Case study at Olifantputs Northwestern Namibia

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Introduction & methodologies

The case study at Olifantputs was based on two years of fieldwork by a number of people involved with Namibia's National Programme to Combat Desertification (Napcod). Dudu Murorua, as the regional facilitator of the programme, selected the communities who were interested in working with the programme and he himself had good insight into the community and natural resource related issues of the area and of Olifantputs in particular.

Deon Sharuru and Franscico van Nooten were two students from the !Nara school, a local institution which trains young Namibian school leavers in PRA (Participatory Rural Appraisal) methodologies. Both students spent several months living among the villagers at Olifantputs and sought insight into the rural livelihoods of individuals and the community as a whole.

Penda Shimali and Panduleni Hamukwaya were two internship students from the Department of Natural Resource Management at the Polytechnic in Windhoek who worked with the "desertification indicators" programme for several months. They were mainly involved with generating a land use questionnaire, working with Deon and Franscico, and interacting with community members. The philosophy of all the staff was to not only extract information, but to engage in an information exchange process with the Olifantputs community.

The methodological approaches varied a great deal and the information generated was in the form of notes from interviews, drawings, diagrams and matrices developed with community members through PRA methods, quantitative data from physical counts, and information provided through answers to the questionnaires. The different tools of and approaches to information gathering generated results, which supplemented each other and also allowed for verification of the information.

Information feed-back to the community was instituted mainly through mini-workshops, personal conversations and a specifically developed "Information file". The information file was a lever-arch folder containing single sheets of information summaries on topics of interest and relevance to the farmers, such as environmental background data at the sites, information on Napcod and discussions on issues such as land use management. This was an "open" file, and new sheets could be added continuously. The farmers discussed topics, raised questions of concern and the Napcod team responded to these on their visits.

The following chapter summarises a profile of the farm Olifantputs, providing a socio-economic and bio-physical baseline. However, most of the environmental, and ecological data are not presented in this report but are available in Zeidler J. 1999 *Establishing indicators of biological integrity in western Namibian rangelands.* PhD Thesis, University of Witwatersrand, Johannesburg.

References for the statements and information provided are given in parenthesis. The reference number corresponds to the database, which contains the computerised information from the questionnaires (Q reference), PRA activities (OP reference) and interviews (dated).

Olifantputs history

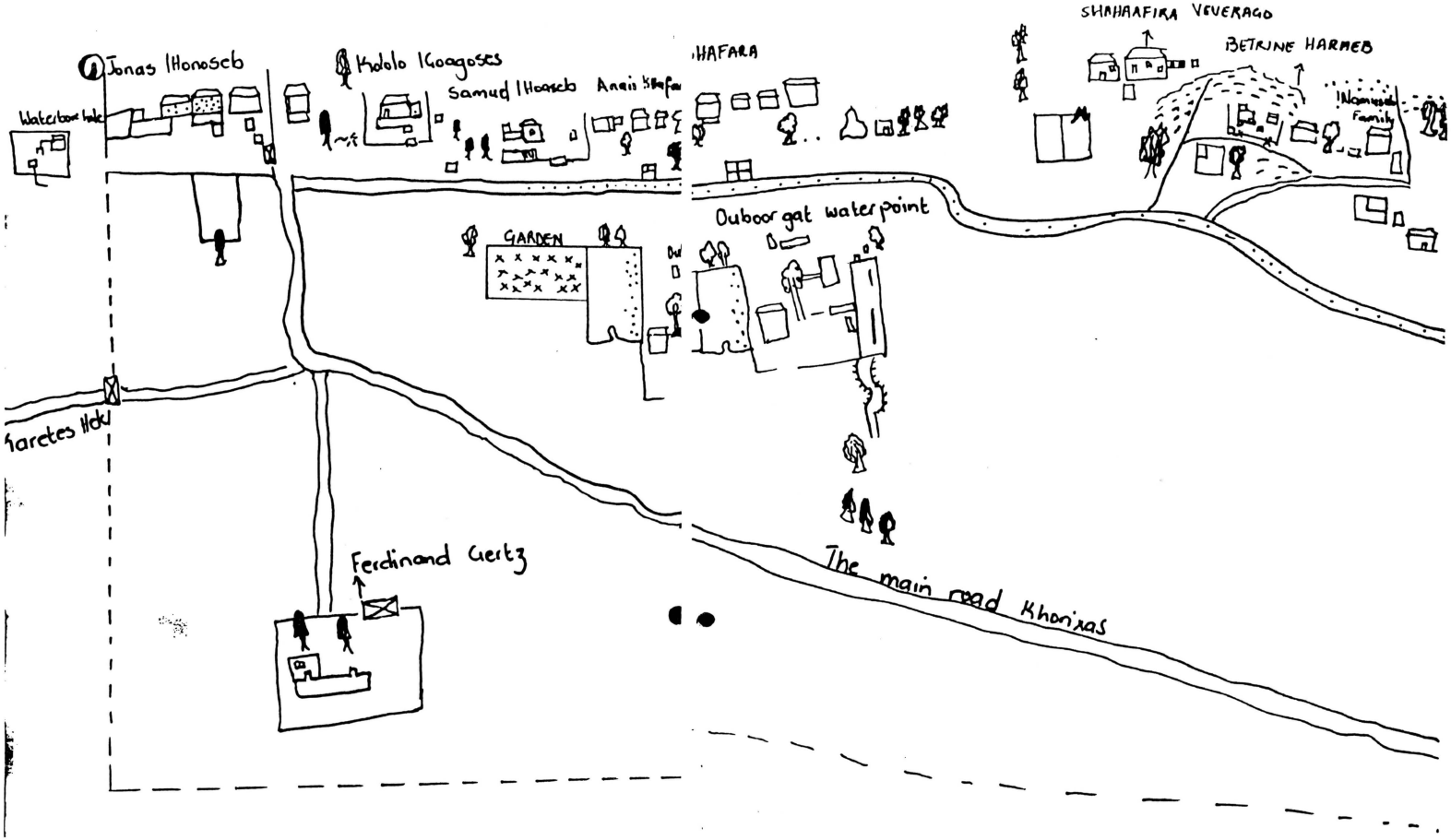
History of establishment

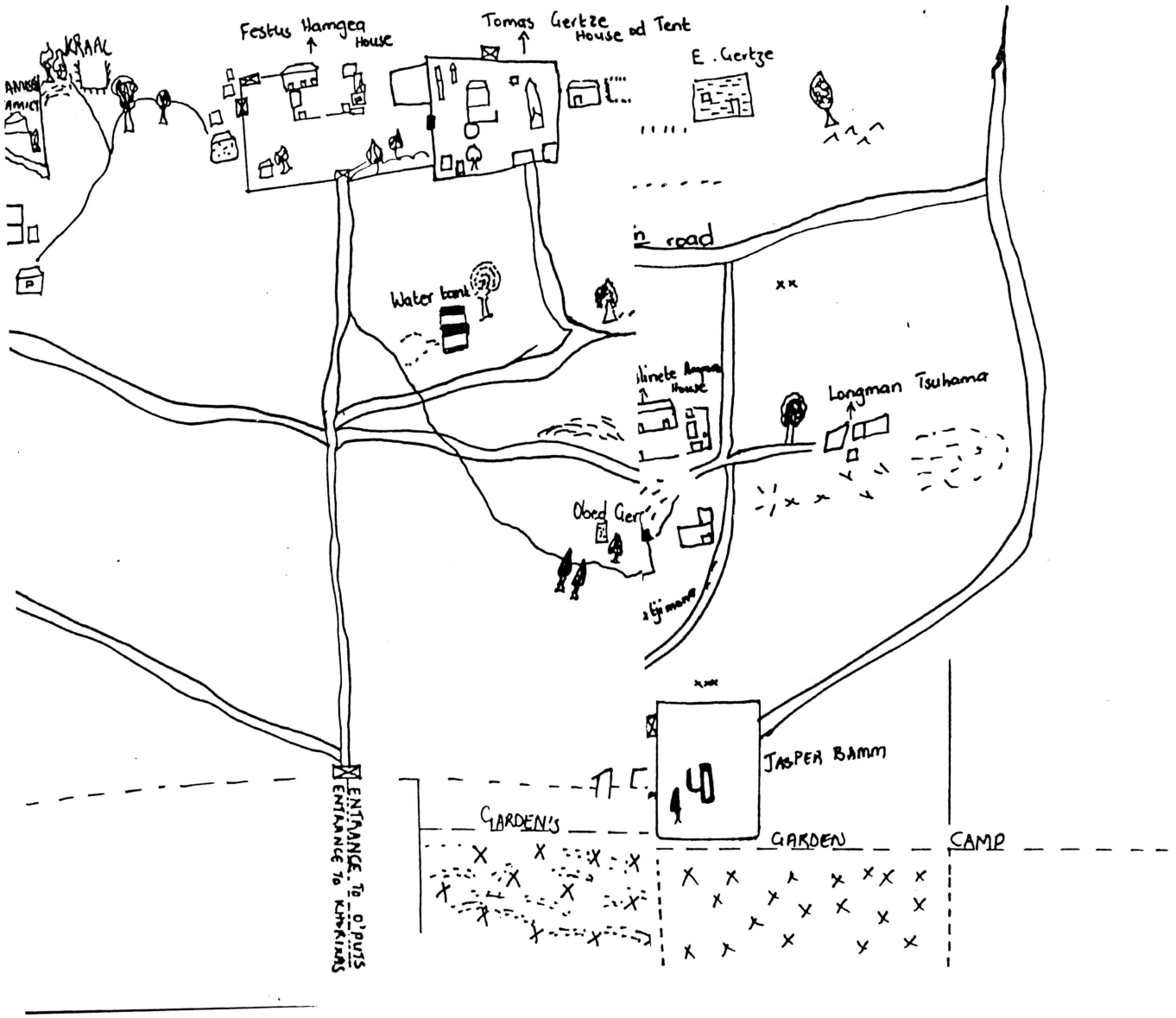
According to the oral history of Olifantputs (OP 43 & 44), the village was established in 1953 by Fanuel Amporo. He was living on the farm Mopane, east of the Fransfontein reservation, and had been grazing his livestock in the open access or communal farming area of Fransfontein, within the boundaries of the northern Damaraland reserve, for some time. The cattle post offered good grazing although there was no open water. The area was frequented by elephant and other wildlife and occasional domestic animals. Fanuel Amporo was a councillor for the Mopane and neighbouring communities. When on one occasion he provided charcoal to a borehole drilling team which was siting waterholes in the region he negotiated with them to drill a waterhole at the cattle post - the existing "old" borehole at Olifantputs. With the establishment of this permanent water source, the village of Olifantputs was founded.

In the following years a number of families settled in Olifantputs. Fanuel Amporo was the headman of the village, deciding on grazing and settling rights of the newly arrived. Today still, Amporo's family and descendants play a prominent part in local politics and decision making in the region. Fanuel Amporo's son Salomon, who married Thusnelde Amporo, born Murorua in 1957, succeeded his father in the leading position at Olifantputs (OP45 & OP46). Thusnelde Amporo retired in the village and still resides there as one of the community elders.

