me that the association holds workshops on sustainable rangeland management, looks up places where they can move their animals, as well as looking up the right market price when it is time to sell.

5.9.2 Adaptation

Despite harsh conditions, there are those who choose to stay and struggle. The explanation is simple: "We grew up here, we do not have anywhere else to go" (15). The only option is to save money and stock up when a drought is oncoming. Three of the respondents mentioned selling animals as an adaptation strategy. One respondent, however, choose to go in the opposite direction:

I definitely see a way to adapt. The animals adapt as well. Maybe nature made the animals so easily adaptable to this area. You can see it in their size, for example- the animals are not as big as they normally are due to the limited amount of food (13).

But even if the animals have gotten smaller, it is difficult to adapt to no food. Although you have to admire this man's positivism. A more realistic farmer meant that it was not a matter of adaptation, but of preparation. He has been a farmer for many years and means that he has learnt what years that will become drought-years, so he prepares himself by selling animals. Once again Israel Kokura pushes fact to what has to be done:

The best thing you can do is to manage your rangeland. Then all the other factors will fall into place. You cannot farm animals and all you get is minus, due to theft, predators or droughts. That is irresponsible farming! If you start managing the herd the results will improve. It is gonna take some time, but we need to convince people that this is the best option.

5.9.3 Ideas of improvement

But what the village lacks in governmental help, the villagers make up for by their thoughts of how the government should help: "The animals are bringing something to the economy of this country so the government should help. It is from us the ministers gets their income!"(10). This seems to be a widespread statement and is mentioned by yet another farmer: "We are the economy of the country, if our livestock die the country will go back! If we have livestock in bad conditions, what is left to sell?" (15). One farmer adds that he would appreciate help from the government to remove bush encroachment.

When asking if they had any ideas of improvement, six of 15 respondents quickly said re-settlements (figure 12). "We do not know where to put our animals. I want to have my own farm where there is no theft and you know the animals will have food" (8). Another respondent continues: "The government must buy land from commercial farmers. Especially those who borders communal areas so that we can enlarge the reserve. After all, it was created by our people originally!" (13). There is no doubt that re-settlements is a burning issue. However, there has been an ongoing debate over the criteria of re-settlements, and the majority of farmers are not happy with the outcome:

We need re-settlements so much that people have started to feel the impact of the situation. So far, only a handful of people have benefited from the re-settlement programs. What good does that do for an ordinary family that has not been re-settled? There must be a system where the majority of people can benefit at once so that our patience and demand for land can be minimized (13).

One farmer felt the need to push for education as a way to cope with the overstocking situation. He meant that it is of great importance that the farmers must attend the so called "farmers days", in order to learn the new methods of farming: "We must stop using old farming methods and start practice commercial farming but in a communal village" (14). He also points of the need for farmers to visit a veterinary to learn how to look after the animals. Interesting fact is that only one single farmer brings up this statement. Apparently no one else felt the need to suggest that education could be the answer to his or her problems.

Suggested improvements

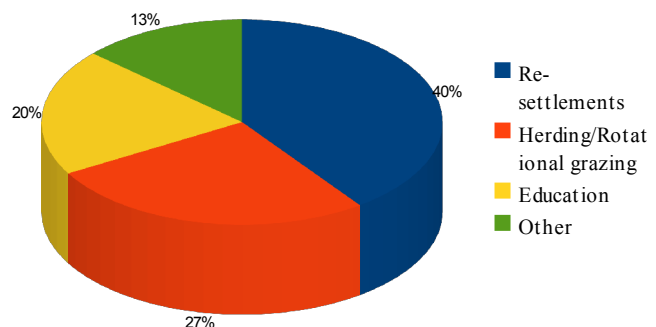


Figure 12: The farmers' ideas of improvements. Figure by Rosengren, 2010.

5.9.4 Looking ahead

Frustration was big when I asked the respondents what they think Ovitoto will look like in 10 years? For most, people are upset and discouraged and looks at the future with a greatly constrained optimism: "Conditions will be poorer. The community will disappear and people will move" (2). For many of them the only possible solution is to be re-settled, something that, at the moment, is

occurring at a very slow pace: “If we do not get re-settled and my children buys animals, where will he keep them? Here of course! The animals already struggle to survive! What will you expect from that kind of situation?” (11). All the respondents’ claims to have little or no faith in the sitting government: “I do not understand this government? They get millions after millions, but no money ever goes into the communal land!” (8). Another farmer agrees and continues:

It feels like the people in charge have lost it somehow? It is very hard to predict if something positive will come out in the end. We, the farmers, are very frustrated and we do not see the light at the end of the tunnel (13).

