

Wild food: Use of natural resources for food in eastern Caprivi

Samson Mulonga



Directorate of Environmental Affairs, Ministry of Environment
and Tourism,
Private Bag 13306, Windhoek, Namibia
Tel: + 264 (0)61 249 015 Fax: + 264 (0)61 240 339
email: contact@dea.met.gov.na
<http://www.dea.met.gov.na>

Wildlife Integration for Livelihood Diversification
(WILD) Project, Directorate of Environmental Affairs, Ministry of
Environment and Tourism,
Private Bag 13306, Windhoek, Namibia
Tel: + 264 (0)61 249 015 Fax: + 264 (0)61 240 339
email: salong@dea.met.gov.na

This series of Research Discussion Papers is intended to present preliminary, new or topical information and ideas for discussion and debate. The contents are not necessarily the final views or firm positions of the Ministry of Environment and Tourism. Comments and feedback will be welcomed.

W3

Table of contents

EXECUTIVE SUMMARY	3
1. INTRODUCTION	5
2. THE IMPORTANCE OF FOOD FROM THE WILD	5
2.1 <i>Background</i>	5
2.2 <i>Nutritional importance</i>	6
2.3 <i>Traditional and cultural importance</i>	6
2.4 <i>Livelihood importance</i>	6
2.5 <i>Biodiversity conservation</i>	6
3. OVERVIEW ON WILDLIFE, PLANTS AND FISH RESOURCES IN CAPRIVI	7
3.1 <i>Caprivi Region</i>	7
3.2 <i>Wildlife</i>	7
3.3 <i>Plants</i>	8
3.4 <i>Fish</i>	9
4. WILD FOOD STUDY	9
4.1 <i>Methodology</i>	9
4.2 <i>Bushmeat utilisation</i>	10
4.3 <i>Plant-based wild food utilisation</i>	16
4.4 <i>Use of fish resources</i>	17
4.6 <i>Wild food and livelihoods</i>	18
4.7 <i>Social, traditional, cultural and religious aspects of wild food use in Caprivi</i>	20
5. FACTORS INFLUENCING WILD FOOD USE AND AVAILABILITY	22
5.1 <i>Natural factors</i>	23
5.2 <i>Local and government institutions</i>	23
6. CONCLUSIONS AND RECOMMENDATIONS	26
6.1 <i>Monitoring of resource utilisation</i>	26
6.2 <i>Potential for post-harvest processing</i>	26
6.3 <i>Identification of declining species</i>	27
6.4 <i>Community hunting as an option to reduce illegal bushmeat use</i>	27
6.5 <i>Site-specific exclusion with new tourism land-use plans</i>	27
6.6 <i>Benefit distribution to mitigate wild food use</i>	27
6.7 <i>Environmental education and sustainable harvesting of natural resources</i>	27
6.8 <i>Cultivation of wild-plant species and domestication of some wild animal species</i>	27
7. REFERENCES	28
APPENDIX 1: BUSHMEAT SPECIES UTILISED BY HOUSEHOLDS INTERVIEWED	30
APPENDIX 2: POACHING INCIDENTS RECORDED BY MET FOR 1998-2003	31
APPENDIX 3: PREFERRED SPECIES OF HOUSEHOLDS	33
APPENDIX 4: SOME PLANT SPECIES USED FOR FOOD IN CAPRIVI	34
APPENDIX 5: CURRENT AND POTENTIAL USES OF SOME PLANT AND ANIMAL SPECIES USED FOR FOOD IN CAPRIVI	35
APPENDIX 6: WILD FOOD RECORDING TABLES	37
APPENDIX 7: WILD FOOD QUESTIONNAIRE	38

List of tables and figures

Box 1: The role of wild food and other natural resources in rural livelihoods case study	19
Figure 1: Hunting methods used to hunt bushmeat species by households interviewed (%)	12
Figure 2: Price difference between domestic meat and bushmeat (% of respondents)	13
Figure 3: Poaching incidents per species and number of animals involved	14
Figure 4: Percentage of poaching incidents per locality	15
Figure 5: Importance of wild food to respondents for food and for cash income (n=39).....	19
Figure 6: Livestock holding of respondents (n=39)	20
Table 1: Commonly hunted bushmeat species, as observed by CRs.....	11
Table 2: Locality, locality type, number of animals and type of species involved in poaching incidents	15
Table 3: Rules and regulations on harvesting wild food.....	21
Table 4: Changes that have occurred to natural resources in the last 10 years according to respondents (n=39)	22
Table 5: Changes that have been brought by the conservancy to NR harvesting	24