Many of the families staying at Olifantputs today (Table 1 and Figure 1) share a long association with the village. Some of the early inhabitants were Ruth Bamm (OP51 & OP62), Festus Hamukwea (OP 49 & OP50 & OP51), Filleman, Calle and Jonas Howoseb (OP51), Frederik Nanuseb (snr.) (OP51 & OP52 & OP53) and David Barondonga (OP43, OP44, OP43 & OP44). Although these families have not stayed in the village continuously (see section "History of individuals"), family bases were established and Olifantputs is "home": the place for retirement.

Figure 1 **Olifantputs**




Festus Hamgeq House
Tomas Gertze House
E. Gertze
KRAAL
Water tank
Longman Tsuhama
Obed Ger
JASPER BAMM
40
GARDEN
GARDEN
CAMP
ENTRANCE TO KHORIXAS

Community-based decision making structures

Jonas Howoseb, as village elder, was elected headman after the late Salomon Amporo passed away in the mid-eighties. Since his retirement in 1992, he has been residing permanently at Olifantputs. Jonas Howoseb has-long standing links with the village. Today other official village representatives and decision-makers are Charlie Bamm, who is a councillor (Murorua, pers. com.) and Frederik Nanuseb, the secretary and Festus Hamukweya. In addition to the traditional community leadership, a water point committee was elected to strengthen community structures and support community-based decision making, planning and resource management. Thusnelde Amporo is the chairperson of this committee, assisted by the secretary, since she is only fluent in spoken and written Herero. Samuel Howoseb fills another extremely important role in the community as the pastor (OP61).

Community-based organisations (CBOs) are usually groups such as the water point committee mentioned above. The establishment of such structures within a community is regarded as crucial to development, particularly in communal areas. The collaborative management of natural resources is seen as a way forward in working towards the sustainable use of (natural) resources.

Involved organisations

In line with internal community structures, external relationships with organisations and institutions operating in the region are important to the community function. In Olifantputs it seems that the headman and established community structures are important to the community members. The church plays a significant role, as does the water point committee. The food committee, although not operating anymore, was an internal institution and seemed to be well accepted (OP23). NGOs and/or programmes operating at Olifantputs, namely Africare and Napcod, were not seen by the community as a close and integral part of the system. (Figure 2).

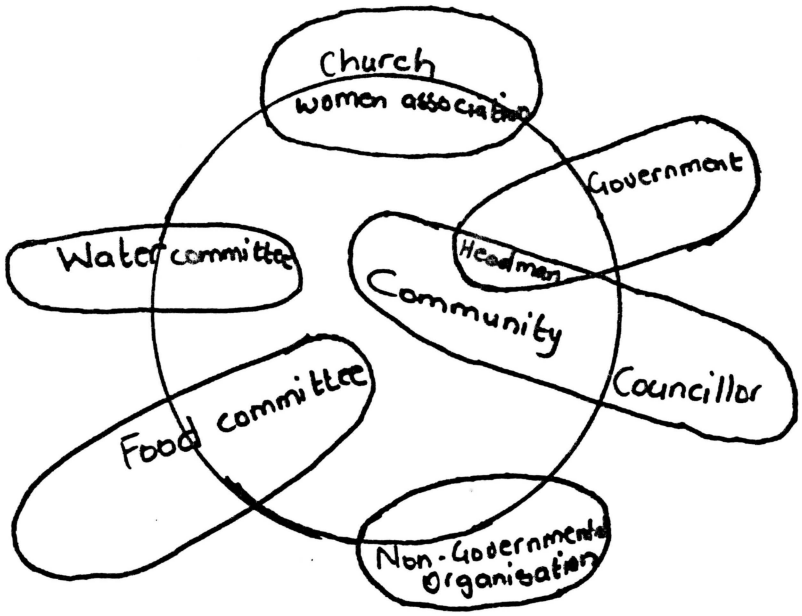


Figure 2: *Venn Diagram of Institutions at Olifantputs*

Boundaries

Olifantputs is situated in the south of the former Fransfontein reserve. No physical village boundaries are in place, because fencing is prohibited in communal areas. The area of Olifantputs is estimated to consist of 5 000ha (Murorua, pers.com). Olifantputs is surrounded by a number of neighbouring villages. The neighbouring villages are Petrusfontein, Middelpos, Karates towards the north and Bampos in a southerly direction. Fransfontein lies to the east of the farm. (OP 93; Figure 3).

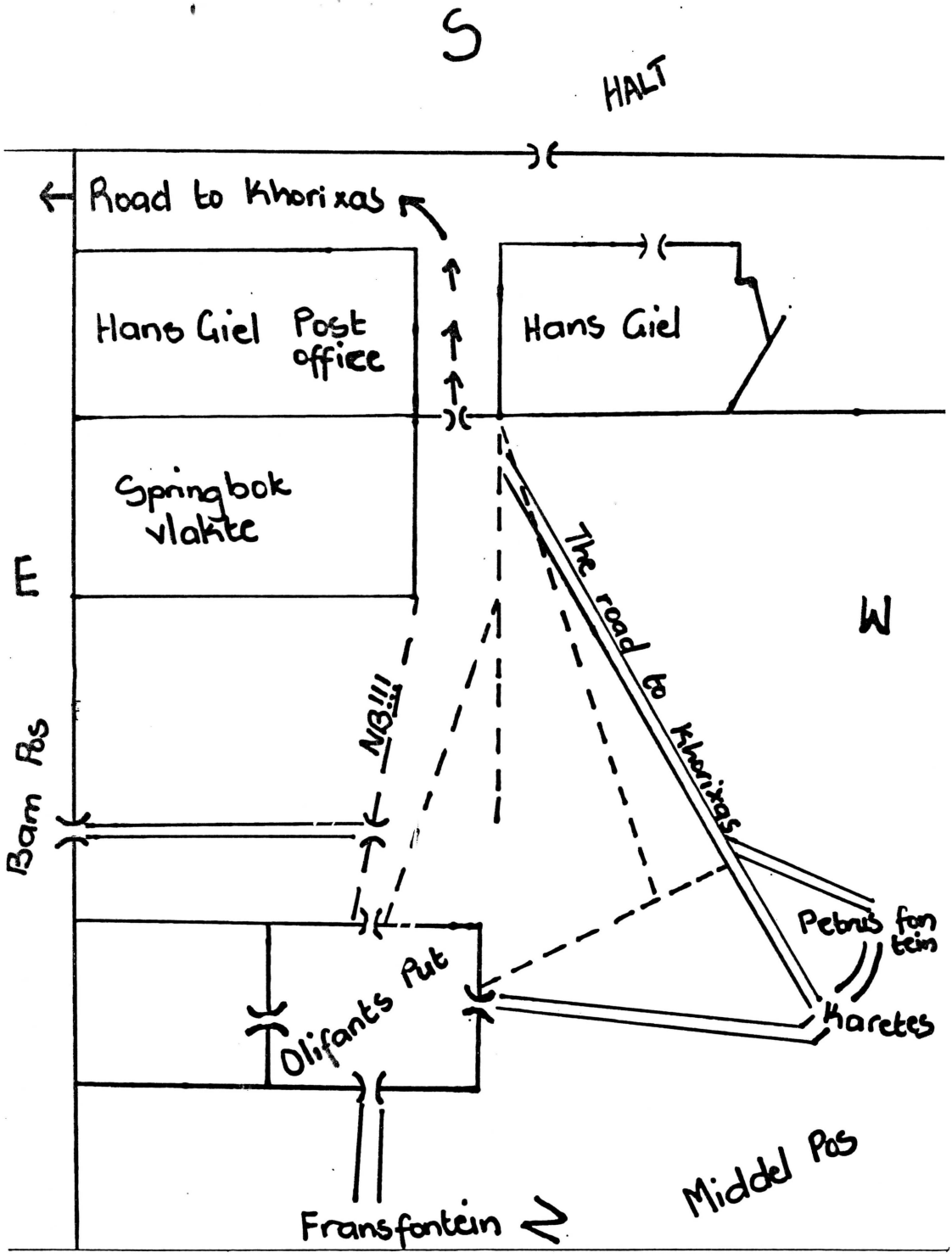


Figure 3: *Map of neighbouring villages*

There are no fences other than the old fences demarcating the reserve, the remainders of a village fence (OP81 & OP82 & OP83) and the existing calf camp.

History of individuals

A few members of the Olifantputs community provided brief descriptions of their individual histories. These are a good collection of different backgrounds and lifestyles of village inhabitants and reflect the dynamics of the place. Records of Thusnelde Amporo (OP 45 & OP46), Engelbarthine Hamukwea (OP47 & OP48), Ruth Bamm (OP62), Festus Hamukwea (OP49 & OP50), Berthine Haraes (OP51) and Henrite Hangula (OP52 & OP53) are summarized. It should be noted that most of these are key figures in the household structures (see section on "Olifantputs: structure today" below).

Thusnelde Amporo (OP 45 & OP46)

Thusnelde Amporo was born around 1930 as the daughter of Berthine and Ismael Murorua. Her father was from Omaruru and her mother from Okakarara. She is Herero speaking.

Her parents married in Fransfontein in 1929 and settled at Ligurus where they farmed. However, her father was a policeman and he worked in Otjiiwarongo, Outjo and Kamanjab.

In 1957 Thusnelde Amporo married Salomon Amporo, the first son of Fanuel Amporo, the founder of Olifantputs. Before Thusnelde married Salomon she had two sons, John Murorua in 1951 and Petrus Murorua in 1953. Both her sons now live in urban areas of Namibia. John is a municipal councilor and works at the tannery in Swakopmund. The young Amporo couple settled at Olifantputs after their wedding but moved to the Tsumeb area with their cattle in 1958 in search of better grazing. The following years were characterised by continuous moving between Olifantputs and various towns, since Salomon joined the police force in 1960. Amongst others, the family moved to Walvis Bay where their daughter Anna was born in 1963, and to Swakopmund. After a stay in Karibib, the Amporos moved back to Olifantputs in 1969. Her husband passed away after a long illness in 1985. Thusnelde has now retired at Olifantputs. She seems to hold a very senior position within the community

structures, being elected as the treasurer of the local water management committee, as a result of her family history at Olifantputs.

1958 was a drought year according to Thusnelde and her family moved their stock to the Tsumeb region. After their return in 1960 they were driven out by the elephants that frequently disturbed the village. Thusnelde describes the land at Olifantputs as being in a good condition in the old days. Although there were people with many livestock, the villagers were in a balance with the natural resources. Resting periods of the range were instituted and apparently adaptive stocking rates were applied. Olifantputs villagers cultivated rainfed gardens and collected veld foods.