Three of 15 farmers believe that degradation will decrease when the older generation retires, as they are the main opponents to a shift in land use methods: “The old generation is farming traditionally, but the new one is farming more sustainably” (14). Israel Kokura explains the differences in methods:

It is impossible to get through to an old farmer. It took them some time to develop their own working system and they do not want to risk everything, changing from a system they has been following for so many years.

The farmers means that the future stands and falls with the minds of the younger generation: “I hope and pray that they will try and practice what they already know in terms of good management” (12). But even if the young generation would change its mind and leave Ovitoto, one farmer believes there is still hope, though the prophecy leaves some room for modifications:

It is the survival of the fittest. Those who have another source of income will survive. Those who do not, or practice bad management will not. You have to learn new methods if you are going to survive the situation (15).

6. DISCUSSION & CONCLUSION

The main objective of this study was to find out how farmers affect land degradation in rural Namibia, but also how land degradation affects the farmers. This question has in turn been studied through 4 more defined questions, and three of them will be answered below.

6.1 Has there been any land degradation in Ovitoto? If so; what are the causes and consequences?

Animal numbers and overgrazing

The issue of overgrazing in Ovitoto has been going on for a long time. A report issued by the South West African Directorate of Water Affairs in 1979, shows that the grazing in Ovitoto was under severe pressure even then. The study investigated past livestock population in Ovitoto and estimated that the reserve, with continued overgrazing, would be able to support around 2 500 people with livestock. The conclusion was based on the assumption that each household keeps a certain number of livestock and any further population growth would, according to them, have to be supported by other economic activities. The study also showed that the area inhabited around 12 400 large stock units, which was 100% more that the recommended capacity of 6 160 large stock units. According to the study the land “has been so overgrazed, for so long, that it will take a number of years to re-establish”.

Today Ovitoto inhabits around 6 000 persons and the number of livestock has certainly not decreased. The estimated the current stocking rate is around 18 ha/LSU, but the estimated actual carrying capacity is only around 3 ha/(LSU) (= 600% overstocked). As mentioned in the Study area chapter, Ovitoto could in reality hold 3 465 LSU's, but currently holds 21 148 LSU's. The consequence is 17 683 LSU's too much. Now take into consideration that a cow weights around 450

kg and eats approximately 3% of its weight per day. This means a daily consumption of around 13 kg forage, and an average annual consumption of 4 900 kg (Kruger and Katjivikua, 2010). For one cow. No surprise the place is overgrazed! Then add that one kg of hay costs around N\$1, which gives an annual cost of a little less than N\$5000 per cow per year. It is true that a cow can survive on much less, but that would mean less milk production for the calves, which in the end will lead to reduced income due to bad livestock condition.

But the grazing is not the only thing the animals have been hard on. According to the study made by Ward and Forbes Irving (1999), a cow and a goat drink up to 45 and 12 liters of water respectively. Based on the answers from the respondents, it is then reasonable to assume that the number of animals in a typical herd consists of around 80 animals (40 cows and 40 goats) (sheep, horses and donkeys excluded). This gives a total water consumption of up to 1800/480 liters per day. Assuming that the mean water consumption is around 28 liters per day, the annual water consumption for a typical herd would end up at around 817 600 liters. For one herd! Now it is easy to see why there is no water left for cropping. However, this is of course a very, very generalized way of calculating (for example: no consideration has been taken to the number of calves, kidlings and lambs etcetera). Nevertheless, the result serves its purpose by alerting that this kind of extreme situations calls for extreme actions.

Global warming

Another possible cause to land degradation is global warming. According to a information sheet produced by DRFN (1998) the temperature in Africa has increased by 0,75°C over the last century, compared to 0,5°C in the Northern Hemisphere. This change has not gone unnoticed by the farmers, who believes that precipitation have decreased heavily in the last years. Unfortunately rainfall data collection in Ovitoto did not start until 2009, which makes it hard to identify any trend that might occur, whether it is negative or positive. However, looking at Namibian national precipitation data, no extreme decrease was detected. Unfortunately for the farmers, the only possible explanation for the land degradation is overstocking, and not something to blame on the climate. It is, however, worth mentioning that the effects of global warming are debated and have disturbed traditional lifestyles all over the world (Popp et al, 2009).