Acronyms

CBNRM	Community-based Natural Resource Management
CR	Community Ranger
CRIAA	Centre for Research Information Africa Action
CGG	Community Game Guard
CRM	Community Resource Monitor
DEA	Department of Environmental Affairs
EEU	Environmental Economics Unit
FAO	Food and Agricultural Organisation
FA	Field Assistants
GRN	Government Republic of Namibia
HWC	human wildlife conflict
IRDNC	Integrated Rural Development and Nature Conservation
MET	Ministry of Environment and Tourism
NACSO	Namibia Association of CBNRM Support Organisation
NGO	non-governmental organisation
NR(s)	natural resource(s)
SDA	Seventh Day Adventist church
SIAPAC	Social Impact Assessment Policy Analysis Corporation
SADF	South African Defence Force
UNAM	University of Namibia
WILD	Wildlife Integration for Livelihood Diversification Project

EXECUTIVE SUMMARY

This study was carried out from 2002 to 2003 in the Caprivi Region. The Caprivi Region is one of the 13 regions that make up Namibia. It is situated in the far north-east of the country, bordering Angola, Botswana, Zambia and Zimbabwe. Caprivi has a higher rainfall (600-700mm) than most of the rest of Namibia and boasts perennial rivers such the Zambezi, Chobe and Kwando Rivers.

The research was conducted in Salambala and Mayuni Conservancy and at Linyanti, which is a non-conservancy area. The main objective of the study was to look at the use of wild food resources by people as a livelihood activity in rural areas in Caprivi and the factors influencing the use of these resources.

Main features of wild food harvesting in Caprivi

Wild food harvesting is an important part of the diverse range of livelihood activities of people in Caprivi. Different plant and animal species are utilised. Bushmeat, fish, wild fruits and vegetables form part of the daily diet of most households. This paper aims to give an overall picture of wild food¹ harvesting and utilisation in Caprivi. It provides insights into species used; harvesting methods; the influence of taboos, other cultural beliefs and other factors on wild food harvesting and consumption.

Gender in wild food harvesting

Hunting of bushmeat species is done by men (all the respondents involved in hunting bushmeat were male). Women are not known to hunt wild animals, instead they are the main providers of wild fruits and vegetables consumed in households. Fishing is also male dominated, but some women do fish using traditional methods such as woven baskets.

Hunting bushmeat

Most of the bushmeat consumed comes from small species such as springhare, rabbits, francolin, guinea fowl and duikers. Larger species such as buffalo, sable, kudu, impala and hippo are also hunted but on a smaller scale than the smaller species. Meat from these larger species is mostly sold to the individuals who command the largest salaries in local areas, such as teachers and nurses and other government workers. Wild fruits and vegetables are considered free access resources for everyone including people from other areas.

Poaching incidents recorded by MET

The most common incidents of poaching recorded by MET between September 1998 and April 2003 were for elephant (14 out of 55 incidents), with most cases (80%) involving elephant tusks. The next most common were buffalo and hippo (with nine incidents each). Where the hunting method was recorded (37 out of 55 incidents), the majority (87%) involved firearms.

Harvesting wild plants

People harvest different wild fruits and vegetables. Water plants such as water lilies are regularly harvested. Water lilies are an important resource in most areas of Caprivi near rivers or channels, from which it can be harvested. In Mayuni Conservancy, women harvest water lilies almost on a daily basis, especially during the dry season (August to November). Most of what is harvested is consumed – sales are limited.

¹ Wild food is defined as food from natural or non-domesticated sources.

Fishing

Fish is an important food source and generates a much higher and more consistent income than bushmeat or wild plant sales. The market for fish is well established in Katima Mulilo. Mostly women travel to rural areas to buy fish from predominantly male fishers. Gill-netting is the most commonly used fishing method in Caprivi, with drag-netting being used mostly when the water recedes.