Engelbarthine Hamukwea (OP47 & OP48)

Englebarthine Hamukwea is a born Gertze. Her parents were Hendrich and Asnap Gertze, and Englebarthine must have been born around 1926. She grew up living with her grandfather and mother in Omaruru and Karontwa. Her stepfather was establishing the village at Olifantputs during that time. Englebarthine met Festus Hamukwea, her future husband and they moved to Olifantputs together in 1976. the couple officially married in 1987 and have two daughters, Elly and Alexsonia Gertze.

In the household Festus makes the decisions about farming and livestock management. Although Englebarthine is a prominent person at Olifantputs because of her long history there she seems to take a backseat to her husband and son.

From her long-term memories she recalls that in the old days rainfall was good at Olifantputs. People farmed with cattle, sheep, goats, chickens and dogs and grew crops, which were transported to Otjiwarongo for sale. According to her, livestock numbers and resource use have increased dramatically, especially at the neighbouring villages. Animals from neighbouring villages use grazing and water in the Olifantputs area.

Festus Hamukwea (OP49 & OP50)

Festus Hamukwea is the son of Hamukwea Hiwanabo and Dehamonare Hiwanabo. He was born after 1930 in Ongwediva, Ovamboland, and his parents moved to

Kalkrand in 1936 in search for work. Festus married Adelhaid Ihula who came from a village neighbouring Olifantputs and with whom he had one son, Casper Ihula, and three daughters, Pauline, Evangeline and Theresia. In 1954 Festus and his family moved to Olifantputs, transferring their cattle from Petrusfonein, a neighbouring village where the Ihula family live. Despite his connection with Olifantputs, Festus worked in various jobs in Otjiwarongo and Outjo. He lost his first wife in 1970 and then married Englebarthine Gertze in 1987.

Berthine Haraes (OP51)

Berthine was born around 1930 and married Andreas Haraeb, a farm worker and small-scale farmer on a commercial farm near Outjo. Her husband was a successful farmer and they moved to Bergville to try farming there. In 1979, Berthine and Andreas asked for permission to settle at Olifantputs with their livestock, which they were granted by Fanuel Amporo.

According to Berthine, the area around Olifantputs received much better rain in formers times and there were no water shortages and the grazing was good. Produce from the rainfed gardens were sold on the market in Khorixas to generate cash income. The village was fenced.

Henrite Hangula (OP52 & OP53)

Henrite Hangula, the daughter of Frederik Nanuseb and Laubha Nanuses, was born around 1938. She moved to Fransfontein in 1959 where she worked as a domestic worker in the house of the commissioner, Mr. Bloemsteyn. Henrite married Johannes Hangula in 1961. It is not clear when Henrite came to Olifantputs, however her cousin, Francisca Harares, who is still living with her in one household, came to Olifantputs in 1956 and settled permanently at the village in 1959. Francisca is the daughter of Andreas Haraeb and Auguste Haraes, which also makes her a relative of Berthine Haraes (see above).

Henrite Hangula remembers that the village was not overpopulated by people or livestock in the past. Rainfall was good and rainfed agriculture was practised,

planting mealies, beans, watermelons etc. The grazing was also good. Elephants were a problem in the area. She mentions that over the past year they have lost many livestock either through theft or dying of sickness. Although her brother, Wilhelm Nanuseb qualified for a governmental livestock loan they had lost almost all their animals during the drought periods. Today they survive on a few livestock owned by her brother and daughter. However, there is barely enough cash income to be able to fix the roof of the house.

Ruth Bamm (OP62)

Ruth Bamm is one of the old inhabitants of Olifantputs. She and her husband have lived in the area for a long time although they settled in Bamboros, a neighbouring settlement. Ruth indicated her age as 65 years, which would fix her year of birth as 1933. She is retired at Olifantputs, and her two sons Jasper and Charlie Bamm stay with her. Jasper works in town but Charlie retired from his position as policeman to focus on the farming activities at Olifantputs.

Ruth points out that the people at the village are family or extended family, but it was not clear whether she was referring to her own household only or whether she included the entire village. According to her, Herero people only moved in because of drought.

Ruth reports that in former times they used to collect medicinal plants as well as veld foods in good rainfall years. Gardens were maintained and the produce sold. Livestock products such as milk were sold in Outjo. She places a great emphasis on the elephant problems that the villagers experienced. The farmers used to chase the animals away with fires and sticks. Today they hardly ever have elephant problems anymore since the government, especially Nature Conservation takes care of the problem. Elephants last came to Olifantputs in 1995.

Olifantputs: structure today

Household members; demographics

The structure of the individual household was difficult to determine in Olifantputs, a village with many family connections and dependencies. However, through PRA based activities, interviews and a questionnaire, some baseline data were collected. Data collection took place over the course of one year and the various data sources were used for triangulation of the results. From these data a list of household members, their names, age, gender and household membership was created. Where possible some additional comments were made (Table 1).

Olifantputs today comprises 13 households. These are (1) Amporo, (2) Bamm, (3 and 4) Gertze/Hamukwea, (5) Goagoseb, (6) Haraes, (7) J. Howoseb, (8) S. Howoseb, (9) Nanuseb, (10) Shiwana, (11) Tsawaro/Rutjindo, (12) Veverako and (13) Katjimune/Nerongo. Some additional background data on the individual household heads are given in Table 1. According to an estimate by the villagers (OP80) 136 people inhabit Olifantputs and 66 people stay at the village most of the time i.e. 50% of the inhabitants stay on the farm only temporarily. This is largely due to a number of children attending boarding schools, and family members, mainly those of an economically productive age, seeking employment in the urban centers.

Table 1 : Additional information on household heads

Name	Age	Marital Status	Household size	Household head	Education	No. of years farming
T. Amporo (F)	67	Widow	10	✓		40
R Towases (F) Bamm	65	Widow	4	✓		61
F Hamukwea (M)	71	Married	33	✓	R & W	33
M Goagoseb (F)	43	Unmarried	5	✓	Std 1	9
B Haraes (F)	56	Widow	11	✓		21
S. Howoseb (M)	71	Married (Evangeline)	21	✓		6/7
J Howoseb (M)	68	Married	17	✓	R & W	52
H Hangula (F) (Nanuseb)	63	Widow	4	✓		4
L Shiwana (M)	79	Married	1	✓		14
A Rutjindo (F)	58	Married		✓		11
E Katjimune (F)	55	Widow	9	✓		?
T. Gertze (M)		Married	9	✓		Works in Windhoek

Table 1 adds up to 111 household members and it is apparent that a number of people were not counted. The data derived from the questionnaire suggest that it was mainly children and absentees that were excluded. Comparing the numbers of adults and children at the village, including absentees and children at school, a ratio of 1:1 is calculated. This would seem extremely unusual but may reflect the high number of old people staying at the village, and, as stated above, the fact that more people, such as people with employment in town, were considered to be part of households although they were not explicitly listed. While it is true that people staying at Olifantputs are mainly pensioners, retired or old people of 60 and older, a number of individuals range in age from 43 to 60, and on the other extreme, there are many children not going to school yet. Additionally, there are a few young men working as farm workers and herders. These are either young family members or hired men

seeking employment from totally different areas. This scenario could well reflect the normal situation in Namibia's rural communities today.

Interpreting the individual history records of selected village members above, it appears common that younger people move to town, take up employment and later retire at their village. Whether this pattern will continue in the future is questionable. Will these younger people come back to retire at Olifantputs? How will the family connections in places like these be maintained?

From the data, it is difficult to reliably establish how many people really stay permanently at the village. However, the table does reveal that eight of the 13 households have less than ten individuals both on a temporary and permanent basis. Four households range in numbers between 17 and 33 people. It should be noted that the Hamukwea and Gertze households have been summarised for the purpose of this analysis, and are only separated for the livestock ownership discussed below. This is due to the fact that (1) extremely close family ties exists between these two households and (2) Thomas Gertze, the household head in the Gertze family, is an absentee farmer living in Windhoek. The Hamukwea/Gertze, J. Howoseb, S. Howoseb and Veverako families maintain the largest family associations.

The questionnaire data established that the number of male adults was slightly higher than that of female adults (41 females: 51 males). It is possible that this is due to the relatively high percentage of farm workers and herders, 13% for the village. Farm workers and herders are usually relatively young men.

Decision making structures

According to the data, females head six households at Olifantputs, the remaining six by men (Table 2). The household heads make most household decisions usually after discussions and negotiations with other household members, especially their spouses. However, explicit decisions about livestock farming seem to be taken by individuals in the household who are not necessarily regarded as the household heads. For instance, several of the female household heads are the most senior people in the house; the elders of the family. Although they seem to enjoy a high

level of respect, they do not really take the decisions on a day to day basis. For instance, in the Bamm household it is the sons that really seem to be steering household decisions. Similarly, in the Veverako household, the mother, Sarafina, is stated as a household head but it is in fact her children who own and make decisions regarding the livestock (QOP7). However, these structures will be explored in some more detail below when discussing livestock management at Olifantputs.

In the community itself, it is perceived that only two women, Thusnelde Amporo and Veronica Howoseb, are involved in community related decision making (OP61; see also above). This is unexpected in a way, since this only reflects one female household head taking decisions on a higher community level. Whether this is due to gender issues or the particularly strong positions and interests the two ladies Amporo and Howoseb hold, is not clear.

Livelihoods based on natural resources use

Livestock farming has traditionally been the main activity at Olifantputs, in fact the village was initially founded as a cattle post. Livestock farming is the prime agricultural activity in the entire area, which, from a climatic point of view, is not suitable for crop farming and plant cultivation (see Chapter 4). Livestock are kept for a number of reasons, however, during the interviews and work conducted at Olifantputs, one main point was made on a number of occasions and can be summed up by a statement made by the headman, Jonas Howoseb during a community meeting in October 1998:

> *"Our parents told us that livestock would always be our bank which requires tremendous care. We believe that everybody wants to increase money in the banks, here we also want to increase livestock as our banking resource. Because we learned how to bank this way, at the moment true farming strategies to us are to increase our livestock by keeping them in high numbers".*

Additionally the headman' mentioned constraints with gardening, which was traditionally practised at the village (see also "History of individuals" above) and provided an additional income:

> *"In the past we learned to cultivate the field and to look after livestock. We used to plant vegetables and sell (them) to get money. With money we can buy livestock. We had livestock farming and gardening to supplement each other but now only one thing (remains) – livestock. Therefore we have great pressure on the land. (There are) no gardens because of water shortages."*

In the view of combating land degradation and supporting the development of sustainable livelihoods in (not only climatically) marginalised areas, the systems in place first need to be adequately understood. Only then can alternatives and possible solutions be explored. The following sections try to establish a baseline on household economics and livelihoods of the people. The first section provides an inventory of the livestock related resources available on a household level, the second gives a generalised picture of incomes and expenditures per household. The third section describes livelihoods based on daily activity profiles for various groupings such as old women, young women and herders, based on data available from PRA activities conducted with the villagers.