HIV/AIDS

It is impossible to discuss sustainable development without mentioning HIV/AIDS. Around 20% of the Namibian population is infected, which makes Namibia to one of the worst affected countries in Africa (CIA, 2011). It is also the number one cause of death in Namibia (El Obeid et al, 2001). This devastating epidemic has only been discussed briefly in this study, but has the power to undermine the entire agricultural system. As mentioned above, a majority of the farmers in Namibia gets their income by being autarkic. HIV/AIDS directly attacks that resource, eroding the physical energy and absorbing the time and energy of those who care for them. With many small-scale farmers surviving on a knives edge, loss of labour to HIV/AIDS can tip the balance and send them into a downward spiral of diminishing food production and income. Although, it is not within the scope of this study to investigate how to HIV/AIDS undermine the agricultural industry, this is a very important factor when discussing how to counter land degradation (Dossier, 1992).

Consequences

Overgrazing and non-existing emerging area set aside for drought periods have led to damaged plant structure, increased soil erosion and forage scarcity, which in turn, have led to considerable stock losses sustained through starvation. The situation in Ovitoto is acute and it is extremely

important to identify what kind of natural resources to prioritize in order to reverse this trend.

One of the easiest ways to measure the consequences of overgrazing is to study grass composition at different distances from a water point. When normal conditions reign, annual grasses should decrease with an increased distance from the water point, and perennial grasses should increase. The presence of perennial plants contributes far more than annual to soil cover and stability through their greater root depth and organic production (Bingham and Savory, 1990). However, as a result of overgrazing, the land is dominated by annual grasses, instead of the more palatable perennial grasses (Kruger and Katjivikua, 2010). They also found that annual grasses and bare ground dominated the area as far as 4 kilometers from the water point. Because of extremely bad rangeland conditions, grass production is close to nothing despite good rainfall the last few years.

6.2 How do the farmers adapt to the environmental issues?

They do not adapt. According to the farmers there is nothing they can do to adjust their lifestyle to the more and more harsh environment. Instead they blame the slow pace of re-settlements and does not acknowledge the fact that they need to change their lifestyles.

However, as a result of the Ovitoto condition, a majority of the farmers have been forced to get additional jobs in order to support their families and animals. But just because the owner is not around it does not mean that the environmental degradation caused by the animals will stop and the question is if the respondents are aware of the strong positive correlation between overgrazing/poor rangeland conditions and droughts? By the answers above, it does not seem like it. Many farmers acknowledge the problem of overgrazing and the consequences of poor rangeland conditions, but very few of them believe that the problem lies in the number of animals. Instead they mean that the area is too small and does not want to recognize the fact that they are a part of the problem that is land degradation.

Reducing livestock numbers is a sensitive issue for Hereros, whose wealth traditionally is linked to the number of livestock owned. Nevertheless, during droughts many of the respondents are forced to sell some of the animals to maintain the others. This is not a positive adaptation strategy, as selling animals at this bad time seldom generates a good price. Not only are the livestock conditions very bad, but the farmers are also more likely to settle at unreasonably low prices. Instead, the farmers have to understand that they are better off selling animals when times are good and the animals fat. It is time for the farmers to plan forward and realize that owning a large herd is not the same as being a rich man.

6.3 How can the people/farmers prevent further and future land degradation?

Modernize traditional methods

To break the land degradation pattern farmers must start implementing what they already know from traditional farming methods. By combining features of indigenous practices with modern development, there is a good chance to learn how to control land degradation (Johnson and Lewis, 1995). Local methods are often more flexible and responsive to the variable climate typical of the region, since the local knowledge base of natural resources is larger. In fact, in 2009 the Ministry of Environment and Tourism published a Country Pilot Partnership (CPP) Programme, where it is believed that the abandoning of traditional methods and knowledge is one possible reason to why food insecurity and environmental degradation continues to be unsolved in Africa. Important lessons can be learned from other areas, such as Opuwo (see box 1), and applied, either in principle or through direct transfer, to solve local problems and increase productivity. As mentioned in the

study from Opuwo, seasonal migration, rotational grazing and/or herding is advantageous for farmers, as more food will be available for the animals. These strategies will give the people both economic and environmental advantages, as well as a chance to keep old tradition alive.