Importance of consumption of wild food to poor households

Wild food use tends to be more important to insecure households who are more vulnerable to threats to household food security, such as drought or loss of crops to wild animals. Individuals interviewed in the Wild Food Questionnaire indicated that wild food was an important livelihood strategy and that it was more important for consumption than for income. Income from sale of wild food is small but very valuable as it is used to meet basic needs, such as purchasing foodstuffs (e.g. mealie meal and relish²) and paying clinic or school costs.

Traditional practices

Taboos, customs and cultural beliefs form part of people's daily life and determine the way resources are used. Traditional management practices exist in some villages. Young people are taught by elders not to shoot pregnant female species and shooting at a group of birds is discouraged to avoid large scale mortalities. There are also taboos and religious beliefs that limit consumption of bushmeat by different groups of people in the community, e.g. women and orphans. The knowledge of wild food harvesting, preparation and processing is passed on from generation to generation along gender lines.

Drought and floods

The recent dry years have had an impact on the availability and quantity of wild food harvested. The ability of some plants to bear fruits has been severely reduced. Some rivers such as the Linyanti/Chobe Rivers and channels dry up during extended dry periods making availability of resources such as water lilies, roots, fish and other water-based resources limited. In contrast, people catch less fish during floods and access to other resources is reduced by the vast amount of water covering larger areas.

Site-specific exclusion with new tourism land-use plans

The formation of conservancies has led to site-specific land use change in some areas where people used to harvest wild food. Some sites are being used exclusively for new purposes such as tourism and core wildlife areas, e.g. the core wildlife area in Salambala Conservancy, Kubunyana Campsite and areas around Susuwe Island Lodge (Mayuni Conservancy). Also the Kwandu and Buffalo core areas in West Caprivi that were prime riverine wild food collection areas for the Khwe community living in that area (K. Rousset.pers.comm.). Conservancies in Caprivi (and elsewhere in Namibia) must consider existing wild food harvesting practices at sites identified for tourism or conservation, and successfully address any conflicts that may arise as a result of this trade-off.

Potential for processing and domestication of some species

Some wild animal and bird species have been domesticated successfully, e.g. guinea fowl. Some of the wild fruits and vegetables found in Caprivi have potential to be processed into marketable products. This can help provide better income to households, as value is added to natural resources (NRs).

² Although relish is a dynamic word, it most often refers to meat, fish, or vegetables eaten with porridge.

1. INTRODUCTION

This paper looks at the use of wild food resources – both wildlife (bushmeat) and plant-based (wild fruits and vegetables) – as a livelihood strategy by communities in eastern Caprivi. It gives insights into the types of resources harvested; the methods used to harvest these resources; and the traditional, cultural and livelihood importance of these resources to people in eastern Caprivi. Factors influencing wild food harvesting and availability in the study areas are also discussed.

The main livelihood activities of people in Caprivi are cropping and livestock keeping (Suich 2003). With extended dry periods in recent years and an increase in human wildlife conflict (HWC) in some areas, the resulting reduced crop yields force people to focus their attention on alternative sources of food and income, such as wild fruit gathering, and wild animal and fish harvesting. The role that wild food plays in sustaining rural people's livelihoods is often underestimated. One way of improving the food security problem is to broaden the spectrum of crops and animals farmed to include non-traditional species such as wildlife and wild fruits (Yaa Ntiamoa 1997). This and the increasing adoption in southern Africa of community conservation initiatives, involving the sustainable utilisation of natural resources (NRs), are among the main reasons why the study of wild food and its contribution to livelihoods is important.

Definitions of terms can be confusing as they tend to be used differently by different people depending on the context. Even though broader definitions of wildlife may include all plants and animals in natural ecosystems, wildlife is defined in this study as including all free-ranging³ vertebrates in their naturally associated environments. Wildlife is therefore a subset of NRs, which are defined in this paper as all the wild plants and animals (vertebrates and invertebrates), and other inorganic resources derived from plants or animals, e.g. honey.