The livestock related resource base

The livestock numbers from Olifantputs were generated during a survey conducted in June 1998. This survey was based on a questionnaire prepared by Penda Shimali, one of the counterpart interns working on the project.

Livestock numbers at Olifantputs were monitored on various occasions during October 1997 to October 1998, however, the June survey provided the most detailed data. These data not only gave fixed livestock numbers per household at that time, but also reflected ownership within a household. Records were also made of livestock gains and losses over the past 12 months. It was noted whether animals were bought or sold, slaughtered for own use, died of disease, died of starvation, were taken by predators or were stolen. These data are presented in Table 2.

Table 2: Losses and sales of livestock

	Animal	Total #	Bought	Sold	Slaughter	Lost	All off-take
Farmer 1							
	Cattle	80	0	40	0	5	45
	Goats	240	0	40	0	9	49
	Sheep	37	0	15	35	5	45
	Horses	0	0	0	0	0	0
	Donkeys	5	0	0	0	0	0
Farmer 2							
	Cattle	13	0	6	0	0	6
	Goats	0	0	0	0	0	0
	Sheep	0	0	0	0	0	0
	Horses	0	0	0	0	0	0
	Donkeys	8	0	0	0	0	0
Farmer 3							
	Cattle	32	1	0	0	0	0
	Goats	70	0	0	4	0	4
	Sheep	0	0	0	0	0	0
	Horses	0	0	0	0	0	0
	Donkeys	0	0	0	0	0	0
Farmer 4							
	Cattle	32	0	6	0	20	26
	Goats	77	0	10	12	40	62
	Sheep	10	6	0	0	0	0
	Horses	0	0	0	0	0	0
	Donkeys	6	0	0	0	0	0
Farmer 5							
	Cattle	39	0	2	1	2	5
	Goats	140	0	10	0	2	12
	Sheep	0	0	0	0	0	0
	Horses	1	0	0	0	0	0
	Donkeys	5	0	5	0	0	5
Farmer 6							
	Cattle	26	0	5	0	2	7
	Goats	54	0	5	10	10	25
	Sheep	9	5	0	0	2	2
	Horses	2	0	0	0	0	0
	Donkeys	4	0	0	0	5	5

Farmer 7							
	Cattle	17	0	4	0	6	10
	Goats	93	0	6	5	12	23
	Sheep	2	3	0	0	1	1
	Horses	0	0	0	0	0	0
	Donkeys	4	0	0	0	0	0
Farmer 8							
	Cattle	1	0	0	0	0	0
	Goats	11	0	2	9	6	17
	Sheep	0	0	0	0	0	0
	Horses	1	0	0	0	0	0
	Donkeys	0	0	0	0	0	0
Farmer 9							
	Cattle	0	0	0	0	0	0
	Goats	49	0	3	4	50	57
	Sheep	0	0	0	0	0	0
	Horses	0	0	0	0	0	0
	Donkeys	6	0	0	0	0	0
Farmer 10							
	Cattle	2	0	0	0	0	0
	Goats	48	0	5	1	2	8
	Sheep	0	0	0	0	0	0
	Horses	0	0	0	0	0	0
	Donkeys	4	0	0	0	0	0
Farmer 11							
	Cattle	205	0	20	0	15	35
	Goats	200	0	30	40	20	90
	Sheep	76	0	0	0	0	0
	Horses	4	0	0	0	1	1
	Donkeys	12	0	3	0	6	9
Farmer 12							
	Cattle	8	0	0	0	0	0
	Goats	0	3	20	5	20	45
	Sheep	5	0	0	0	0	0
	Horses	0	0	0	0	0	0
	Donkeys	7	0	1	0	0	1
Farmer 13							
	Cattle	202	0	0	0	0	0
	Goats	64	4	0	0	2	2
	Sheep	66	0	1	1	0	2
	Horses	0	0	0	0	0	0
	Donkeys	0	0	0	0	0	0

Livestock ownership

Numbers were obtained for cattle, goats, sheep, horses and donkeys. Horses and donkeys have been included in the data tables and reference is made to them throughout the text, however, they have been left out of some of the data presentation. Horses and donkeys play a major role in households, particularly in communal areas. In certain parts of Namibia donkeys are used as a meat source, they are used abundantly for transport and they are traded. Donkeys in particular, occurring in fairly large numbers, also play a considerable role in rangeland use. They are grazers and, as remarked by Danie van Vuuren, the farmer at the commercial farm Weerlig, are known to graze in a most destructive manner by pulling the roots of the grass out completely and by trampling the area (10/98, D.v. Vuuren).

Dynamics over the past 12 months

Table 2 summarises off-takes and add-ons of livestock to and from the farm Olifantputs in the 12 months prior to the survey. From the data it is apparent that extremely few animals were bought into the farming area between the months 6/97and 6/98. Altogether, between the 13 households, only one cow seven goats and 14 sheep were purchased during that year. For some households the off-take numbers were relatively high in relation to animals owned, although total numbers were mostly below 20 head of cattle sold in the same period. Farmers 1 and 11 sold most livestock. However, in relation to the overall herd sizes these numbers are not particularly high. Farmer 1 sold approximately 30% of his cattle, and a much lower percentage of his goats. Farmer 11 sold approximately 15% of both his cattle and his goats. In relation to this Farmer 13 sold a much higher proportion of his animals, that is, 100% of his goats by selling the 20 he had.

Overall it seems that the households at Olifantputs reacted to the prevailing dry rainfall conditions by selling some of their livestock during the 6/97-6/98 time period.

People's activities

The way people and specific groups of household members spent their daily time provides interesting clues.

(1) Time allocation analyses can reveal whether a major part of time is used to perform so-called productive or reproductive activities. Productive activities are those that contribute directly to the generation of income such as selling wood, milk, meat or doing jobs for money. Reproductive activities do not earn any cash income directly, however, they contribute to the livelihood of the person. Examples of reproductive activities are performing household duties or fetching water (OP8). Looking, for example, at the idealised daily activity clock of representatives from different population groups indicates on what type of activities a person spent most of his or her day. For the communities it is often a revealing insight to learn how they spent their time. Based on such knowledge, livelihood-improving initiatives can be identified and planned.

(2) A comparison of activity charts over time are a useful tool for determining whether change in the live(lihood)s of people has taken place. If, for instance, it was identified that women in a village spent most time fetching water and the local water management committee and the community reacted to this problem by improving the water infrastructure, the success of the intervention could be measured by comparing the activity clocks of women from before and after the change. If the women now had more time to engage in other, i.e. productive activities, this would be a useful indicator of change and often improvement.

There are a number of different PRA based tools that are commonly used for time allocation analyses. Examples of daily activity charts of women and men, as well as an activity matrix of young women from follow. Seasonal charts are closely related to agricultural activities and will be presented in the section below.

Four women of different age groups participated in drawing up an activity matrix for themselves (OP20&21). Elly Gertze is the 22-year-old daughter of Festus and Englebarthine Hamukwea. She does not stay at the village permanently, however

she participates in the daily household activities when she is there. Elisabeth Gertze is a 75 year-old grandmother in the household. Rynade and Theresia are not included in the list of household members. It is neither clear to which family they belong nor what their associations with Olifantputs are. However, their daily activities reflected an active involvement in household and farming duties at that time. The daily activities and approximate time allocations for various tasks are shown in Table 3.

Table 3: Activity chart of women.

Daily activities of women are listed with an approximate estimate on the time spent for these.

	Activity	Time allocation to "difficult" tasks
Elly	• Fetch water • Fetch wood • Clean yard • Cook • Wash dishes • Wash cloths • Feed dogs, chicken and ducks	• Fetch water: 2.5 hours • Fetch wood: 3.5 hours
Elisabeth	• Make fire • Make coffee & porridge • Wash dishes • Wash cloths • Chase goats in and out of kraal	• Make porridge: 3 hours • Wash clothes: 3 hours • Wash dishes: 2 hours • Chase goats: 2hours • Make coffee: 1 hour
Rynade	• Make tea • Sweep floors • Fetch water • Water the garden • Wash dishes • Cook	• Fetch water: 2.5 hours
Theresia	• Make fire • Make coffee • Wash dishes • Sweep house • Fetch wood • Feed your goats (e.g milk from mothers)	• Fetch wood: 4 hours • Wash clothes: 3hours • Clean house: 2 hours • Fetch water: 3 hours

All women included in the activity matrix seemed to be staying in one household. They all shared some of the same household activities. It is conspicuous that women of all age classes were involved in household and farming duties. According to the data, none of the women interviewed spent any time on productive, income generating activities. Young women spent a lot of their time collecting water and wood (see also OP14&15), as did even older women (OP16&17). These two activities were identified as being particularly "time wasting". The women would have preferred to spend more time on other important activities, e.g. the sewing of clothes

(pers. com.). It should be pointed out that, especially the older ladies did a lot of sewing, however, they were often limited by lack of materials. Sewing was mainly done for home use, not for sale. Below (in the section on gardens) it will become apparent that in good rainfall years women are very involved in the gardening. This has probably been more so in the past, but definitely also plays a role today.

The following two examples give daily activity patterns of two men of different status in the community, a young herder and a young unemployed man. It would be desirable to collect more data of this kind from a broader sample group.