Rotational grazing

By implementing rotational grazing, grazing areas are shifted between summer and winter pastures as a way to adjust to seasonal availability of water and grass in the district. By moving to new areas seasonally, critical pasture zones are protected from overuse (Johnson and Lewis, 1995). However, for many, the method is not a viable option, as herders will have to get paid with money that the farmers do not have. There are also difficulties in finding places to re-locate the animals, without “stepping on anyone's toes”. But looking on the positive side, it seems to be in more farmers' interest to actually try and practice this system, saying that they are prepared to try if such a system ever came to their village.

Involving local communities and reducing animal numbers

Rotational grazing alone will not solve the problem with land degradation, but has to be combined with local level monitoring and reduced livestock numbers. Nevertheless, the control of livestock numbers within the existing carrying capacity is a sensitive point for the farmers, whose wealth is traditionally linked to the number of livestock owned. Moreover, as is typical for most communal areas, open access land use systems often make it difficult to develop sustainable land management practices. Solutions to managing the natural resources of Ovitoto (particular water and grazing) will therefore only work if there is a common understanding and will among the farmers to manage the area as a whole. Much trust is therefore put on local farmers associations and community leaders to take initiatives and develop sustainable methods. Additionally, it is of great importance to adapt the reference frame to the local environment and culture since a strategy will only work if there is an effective participation of the community (Seely et al, 2008).

Re-settlements

Resettlement is a difficult process where poor people with limited skills are moved hundreds of kilometers to a strange piece of land with the expectation to make a living there (Legal Assistance Center, 2005). But a majority of the people living in communal areas are desperate and do not see any other way out of poverty.

There are two ways to get land in Namibia. The first is re-settlements conducted by the governments where the families gets a 99-year lease, but gets no title deeds and, as a result, no collateral to obtain loans. Now, there is nothing more likely to cause a debate in Namibia than the “land issue”. This because land reformation in Namibia is undeniable slow, only 6 million hectares have changed owner and 2 000 families have been resettled, since the independence in 1990 (Weidlich, 2008). The goal of having 50 million hectares of reformed land to resettle 6,730 families by 2020 unfortunately seems to stalemate (Kruger and Katjivikua, 2010). People who have applied for re-settlement are said to have been on the waiting list for several years, and lately the slow pace of land reformation has started to upset several of the respondents. According to them, the system only benefits a minority of the population, a topic that is also speculated by de Vries and Lewis (2009).

The other way to get land in Namibia is by applying for a loan at the Affirmative Action Loan Scheme (AALS) administered by the Agricultural Bank of Namibia. This was introduced in 1992 and has since granted over 300 loans (12). However, to be granted a loan requires that the farmer

have at least 150 large stocks or the equivalent of that in terms of small stock, which is around 800 (Kruger and Katjivikua, 2010). Looking at the animal numbers in Ovitoto, there are very few who fulfill these requirements.

A consequence of land reformation is that due to limited agricultural skills, many farmers do not know how to farm commercially, which often means that agricultural productivity drops. They also lack money to repair fences, water points and wind pumps (Weidlich, 2008). Giving farmers the necessary management skills and technical know-how is crucial before they are being re-settled. If not, there is a high risk that the farmers will continue to cause land degradation. It is of great importance to educate the farmers before they move so that one day re-settlements are no longer needed. But until then, once land has been distributed, post-settlement support is crucial for the purpose of promoting a sustainable way of farming (Legal Assistance Center, 2005).

7. CONCLUSION

Serious measures must be taken in order to fight and prevent further land degradation in Ovitoto. Not only must the farmers understand their participation in the subject, they also need to make serious sacrifices and convert their way of farming to more sustainable practices. Reducing the number of animals in the small area of Ovitoto is one step in the right direction. The introduction of rotational grazing as a planned management system is another, reducing the pressure on the land and gradually increasing the grass production. Re-settlements might work if proper education is given to the farmers before they are being moved. The people of Ovitoto are well aware of the land degradation and know what they have to do in order to stop it. Most of the farmers are also willing to participate in any kind of stop-land-degradation-method that might come along, leaving the future for the villagers looking not quite so hopeless.

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APPENDIX A

Questionnaire (farmers)

1. Introduction

- Name, Age
- Who is the head of the household?

2. Role in the local community

- What is the main source of income in this household (salary, pension, remittance, sales, livestock production sales)?
- For how long have you been a farmer? Are you a full- time or a weekend farmer?
- Is this your permanent home?
- Have you always lived in this village?
- How many persons are taking care of the cattle?
- Do you think women are/could be better cattle holders than men?