Research for this paper was carried out under the auspices of the Wildlife Integration for Livelihood Diversification (WILD) Project. The WILD Project is an applied, research initiative of the Ministry of Environment and Tourism (MET) whose role is to provide research findings, based on good data, in order to strengthen decision-making about Community-based Natural Resource Management (CBNRM) at all levels. The WILD Project is coordinated from Windhoek with field staff in Caprivi and Kunene. This report is intended to support other WILD papers and publications on the livelihood activities of rural communities in Namibia's Kunene and Caprivi regions and impacts (both positive and negative) of CBNRM on these activities.

2. THE IMPORTANCE OF FOOD FROM THE WILD

2.1 Background

NR use forms part of the diverse livelihood activities practised in Caprivi (Purvis 2002b). The use of NRs has changed with time as some of the resources have become scarce, people have become aware of the importance of conservation of these resources and have formed institutions and committees to help protect their NRs, e.g. conservancies protecting natural resources and especially wildlife. However, people continue to use wild food resources in their everyday lives. At the Katima Mulilo (administrative centre of the Caprivi Region) open market, large quantities of wild fruits, vegetables and fish are sold to generate household income. Seasonally, children sell wild fruits near roadsides in most parts of region.

³ Free-ranging animals are unfenced or at least in a very large enclosure.

2.2 Nutritional importance

The majority of Africans cannot afford to purchase all of their domestic food. Wild food gives them a cheap alternative source of energy, vitamins, proteins and minerals. Research on the nutritional value of wild animal meat indicates that bushmeat is comparable if not better than domestic meat. Evidence from elsewhere in Africa shows that the meat of most wild animal species tends to be low in fat, while equal or better than beef, mutton, chicken or pork in protein content and much higher in vitamin content (Yaa Ntiamoa 1997).

The contribution that wild food resources make to maintaining health and preventing disease is generally unrecognised, but may well be of survival value among poor people subsisting mainly on maize and with limited livelihood options (Van Wyk and Gericke 2000).

2.3 Traditional and cultural importance

Although not directly related to consumption, some NRs have traditional, cultural and medical associations. In Caprivi, some people still believe strongly in their traditional and cultural practices. Wild animals are killed and used in rituals by traditional healers or *naka* (see Appendix 3). Wild herbs are used extensively to cure certain ailments. When a person dies there are wild herbs that are used to bath all their relatives to avoid the person's spirit from haunting these people.

2.4 Livelihood importance

In pre-colonial times most communities in Africa depended on a combination of wild food and subsistence farming for their livelihoods. Wild food resources such as fish, wild animals, wild fruits and vegetables were of utmost importance to people. Today some of these resources are still used by people in both rural and urban areas. Most people in rural areas still depend on these resources for food. Income is derived from sales, including to customers in urban areas who cannot harvest their own supply. Few people realise that there is already a significant trade in wild fruits in southern Africa (Van Wyk and Gericke 2000).

The United Nations Food and Agricultural Organization (FAO) reports that the food situation in Africa is increasingly critical as conventional agriculture fails to meet expectations and the capacity of countries to import food is low due to scarcity of foreign exchange resources (Yaa Ntiamoa 1997). Food insecurity also arises from limited agricultural potential; reductions in herds and harvests in dry years; difficulties in collecting wild foods; wildlife damage to crops and livestock; and insufficient cash income to fill food deficits. During dry years insecure households have to maximize food gathering and exchanging in order to minimize reliance on selling off reserves (Yaa Ntiamoa 1997). However, the role that wild food plays in food security appears to be underestimated, and its importance to different groups is not well understood (Elliot 2002).

2.5 Biodiversity conservation

Article 95 of the Constitution of the Republic of Namibia states that: "The state shall actively promote and maintain the welfare of the people by adopting *inter alia* policies aimed at: (f) maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilisation of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future."

This part of the Namibian Constitution is similar to the Rio Convention on Biological Diversity, which states: "Many indigenous and local communities with traditional lifestyles have a close and traditional dependence on biological resources and need to share equitably in the benefits arising

from biodiversity. Governments have sovereignty over their biodiversity and states are responsible for conserving their biodiversity and using their biological resources.”