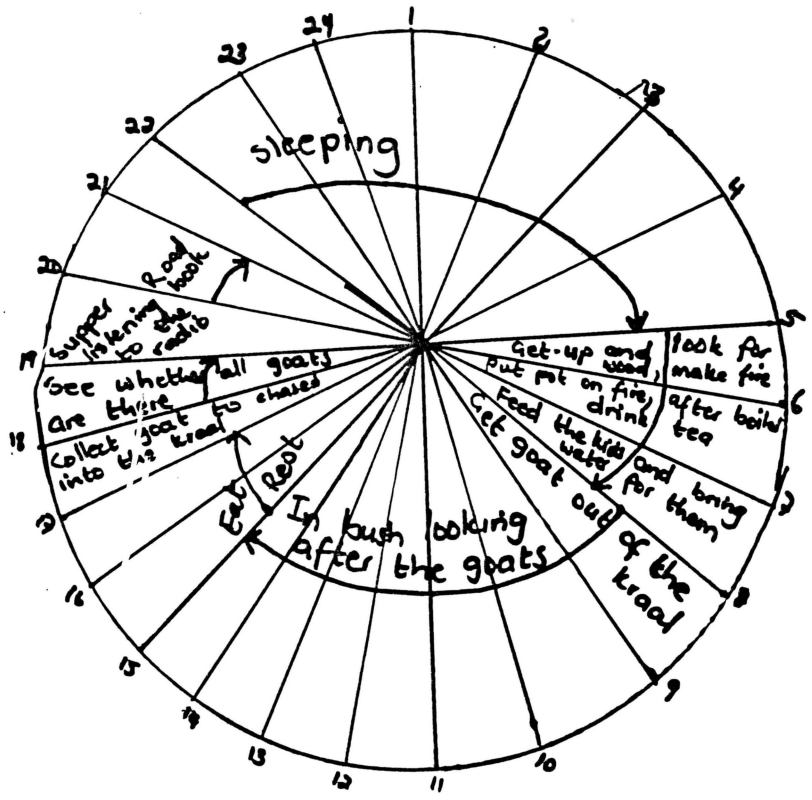


Figure 4: *Activity clock of Ndeshihaluka Goronimo*

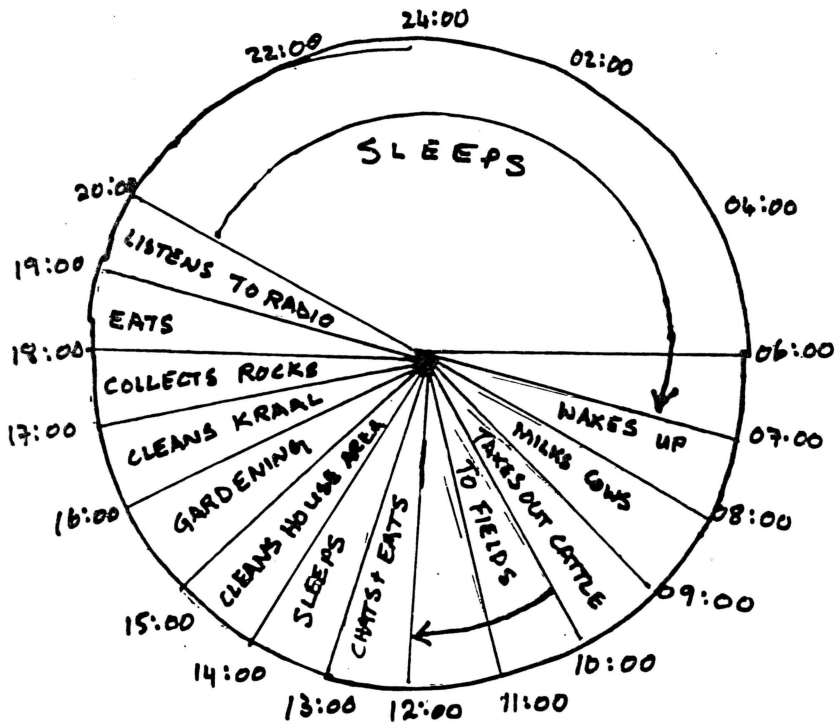


Figure 5: *Activity clock of Christian Haraeb*

(OP11) Ndeshihaluka Goronimo is a 22-year-old herder in the Hamukwea household, employed by Thomas Gertze. His activity clock (Figure 4) shows that he spends most of his time out in the bush with the goats because these are herded all day (see section on livestock management). Ndeshihaluka gets up in the mornings between 5:30 and 7:00, collects firewood and makes tea. He also has to look after the children (it is not clear whether they are his own or belong to the family he is working for) and fetches water from the water point. Between 9:00 and 10:00 he collects the goats from the kraals and takes them to suitable browsing and grazing areas on the farm (see section on livestock management). Around 15:00, the herders return to the village and lead the goats to water. While the goats are in the vicinity of the settlement the herder has time to rest and eat, before he collects the goats at 17:00 and chases them back into the kraals. He has to check that all animals are back and close the kraal. Supper is between 19:00 and 20:00 and the rest of the evening is usually spent listening to the radio and reading books. Ndeshihaluka goes to bed by around 21:00.

(OP59) Christiah Hareab is a 32 year old male staying in the Nanuseb household. Christian is the nephew of Frederick Nanuseb and is unemployed. According to the household structure he stays in a household that is headed by two elderly women. The household owns no livestock. His "idealised" daily activity chart (Figure 5), shows that he works with cattle but it is not clear to whom the animals belong. Christian gets up by 07:00 in the morning to milk the cows and chase the cattle into the field to graze. The remainder of the morning is spent chatting with the other villagers and attending to household duties such as collecting wood and water from the water point. At around midday he usually takes a nap. Afternoon activities consist of cleaning the house and surrounding areas, doing some garden work (aside from the fields, most houses have small gardens, pers. obs.) and cleaning the kraal for the livestock. Dinner is around 18:00. In the evening he often listens to the radio before going to sleep by around 20:00.

The two examples support the picture that most village activities revolve around livestock farming and the upkeep of the households. Community activities and innovative ideas seem to be extremely rare.

Agricultural activities

Life at Olifantputs focuses mainly on agricultural activities. Livestock farming plays a significant role throughout the seasons and years, while gardening is only important in years of good rainfall. It seems that gardening plays less of a role today than before, which has been largely attributed to the loss of productivity of the fields and a lack of rainfall (e.g. 3/98 S. Howoseb). The use of veld food and medicinal plants is mentioned frequently.

In the following sections, information on land use practices and management and on land-use intensity is provided. The first part deals with the gardens maintained mainly during the rainy season at Olifantputs, information on veld fruits and medicinal plants follows and the last part focuses on livestock husbandry.

The local farmers established a timeline indicating their major monthly activities through the year (Figure 6). The timeline is idealised to a good rainfall year. According to the timeline, the year is characterised by three main sections, which supplement the normal ongoing activities. These relate to gardening activities during the rainy season (OP8 & OP13, see section gardens below), specific livestock related activities such as milking, processing milk products, marking and dehorning of animals during the rainy season and more household oriented activities pursued during the winter months, when houses are renovated, i.e. plastered with cow dung, and veld fruits are collected.

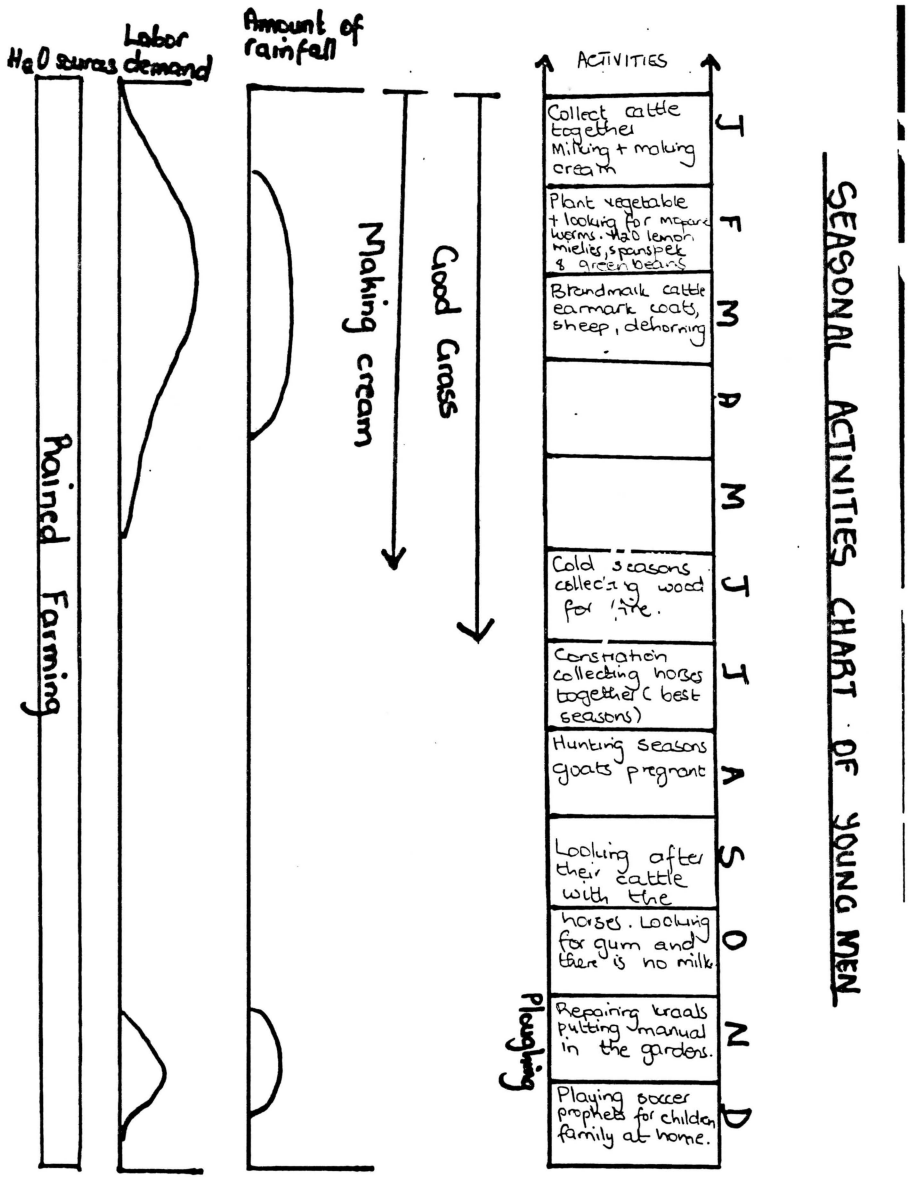


Figure 6: *Timeline of Agricultural Activities*

Gardens

Each household at Olifantputs is entitled to own and cultivate a 200ha piece of land for gardening (3/98 Frederik Nanuseb). The gardens are protected from the livestock by fences. Gardening activities depend on rainfall. There are two rainy seasons in northwestern Namibia. Since gardening is dependent on rainfall, these two seasons are well reflected in the seasonal agricultural activity charts drawn up by the village members (Figures 6 & 7). The "small" rainy season is from October to early December, with an expected rainfall peak in early November. This is the time to plough the fields and to sow the first seeds (OP13 & OP19). From January onwards, the "large" rainy season starts. If rainfall is conducive to crops, vegetables and fruits are planted. The growing season continues until March, during which the fields are maintained and weeds and pests are removed from them. Harvesting time is from March to April.