3. Occupation

- How is the situation being a farmer/living in Okandjira?
- How many of the following animals do you have (cattle/sheep/goats/horses/donkeys)?
- Have the number of animals changed over time?

4. Natural Resources

- What natural resources do you depend on in order support your livestock?
- Is it more or less rain now than 10 years ago?
- Have you noticed any change in vegetation over time (cover, species)?
- Why do you think these changes have occurred (activity of the cattle/people)?
- What is done about bush encroachment?

5. Livestock

- What is the most important reason for keeping livestock (family tradition/to sell/status/manure/weddings and funerals/draught power/security/other)?
- How would you rate the current condition of your cattle (1. very poor, 2. poor, 3. moderate, 4. good, 5. excellent)?
- Have the cattle condition changed over the last 10 years?
- Where does your animals graze?
- Are they herded or do they roam around free? If herded; does the herder follow some kind of system?
- Where does your cattle spend the night (close to home or far away)?
- What kind of animals make the most damage to the environment?

6. Management

- How would you rate the current condition of your grazing (1. very poor, 2. poor, 3. moderate, 4. good, 5. excellent)?

- Has it changed during the past 10 years?
- Do you practice any form of rotational grazing?
- What grasses are good for the cattle and where do they find it (how far from the water source)?
- Have the distribution of these grasses changed or been replaced over the past 10 years?
- How has the change of grazing affected the cattle (health, mortality rate)?

7. Water

- Where does your animals find water?
- How many water sources do you/the animals have access to?
- How is the water source managed?
- Do you have to pay for water?

8. Finance

- Do you sell livestock?
- When are the best time to sell and where?
- What animals bring the best prices?
- How many animals are sold/year?

9. Adaptation:

How do you cope during times of drought?

Do you receive any help during drought?

Do you see a way to adapt to the changed environmental conditions?

Do you have any ideas on how to improve the situation? What can/should be done?

What do you think will happen in the future?

How does the agricultural society differ in 50 years from now?

Questionnaire (authorities)

1. Introduction

- M/F, Name, Age (experience)
- Level of education

2. Role in the local community

- What is your role in this community?
- For how long have you been doing this?
- Is Okandjira your permanent homestead?
- Have you always lived in this village? If not; where did you come from and why?
- Do you think women are/could be better cattle holders than men? Why/why not?

3. Occupation

- How is it being a member/chairman of the farmers association/counselor/traditional chief in Okhandjira?
- Do you own livestock?
- How would you estimate the situation of being a farmer in Okahandjira?
- How many of the following animals would you estimate lives in this village (cattle/sheep/goats/horses/donkeys)?
- Is there a special reason why the farmers breed these particular animals?
- Have the number of your animals/farmer changed over time?

4. Natural Resources

- What kind of natural resources does the farmers depend on in order support their livestock?
- Have the availability to these resources changed over the last 10 years?
- Do you think that the overall changes in the environment are connected with the activity of the cattle/people?

5. Livestock

- What is the most important reason for keeping livestock?
- What value does the cattle have, except for being a source of income?
- How would you rate the overall current condition of the cattle (1. very poor, 2. poor, 3. moderate, 4. good, 5. excellent)?
- Have the cattle condition changed over the last 10 years?
- Is there a herding system for the animals in Ovitoto?

6. Management

- How would you rate the current condition of the overall grazing (1. very poor, 2. poor, 3. moderate, 4. good, 5. excellent)?
- Have the land condition changed over the last 10 years?

7. Water

- How many water sources does the cattle have access to?

- How is the water source managed?

8. Finance

- How do you market the animals, and when?
- What animals bring the best prices?
- How many animals are sold/year?

9. Adaptation:

- How do the farmers cope during times of drought?
- Do they receive any help during drought?
- Do you see a way to adapt to the changed environmental conditions?
- Do you think the farmers would be willing/able to make these changes?
- Do you have any ideas on how to improve the situation? What can/should be done?
- What do you think will happen in the future? What kind of changes will occur? Will it be better or worse to be a cattle handler/crop producer?

APPENDIX B

Interview date, gender and language:

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17/11, Male, Otjiherero
17/11, Female, Otjiherero
18/11, Male, English
18/11, Male, Otjiherero
18/11, Male, Otjiherero
18/11, Female, English/Otjiherero
18/11, Male, English
18/11, Male, Otjiherero
20/11, Male, Otjiherero
20/11, Male, English
21/11, Male, English
22/11, Male, English
3/12, Male, English
17/12, Male, English
17/12, Male, English

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