The Caprivi Region is a conservation priority for MET. This is due to the presence of endangered species such as Roan, Red Lechwe, Tsessebe, Sitatunga, Cheetah, Wattled Crane, Saddlebilled Stork, Blackbellied Korhaan and others (MET, undated). In addition to this, knowledge of resources people are utilising and ways these resources can be utilised in a sustainable manner is important for effective conservation of biological diversity.

3. OVERVIEW ON WILDLIFE, PLANTS AND FISH RESOURCES IN CAPRIVI

3.1 Caprivi Region

The Caprivi Region is situated about 1300km north-east of Windhoek. The region borders Botswana in the south, Angola and Zambia in the north, and Zimbabwe in the east. The Okavango River forms the border with Angola. The Chobe River forms the border with Botswana and the Zambezi River forms the border with Zambia and Zimbabwe. Compared to the rest of Namibia, the Caprivi Region has a high rainfall (760mm per year) (Økland et al. 2000). It is a flat area, approximately 1000m above sea level. Seasonal flooding creates extensive floodplains, especially in East Caprivi where almost 30% of the area can be flooded (Økland et al. 2000).

3.2 Wildlife

3.2.1 Wildlife in Caprivi

In pre-colonial times the Caprivi Region had large numbers of wild animals of different species. Large herds of buffalo, elephant, kudu and roan/sable antelopes roamed the forests and floodplains (Rice 1997). It was during the outbreak of the liberation struggle and the presence of the South African Defence Force (SADF) that the rapid decline in wildlife numbers started (Rice 1997). Poaching by members of the SADF became a regular occurrence and no effort was made by either SADF or the apartheid South African Government to halt this practice. Species such as eland, waterbuck, wildebeest and giraffe disappeared in East Caprivi (Rice 1997). In the 1994 aerial census on wildlife resources in Caprivi, it was found that only elephant and to a lesser extent buffalo existed in high enough densities to support sustained consumption in the preceding years. Species such as sable, giraffe, and zebra were found to be stable, but existed in numbers only high enough to support their own existence (Rodwell et al. 1995).

3.2.2 Wildlife and CBNRM

Recently some of these wild animal populations have started to increase in numbers. Although the cause of this recovery is scientifically unknown, it is perceived by many to be a result of the introduction of the Community Game Guard (CGG) system in 1991. In 1996, giraffes were seen for the first time since 1989 at Salambala Conservancy (Ashley 1998). Another sign of increasing wildlife numbers is the increase in problem animal incidents (Mulonga et al. 2003). Salambala Conservancy has also completed some game translocations of impala and blue wildebeest. Conservation and management of wildlife and other natural resources is now a focus for many communities in Caprivi (with the establishment of five gazetted and four emerging conservancies in the six year period between 1998 and 2003).

With the help of NGOs (under the umbrella body of NACSO) and Government (MET), conservancies in Caprivi have made considerable achievements in terms of conservation awareness

and natural resource management (NRM). Conservancy staff, Community Rangers (CRs), Community Resource Monitors (CRMs), Integrated Rural Development and Nature Conservation (IRDNC) staff and community members attending the WILD Project feedback in April 2003 at Cheshire Homes in Katima Mulilo, articulated clearly the purpose of CBNRM, mentioning resource management and return of benefits to communities as key concepts (Murphy 2003). However, benefits such as cash returns, employment and meat from trophy hunted animals are still limited in their distribution in Caprivi. Intangible benefits (such as pride and empowerment) are considered to be more widely distributed, although it hard to measure to what extent. It is believed that in the long run income earned by conservancies will increase substantially to the extent that conservancies will be able to be financial self-sufficient and in a position to deliver significant benefits to members⁴. Diggle (2003) predicts that all emerging and registered conservancies in Caprivi can achieve financial independence within five years⁵. MET has given a hunting quota to Salambala Conservancy, who have an agreement with a trophy hunting and photographic safari company. In 2002 this conservancy earned around N\$ 300 000 from this venture. A joint hunting concession between the same company and the four conservancies along the Kwandu/Linyanti River (Wuparo, Mashi, Mayuni and Kwandu Conservancies) has been secured to the value of about N\$ 1 million per year for the four conservancies.