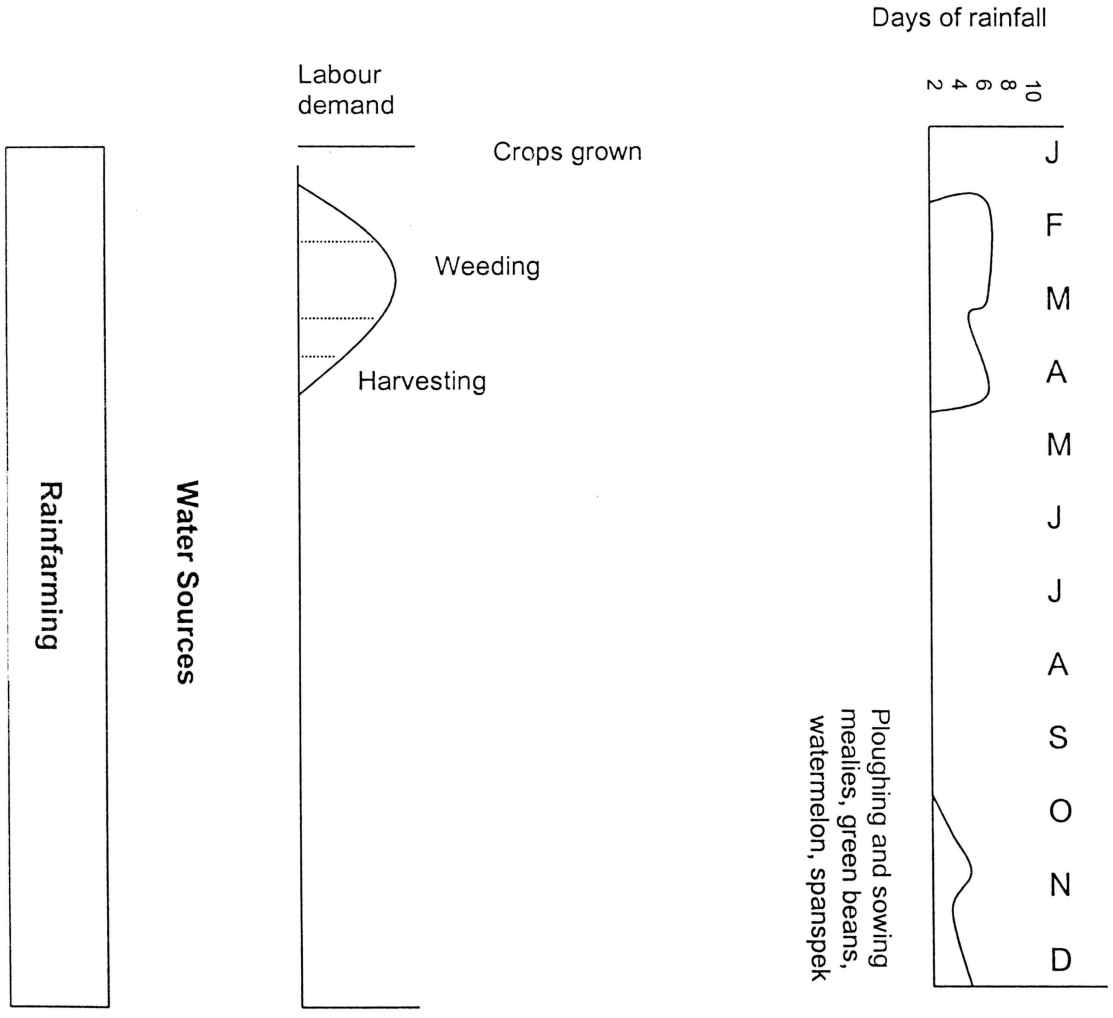


Figure 7: *Seasonal Calendar (elder women). Rainy Season*

A list of plants grown at Olifantputs in the past is included in Table 4.

Table 4: List of plants cultivated at Olifantputs in the past

Sources :	Crops
OP13, OP18&19, OP20&21, OP33, OP34&35, OP36&37, OP38, OP40	Water melons
	Mealies
	Green beans
	Papayas
	Pomegranates
	Tsama melons
	Vegetables
	Spanspeck
	Pumpkin
	Carrots
	Tomatoes
	Gerkins/cucumbers
	Cotton
	Lucern

Traditionally, rain fed gardening is done only at Olifantputs, however the household of headman J. Howoseb maintains an irrigated garden throughout the year. This is astonishing, considering the serious water problems in the village (see section on water below). Generally the villagers seem to be very disillusioned about their gardens. They feel that not only have rainfall conditions deteriorated and prohibit gardening, the productivity of the fields has also apparently declined. Some of the reasons for this apparent loss, were that the fields are more than 25 years old, there are now fewer trees and water is scarce (3/98 Frederik Nanuseb). It was also mentioned that no pesticides or subsidies (probably meaning fertilizers) were applied (OP33).

Veld foods and medicinal plants

The use of veld foods and also medicinal plants is mentioned frequently (e.g. OP8, OP9, OP 43& 44, OP45&46, OP56, OP58, OP62, OP63). Mention is made that in former times people, particularly women, would collect veld food as an additional

food source. These veld foods were mainly available during the rainy season. while they are very scarce during the dry season (OP56) and do not provide an alternative food source.

A list of the plants and their purposes is included in Table 5. A more detailed ethno-botanical survey would reveal an even broader and more explicit list, since Sullivan (1998), Van den Eynden *et al.* (1993) and Craven (unpubl.) have provided ethno-botanical works that reflect a broad spectrum of plants used.

Table 5: Local Plants/Trees utilised by villagers

Local Name	Parts used	Treatment/Use	Preparation
Awahas/ Staalbos	leaves	eaten by stock	
Korina Grass/ Horolab			
Soreb (in summer)	branches	coughs	cooked
Aropa/ Arob	Branches	treating internal parasites and stomache problems	boiled
Haras	gum, pods	eaten by stock firewood	
Hab	leaves	stomach ailments	boiled
Augoreb (Aloe)	leaves	to cure salivating dogs to treat coughing in humans	cooked boiled
Arub	branches	for pain and boils	dried and used as a powder/cooked
Xaubes/stinkboom	berries and leaves	eaten by stock and humans	
Kamugu	roots	stomach ailments	boiled
Coffee Tree	seeds	coffee eaten by humans and stock	dried
Tsaura-Heis/Mopane	leaves and branches	leaves eaten by stock wood used for firewood and construction	
Ioe-Heis	gum, leaves and bark	eaten by animals	

Besides plants, a number of animals are used as food sources. All game species that occur are thought to be good meat sources. Although game numbers have declined in the area, (see QOP1-13) there are still a number of species present. Some other wild animals collected as food include Mopane worms (OP8) and hedgehogs (pers. obs.).

Livestock management

Livestock play an extremely important role at Olifantputs and almost each and every household owns domestic animals (see section "household members; demographics" above). These include cattle, goats, sheep, donkeys and horses, and almost every household keeps chicken or ducks. The way livestock and grazing are managed, the structures for decision making and the coping strategies applied in drought situations are some of the main themes that have to be studied to gain important insights into rangeland management, particularly in communal areas. There are a number of specific frame conditions and constraints to the use of shared resources in communal areas which need to be considered before making recommendations.

Herding and grazing rights

95% of the 5 000ha land area of Olifantputs is used for grazing (3/98 Festus Hamukwea). Although the land is communal, only people resident at Olifantputs seem to have grazing rights here. Residence and grazing rights are decided on by the local community structure with the headman as the leader. Animals from neighbouring villages may come into the Olifantputs "boundaries" for grazing. However, this is frowned upon by the Olifantputs villagers (e.g. 3/98 Festus Hamukwea). The grazing area is not fenced. Within the community there are non-legislated rules as to who grazes their animals where. For cattle this is difficult since they are not herded, but only "pushed out" into the bush (e.g. 3/98 Frederik Nanuseb). Goats and sheep are herded because of fear of livestock thieves. These herds will depart into various pre-allocated directions in the field, according to which area is reserved for their owners.

OP64 states:

> *"About 226 goats, which are owned by A. Rutjindo, B. Haraes, H. Hangula and S. Veverako go towards Khorixas. And to the western side of Olifantputs the owners are J. Howoseb having 225 goats and S. Howoseb having 141 goats. At the eastern side, the goats there are 68 goats of Thusnelde Amporo, 28 goats of Johann Lankerman (in the J. Howoseb household) and 110 goats of R. Bamm."*

This could be portrayed as follows in a drawing of the grazing areas (Figure 8):

Figure 8: *Grazing Patterns at Olifantputs*

Thus, according to this, no animals are taken to the north of the village. This is explained by the fact that foreign animals coming from the bordering villages are moving in from that direction (10/98 Joseph Ayonga, herder). A number of goat owners have not been mentioned and there are no clues provided as to where they would take their animals. This will have implications for land use intensity at the various sites.

Whereas it is the household heads that take decisions such as which direction the herds of particular owners are supposed to move, it is the herders who take the day-to-day decision of where to let the animals graze. The herders have a good knowledge of where the browse and grazing are suitable at the time. The four herders, Joseph Ayonga, France Nangedha, Daniel Nghuwete and William Numbinga present at Olifantputs in October 1998, mentioned that they sought out food the goats liked to eat (10/98, herders, Table 6). The animals seemed to browse most trees growing on the farm, however, they preferred young *Mopane* leaves and *Acacia* pods, and also feed on *Catophractes* leaves and flowers and parts of *Boscia* spp.

Table 6: What a goat likes to eat. Herders at Olifantputs describe what goats like to browse.

Plant	Plant part preferred
• Acacia fleckii, most Acacias • Catophractes • Albizia • Boscia • Mopane tree	• Pods • Leaves • Pods & flowers • Leaves

From the activity chart of a herder (see section on People's activities above) it is easy to derive the activity of goats. Goats and sheep are usually kept in the same herd, accompanied by dogs and the herder for protection against thieves and predators. It should be noted that about 43% percent of small stock off-takes per annum (6/97-6/98) were attributed to these factors. Small stock is kept in protected kraals overnight and only goes to the veld for a couple of hours. During the rainy season they move approximately 4-5km into the veld, while in the dry season, when most resources are depleted or scarce, they have to walk an average of 5-7km to find enough browse (OP64). Although goats are mainly browsers they also feed on the remaining grass stumps in the rainy season (10/98, herders). The goats have the advantage that browse is more perennial than grazing. The carrying capacity for small stock is higher and more stable at Olifantputs than for cattle. The goats seem to drink once a day, usually in the afternoon upon returning from the veld.

The daily activity chart of a cow (Figure 9) reflects that cattle are not herded at Olifantputs but remain in the veld throughout the night and move back to drink at the waterhole in the early morning hours. Then they are kept in the vicinity and the cows are milked, if milk is available (mainly in the rainy season). During the day the animals are let out to graze again. Apparently they drink for a second time in the afternoons before departing for further grazing. The calves are separated from their mothers overnight. They stay in the only camp available on the farm; the calf camp.

Napcod data sheets
Pilot areas

Place: Olifantsputs
Informants:
Malagie Goagoseb: Ernst Richter

date: 29/09/97

Issue: Activity chart of a cow

Tools: Observating and brainstorming

Process
Observing and informal interview
Results / New learnings

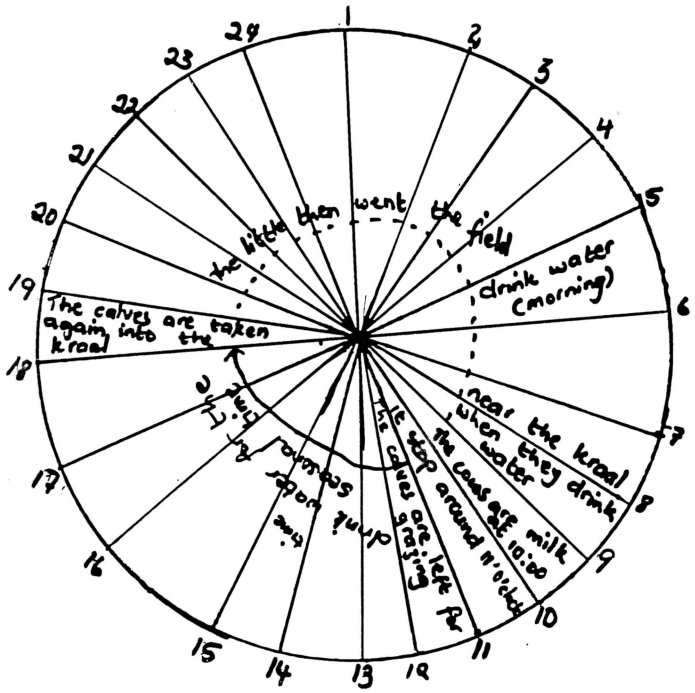


Figure 9 *Daily activities of a cow at Olifantputs*

No rotational grazing is practised at Olifantputs, thus the area is continuously exploited wherever and whenever good food is available. The farmers identify this and overgrazing as two of their main problems on the farm (see section "Livestock related environmental problems" below).

Coping with drought

Damaraland normally has very low rainfall. These bad years are often defined as a "disaster drought" (Anon, 1997), conditions are bad enough that livestock die of starvation and the farmers have to apply drought coping strategies. In a variable environment such as arid and semi-arid Namibia, farms should be managed in a way that enough grazing is available for livestock over a number of years of expected poor rainfall. However, where this is not the case, other strategies need to be applied. At Olifantputs these are foremost (1) move the livestock, particularly the cattle, for emergency grazing to other areas, (2) sell animals to reduce stock numbers, and (3) feed the animals supplementary fodder. All three strategies will be described with data from Olifantputs for the year 1998.

Emergency grazing

1995 -1997 were relatively good rainfall years in western Namibia. Vegetation growth was good after 96/97 rainy season (Zeidler, pers. com.) and grazing was available. In March 1998 grass biomass per ha was 20kg/ha and deteriorated to 12kg/ha in October 1998. Thus available grazing declined rapidly. By June 1998, the farmers at Olifantputs had already moved most of their cattle as well as some goats to other farms. Usually this is done with permission from the Ministry of Agriculture, but always with the consent of the owner of the selected grazing area. In the case of Olifantputs the following movements were tracked (10/98, Shimali).

Mainly the four households of Hamukwea, J. Howoseb, Rutjindo and Amporo had moved some of their livestock.

The animals of the Hamukwea family were moved to a farm some 30km from Olifantputs, a former Odendaal farm called Nortal-Lofdal, situated west of the Fransfontein area. Jonas Semba is the head of the farm, which was allocated to him by the Government. There are four houses and a water point. He has resided on the farms since 1991. He says that since then they had not received enough rain and that there has been drought on this farm too. However, the farm is big and he and his brother from Windhoek were the only people with livestock, which consisted of 200 cattle, 70 goats and 42 sheep. The farm is fenced but is not separated into individual

camps. A borehole was erected there during the 1992/93 drought relief programme but was criticized as the water was of low quality and there were fears that its placement could cause inappropriate land use (Napcod, 1997). When asked why he had allowed the Hamukweas to bring their cattle he said: "we felt sympathy for the Olifantputs farmers and we decided to help them." It is not clear how many animals Festus Hamukwea brought to the farm however, according to his record in June 1998, 116 of his cattle were sent to emergency grazing areas.

A. Rutjindo and T. Amporo both negotiated for emergency grazing on Naute farm, which is an Odendaal farm even further to the west. No further description of the place is available than that there were three houses on the farm and originally only goats were kept there. There was also a water shortage. The borehole was driven by a diesel engine. A Rutjindo brought six cattle, T. Amporo another five cattle and 66 goats. Their herders looked after the animals. It was mentioned (Murorua, pers. com.) that additional animals of T. Amporo were lodged elsewhere.

J. Howoseb, the headman, received permission from the farm owner, Mrs. Poppy !Hauses, to bring his 53 cattle to the farm Losshoof. Mrs. !Hauses does not live on the farm herself but stays permanently in Khorixas. However, four other households were on the farms. The farm owner herself did not own any livestock, but the other inhabitants kept 11 cattle. There is a water point close to the houses and from there the grazing area extends some 5 -10km. J. Howoseb's animals were accompanied by his herder.

Whether other households from Olifantputs moved their livestock elsewhere and if so, the numbers and where they took them, could not be established. However, the rainy season of 1998/99 was also extremely poor. Olifantputs received little rainfall in January and afterwards although this was enough to start some grass sprouting. Perhaps because of the positive hopes for the rainy season or because of the deterioration of the emergency areas as well, many farmers from Olifantputs moved their livestock back to Olifantputs in early 1999. The fresh grass cover was exploited as it came up.

Livestock sales

Adaptive management should be instituted in areas with variable rainfall conditions. Stocking numbers should flexibly track rainfall and thus the vegetative biomass available for grazing. Moving animals to emergency grazing areas is one option to reduce grazing pressure on your own farm however, this is often only a temporary solution, shifting the problem from one place to another. Livestock off-take through sales and slaughter are other possibilities.

Data on livestock sales for the period of June 1997 to June 1998 have been presented in section "Dynamics of past 12 months" above. This time period extends from a good rainfall year (season 1996/97) to a very poor year, leaving the farm with almost no significant rainfall in the 1997/98 season. This time period could be characterized as a "pre-drought" condition. At Olifantputs, only Farmer 1 sold a significant number of livestock, 40 head of cattle and 40 goats. He also sold a few sheep. Farmers 11 and 12 sold 30 and 20 cattle respectively and Farmer 11 also sold 20 goats. Most of the other households sold few livestock, although what they sold was possibly significant in relation to what they owned. However, the numbers of livestock remaining at Olifantputs were still high. Samuel Howoseb mentioned that as a drought preparation activity "we sell our animals and bank our money. We wait for the rainy season to buy others" (QOP8).

Generally communal farmers do not like to sell their animals at official auctions because they feel that the prices their animals fetch are extremely low, especially when compared to the successes of the commercial farmers. Marketing and pricing of livestock of communal farmers has been identified as a major problem. If incentives for livestock sales are to be set, especially in a pre-drought situation, these problems urgently need to be addressed.

Supplementary fodder

Only a few of the farmers at Olifantputs mentioned feeding supplementary food as one of their actions against drought (QOP1-13). However, when asked whether they did supply extra food at times, a number of them came up with supplements given. All farmers provided salt licks for their livestock. Lucerne was another common extra.

In former times, Lucerne was grown in the local gardens but when the gardens are dry this is not an option and Lucerne needs to be brought in from elsewhere. Other extras were bone meal, maize stalks, mealie meal and cabbage. Two farmers mentioned the use of a mix of natural supplements, including Acacia *erioloba* pods, sunflower seeds, maize stalks and grass. Another natural food used was Mopane leaves, which had been stored. It was observed that individual farmers were raking grass stalks in a manner similar to making hay.

In the 1992/93 drought as well as in 1994 the Government provided livestock subsidies in the form of cash allocations for supplementary fodder. A number of households at Olifantputs were recipients of such subsidies (see section "Income and expenditure above). The supply of supplementary fodder to livestock has been criticised as supporting unsustainable land use, especially under drought conditions.

Other (economic buffers)

Drought preparedness is a key word in Namibia's National Drought Policy. Besides agriculturally based activities, communities and individual farmers could and should investigate other opportunities to be less vulnerable to such emergency situations. Mobilisation of savings, diversification of incomes etc. are just a few of the concepts that could be considered. It is clear that at Olifantputs several households have very slim buffers for coping with extreme situations. It could not be established how far individual households were safely bound to urban family connections, which could provide a social backstop system.

3.9 Water

Water availability is the single most important factor in the settlement and exploitation of grazing areas in arid to semi-arid rangeland. This is possibly best illustrated by the founding story of the village of Olifantputs itself (see section "History of establishment" above). People could only settle there after the first borehole was drilled after which the cattle post developed into a village. It should be mentioned that aside from using borehole water, people engage in rainwater harvesting (OP28). It is not clear how advanced the technology for this is.

The first borehole was established in 1954. "In the old days the villagers drove their donkeys in circles around the borehole to extract water from the dam." (OP43&44). In 1957 the waterhole was equipped with a windpump. Today Olifantputs has two boreholes which both tap the ground water (OP86). There is no clear knowledge of the size and condition of the underlying aquifer system and its in-flow and out flow-dynamics, either for Olifantputs, or the area in general. (Seely, pers. com.). However, DRWS says that the supply of water will be sustained if the consumption on the current estimates hold (see Figure 10). A new diesel engine was supplied by the Directorate of Rural Water Supplies (DRWS) of the Ministry of Agriculture, Water & Rural Development. In 1998 the government dismantled the windpump (pers. obs.). Apparently the windpump was repaired and returned (Karabo, per. com.). From 1997, the DRWS implemented a cost recovery policy for the water points (Napcod, 1997), which puts the responsibility for the maintenance of the borehole into the hands of the communities. From August 1999, all communities will be expected to carry 50% of all costs arising from the maintenance of water points and in eight to ten years the costs of the water points are to be fully carried by the communities (Karabo, pers. com.).

At Olifantputs, a Water Point Committee has been set up with Jonas Howoseb as chairman, Frederick Nanuseb as secretary and Thusnelde Amporo as treasurer (OP25, OP61). The committee maintains a bank account, which is supposed to house the water fund. The committee has been in place for quite a while now, approximately since 1995 (10/97 de-briefing Dudu Murorua). In discussions with community members at the village, pricing of water and determining how it is used have proved to be extremely difficult. Presently, every 3 months the government supplies 200-210l of diesel to the villagers for free to run the diesel pump (OP28). Additional maintenance and purchases of supplementary fuel are up to the villagers themselves. In one reference it was stated that at Olifantputs every household has to contribute N$30 (OP28). It is not clear whether this is per month. Another reference (OP25) stated that every household in the village contributed N$50 monthly to buy fuel after the diesel supplied by government was finished. A herder (OP77) mentioned that he alone had to contribute N$20 (per month) to the diesel fund.

Pricing of water at Olifantputs is done per household. There is no staggered pricing system that would allow charging according to usage. This seems to be a problem at Olifantputs – looking at the different sizes of the individual households and the associated livestock herds would indicate extremely dissimilar water consumption levels (see section "household members; demographics").

The following paragraph attempts to give some estimates on overall water consumption at Olifantputs, consumption per household, and costs. Some of the underlying data are rough estimates.

Figure 10: Water supply and consumption at Olifantputs

Olifantputs has two boreholes. The new borehole was drilled in 1997 and is equipped with a diesel pump. The old borehole is run with a windpump. The old borehole was temporarily closed after the installation of the new borehole. The windpump was dismantled in 1998. The old borehole has since been rehabilitated and the repaired windpump has been brought back to the village (Karabo, DRWS, pers. com., 07/05/99). Currently supplies from both boreholes supplement one another.