3.3 Plants

As a region, Caprivi has the highest density and variety of trees and plants in Namibia (Ashley and La Franchi 1997). Most of the Caprivi Region is dominated by woodland species, while the Chobe floodplain characterises the eastern part.

Mendelsohn and Roberts (1997) recognised six broad vegetation communities: open water, floodplains, riverine woodlands, Mopane woodlands, Kalahari woodlands and Impalila woodlands. Some of the common tree species are: Mopane (*Colophospermum mopane*), Camel thorn (*Acacia erioloba*) and Teak (*Baikiaea plurijuga*). Fruit-bearing species such Brown Ivory (*Berchemia discolor*), Large Sourplum (*Ximenia caffra*) and Blue Sourplum (*Ximenia americana*) are also common.

The floodplains are characterised by open areas of grassland, which are covered by water during the flooding season. Fewer trees grow in the floodplains as they become inundated by water during floods (Mendelsohn and Roberts 1997). The floodplains are very important for cropping, especially maize. People plough in the *mulapos* (channels) and on the edge of the water. As the flood recedes (late August to October), people move onto the floodplain and cultivate the *litapa*⁶ using residual soil moisture so they do not have to wait for the rains in order to plant (Purvis 2002b).

Within the various *mulapos* that make up the floodplains people harvest a variety of wild water plants and roots for food. Water lilies are a good example of the rich diversity of resources people harvest for food in the floodplains.

⁴ Both Salambala Conservancy and West Caprivi (Kyaramacan Trust) have carried out benefit distribution at village level. Salambala Conservancy no longer receives donor funding for operation expenses.

⁵ However, he also cautions that strong leadership and appropriate institutional mechanisms need to be in place, and there remain "considerable challenges concerning the establishment of strong and effective institutional mechanisms that are able to promote and control 'multi-million-dollar' ventures" (Diggle 2003; pg 74).

⁶ *Litapa* is a term used by local people for the crop fields found in the floodplains.

3.4 Fish

Fish is one of the most important NRs that Caprivians have access to. With three rivers surrounding the Caprivi and a large floodplain area, many women and men engage in fishing for both cash and subsistence needs. Fish also occupy a central place in people's culture and daily life. It is a dominant commodity at the central market place in Katima Mulilo (Tvedten et al. 1994). The value of the Caprivi fishery approached N\$ 9 million per annum in 1994 (Tvedten et al. 1994).

In recent years there has been increased pressure on fish stocks due to growing human population; extended dry periods that have affected the hydrology and flood patterns of the region; and semi-commercialisation of the fish resources. Common species includes Sharp-tooth Catfish (*Clarias gariepinus*), Tiger fish (*Hydrocynus vitatus*) and some tilapia species. Purvis (2002 a and b) has done extensive research on fishing and livelihoods in Caprivi and a recent initiative in the Upper Zambezi River has been a transboundary approach (Zambia and Namibia) to community fisheries' management and research (refer to Abbott et al. 2003).

4. WILD FOOD STUDY

4.1 Methodology

Weekly recording tables (see Appendix 6) were given to three Field Assistants (FA) to record the daily harvests of selected households. Two of the FAs carried out this work in conservancy areas (i.e. Mayuni and Salambala Conservancies) and one FA worked in Linyanti (a non-conservancy area). Households using wild food were identified and targeted. Final selection was dependent on the willingness of individuals to reveal information about what they were harvesting. Some households were part of the WILD Project's household-level research, and different participatory research methods were used to source more information from these households, e.g. resource mapping and use exercises (see Long 2002 for details). It was more difficult to get data from households utilising bushmeat than it was for other resources such as plants and fish. This is because the harvesting of bushmeat without sanction from MET is illegal (refer to Section 4.2.1 below).

A household questionnaire was conducted in the three study areas. Furthermore information was sourced from the WILD/EEU Socio-economic Questionnaire Survey (n=1194) carried out by SIAPAC (refer to Suich 2003). A workshop was also held with Senior CRs from all the conservancies in Caprivi, in which use of wildlife and local management systems were discussed (Murphy and Mulonga 2003). MET poaching incident records for Caprivi from 1998 to 2003 were analysed with permission from MET Caprivi office.