In the following, data on water demand at Olifantputs are displayed using information from various sources and making different assumptions. Discrepancies between estimated demand and actual usage are illustrated as a case scenario.

1.) **Baseline data on the water supply in Olifantputs**

- At Olifantputs two water reservoirs are in place. The old concrete dam has a volume of $36m^3$ and holds water for the livestock, the new covered tank has a volume of $5m^3$ and is earmarked for human consumption (DRWS, pers. com.). The same boreholes fill both tanks. Together this makes a storage capacity of maximum 41 000l water.

- According to the villagers at Olifantputs the diesel engine uses 20l of fuel to totally fill up the reservoirs. Filling them takes 24hours (2 x 12 hours throughout the night). The engine needs to rest in between to allow the water to replenish (Howoseb, pers. com.).

- The Namibian government through the DRWS has been supplying 200-210l of diesel to Olifantputs every third month for free (this is now been reduced to 175l for 3 months, Karabo, pers. com.). 200-210l of diesel would allow the community to fill the reservoirs approximately 10 times in three months. This is an average of 3-4 times a month.

- Working on an average of filling the reservoir 4 times a month, 164 000l of water would be supplied.

- The villagers report that the diesel supply only lasts for about 1 month and 3 weeks. This means that at Olifantputs the reservoirs are being filled twice as often as the diesel is supplied by DRWS allowes i.e. 7 to 8 times a month.

- Calculating 8 fills per month means that the diesel engine is providing 328 000l to Olifantputs a month.

2.) Water demand estimates by DRWS

The daily water consumption for Olifantputs is calculated on the basis that each animal consumes approximately 25l of water per day, and each human inhabitant, 15l per day.

Olifantputs:

Animals:	500 x 25l	= 12 500l
Humans:	40 x 15l	= 600l
DAILY TOTAL		= 13 100l

DRWS estimates a demand of 13 100l water per day at Olifantputs, hence a monthly consumption of approximately 393 000l.

3.) Case study June 1998

In this case study of Olifantputs, livestock numbers per household were established. The numbers derived for cattle, goats, sheep, donkeys and horses, as well as the average number of humans staying at the village are used for the calculations below. A daily consumption of 20l has been assumed for large stock, including cattle, donkeys and horses. Small stock, goats and sheep are calculated to have a daily consumption of 7l. Human consumption has been estimated extremely conservatively at 15l, the minimum, which the DRWS recommends. However, the number of people has been estimated generously.

In the June 1998 survey the following results were obtained:

Cattle:	457 x 20l	= 9 140l
Goats & sheep:	1251 x 7l	= 8 757l
Donkey & horse:	69 x 20l	= 1 331l
Human:	70 x 15l	= 1 050l
DAILY TOTAL		= 20 278l

If the daily consumption of water is 20 278l at Olifantputs, the monthly consumption is calculated as 608 340l per month. **The actual consumption of water at Olifantputs in June 1998 was close to one third higher than the estimate of DRWS suggests!**

4.) Additional supply from windmill

According to both the estimates of the DRW as well as the data from the case study, water pumped with the diesel engine is only supplying a fraction of the overall water drawn.

- If working on the DRWS estimates of a monthly water consumption of 393 000l, and a contribution of a maximum of 164 000l through the diesel engine (running 4 times a month), the wind pump would have to pump 229 000l of water per months. This would mean a yield of 7 633l per day.

- Working on the estimates based on the case study of June 1998, and a contribution of (a) 164 000l through the diesel engine (running 4 times a month) and (b) a contribution of 328 000l (running 8 times a month), calculations are for (a) that the windpump has to generate 444 340l per month (14 811l per day), and for (b) 280 340l per month (9 344l per day).

5.) The Olifantputs diesel fund

Currently the maintenance of the machines and equipment is still carried by DRWS, as is a basic diesel supply (Karabo, pers. com.). The local Water Point Committee at Olifantputs has established a bank account into which each household has to pay a monthly contribution. There are two different versions of how much the monthly fee per household is and both are used for the calculations: (a) N$30 and (b) N$50. Estimating that a litre of diesel costs N$2.50 (excluding transportation to the village) the following calculations have been made:

i. Current costs (monthly)

Windpump maintenance:	DRWS
Diesel engine maintenance:	DRWS
Diesel for approx. 4 fillings:	DRWS
Diesel for approx. 4 fillings (80l), at N$2.50/l:	N$200

ii. The water fund

Currently 13 household should hypothetically contribute to the water fund, according to the two rates mentioned this would mean an income of

(a) 13 x N$30 = N$390
(b) 13 x N$50 = N$650.

If it would cost only N$200 per month (see above) in contributions, the diesel fund should have saved money.

- However, from personal communications this seems NOT to be the case. If we assume that all money was collected and all money was spent on diesel, the diesel engine would have run a lot more often. This is possible, considering that the windmill was out of order for a while. We also do not know how large a yield the water pump can generate.

The villagers acknowledge that water consumption fluctuates seasonally (OP28), possibly because the animals have different water needs of in the dry season (in the wet season they drink from standing pools in the field) and there are many variations is stock and humans numbers, especially among the latter during the December holidays.

There are three taps, two at the outlet, for humans and one at the trough for the animals. An additional pipe is situated at the back of the reservoir where cans can be filled more rapidly. None of the households have water in the houses and water has to be fetch individually or transported by donkey cart. Headman Jonas Howoseb's household maintains a pipe for watering the irrigated garden.

Water collection features as one of the most time consuming activities in their daily activities among women, young and old, (OP14&15, Op16&17, section "People

activities" above), with a daily average of 2-4 hours being reported. Water inaccessibility is identified as one of their main problems and they suggest that, if water was more readily accessible, they could use their time more effectively on productive activities.

However, whether easier access to water would also increase water usage remains a question. Considering that water is a scarce resource in the area (Napcod, 1997), this needs to be considered for any future development planning at Olifantputs.

Livestock related environmental problems

The discussion on whether environmental degradation is taking place in north-western Namibia or not has been going on for a long time and there have been some outspoken voices (e.g. Sullivan, 1998, Rhode, 1994). The question of whether communal land tenure and land management are impairing the environment is extremely difficult to address. However, it cannot be denied that there are problems that the local farmers have to deal with, particularly in communal areas, which add to the pressure put on the rangelands in this arid to semi-arid area.

As one farmer expressed the problems:

> *"(We have) no choice to improve our land since the main income is only farming with livestock. Since the land is short and has a number of people, it is difficult to manage it. E.g. I can decide to concentrate grazing my animals on one side of the camp while the other side (is) recovering but while doing that someone else will use the other side."*

> *"Because the area is shared by many people who are using it for the same purpose, it is very difficult to manage it since not all people are interested and understand the management. For example, if I was alone, I could have tried a lot of ways of managing e.g. sell some of my animals or preventing over-utilizing of the field. But now, whether you try to minimize your number of livestock, you only risk yourself because the other people are not doing the same".*

"Because people are farming mostly by selling their cattle, goats and sheep. This is what (is) encouraging mismanagement of the land by overstocking. Because everyone is trying to have more animal for him/her to receive money from it. The more animals you have the more money you can receive".

Foreign cattle

One of the main concerns of the Olifantputs community is that foreign cattle, owned by villagers from neighbouring settlements, access their grazing area and even more disturbing to them, their water point (3/98 Festus Hamukwea). All households (QOP1-13) have mentioned foreign cattle as the main reason for overuse of natural resources. In communal areas no community has the right to exclude outsiders from using resources, even if they are situated in their area. Now, especially with the new water costing system coming into place, this will mean that local farmers may have to pay for the foreigners. At Olifantputs this causes great discomfort. During various problem analyses (M&E 5/98), this issue has come up as a main environmental problem facing the village.

During a one-day survey animals were counted at the water point and their household affiliation was determined by individual brand marks. Cattle of eight owners from Olifantputs could be identified unambiguously. A number of cattle had "foreign" brand marks and one type of mark could not be associated unequivocally. Altogether 638 cattle were counted at the water point during that day.

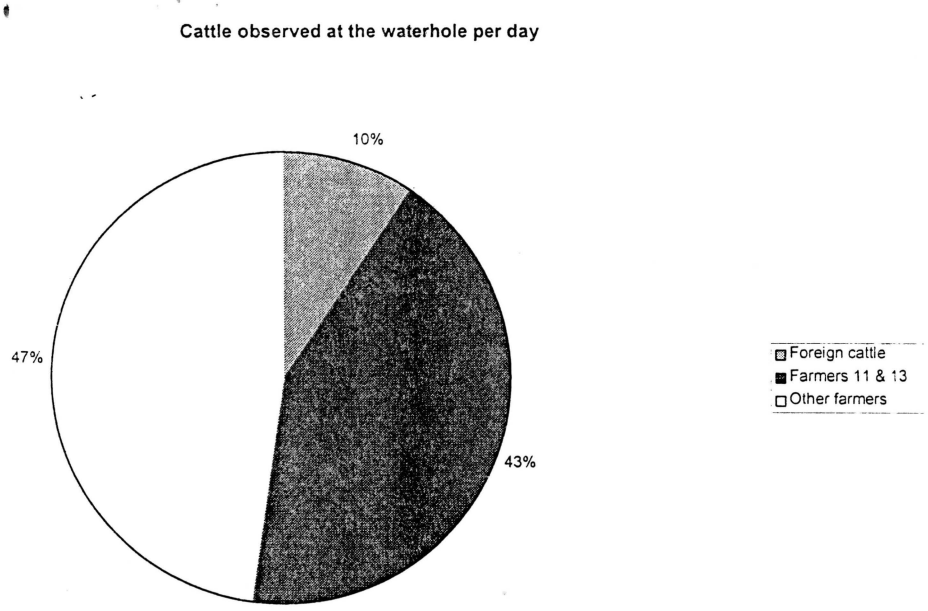


Figure 11: *Percentage of foreign cattle drinking at Olifantputs*

Cattle numbers per household were very different from the numbers obtained during the June 1998 survey. This could be due to many reasons: the observation was carried out at a different time; a number of cattle came to the borehole to drink twice; not all cattle came to drink during the time of observation. However, this should not be of concern to the research objective posed: to determine what percentage of the cattle drinking at the Olifantputs water hole was foreign cattle. A ratio of foreign cattle to Olifantputs cattle could be drawn from the data obtained (Figure 11). The pie chart clearly shows that in the worst case scenario, 10% of the animals visiting the borehole were foreigners. If the animals with the indeterminate mark did, after all belong to an Olifantputs resident, the number would drop to 4.7% foreign invaders at the water point. In contrast to this it is one owner (in a household with various owners) that accounts for 43% of all cattle watered at Olifantputs water point.

Overgrazing and Desertification

Whether the natural resources and rangeland are over-utilised and possibly even degraded has been investigated from a biophysical ecological point of view as part of this research project and is presented in Parts III and IV of this thesis. Insights into local as well as scientific indicators of habitat condition using a set of biophysical

measures are described. The effect of land management practices on the natural resource base has also been investigated.