Obtaining information about bushmeat usage from people was the most challenging part of the study. In most cases people were afraid to talk about bushmeat, as they were scared that this information could be used for prosecution purposes. The research team dedicated large amount of time to convincing people about confidentiality over their identities and that they were not going to be arrested by providing information about wild food harvesting⁷. This, in part, explains the small sample size of the wild food questionnaire (n=39) and households studied. In some cases people refused to talk about wild food labelling the researchers 'government informers'.

⁷ The households participating in the harvest and the wild food questionnaire were guaranteed anonymity and an MET official letter conveying this message was used.

Ideally the study should have been expanded to other areas but due to technical limitations and project time frame it was limited to the three study areas. One of the areas identified as significant for a wild food study was western Caprivi⁸, as the San community residing there are internationally renowned for their wild food harvesting skills. The Khwe residents of Caprivi harvest large quantities of Mangetti nuts (*Schinziophyton rautanenii*). In a household survey done in western Caprivi, 90% of households placed a high value on veld foods as a supplementary food source (Van Rhyn 1995). Given their history as people with a tradition of hunting, bushmeat utilisation may be a major livelihood activity in their area⁹.

4.2 Bushmeat utilisation

4.2.1 Legislation on hunting wild animals

The Nature Conservation Ordinance of 1975

Under the Nature Conservation Ordinance of 1975, it is illegal to hunt any wild animal on any land without a written permit allowing a person to do so.

Subsection 28 (1) (a) of Chapter III of the Nature Conservation Ordinance of 1975 stipulates that: no person shall, without the written permission of the Cabinet, hunt any huntable game, huntable game bird or exotic game or any other wild animal on any land, including communal land, owned by the Government of the territory or a representative authority (GRN 1975).

Commercial farmers, however, were given rights to use huntable game species on their farms in 1968.

The Nature Conservation Amendment Act of 1996

The Nature Conservation Amendment Act of 1996 (Act 5 of 1996) gives limited rights to groups of people to benefit from their wildlife through the formation of conservancies. These rights are vested in conservancy committees to be able to manage the sustainable utilisation of wildlife in their conservancies through both consumptive and non-consumptive use. Trophy hunting, live sale of game, own-use hunting and tourism are some of the many ways communities would be able to benefit from their wildlife.

In a memorandum¹⁰ to conservancy committee members, the Director of Parks and Wildlife Management of MET indicated that conservancies have utilisation rights over their huntable game¹¹ for own use without applying for a hunting quota. Quotas would only be required for trophy animals, and protected and specially-protected game. This means that the conservancy committee would oversee the utilisation of huntable game for "own consumption" by members of the conservancy throughout the year. The committee would be responsible for setting their own quotas for each species and for issuing their own conservancy permits (MET Memorandum 2003).

This shows that conservancies create a locally-controlled system of utilisation of wildlife by communities and creates an incentive for people who are still using wildlife to benefit from these provisions and in the process limit their illegal hunting practices. However, in Caprivi no conservancy has carried out own-use hunts for communities.

⁸ When the WILD Project started in 2001, this area was a no-go area for security reasons.

⁹ Springhares are commonly hunted in West Caprivi (K. Roussett, *pers comm*).

¹⁰ Memorandum dated 30 April 2003.

¹¹ At the time of writing this paper huntable game included only four game species – springbok, oryx, kudu and warthog.

4.2.2 Species utilised

Bushmeat is defined in this study as the meat from free-ranging vertebrates in their naturally associated environments. Households interviewed in the three study areas used 21 different wildlife species.

Commonly utilised species are small mammals and birds, such as guinea fowl, francolin, springhare, duiker and rabbits. Smaller species are less dangerous to hunt and more easily available, making them primary hunting targets. Wildlife numbers (especially larger species) in Caprivi are much lower compared to the Kunene Region. However, large game species such as impala, kudu, buffalo, hippo and roan/sable antelope are also utilised but at a smaller scale. Transboundary hunting of these species is common in areas near the Botswana-Namibia boundaries, e.g. Ngoma. Carnivores and reptiles are not commonly consumed. This is mostly due to the influence of the Seventh Day Adventist Church (SDA), which has a large following in the region (see Section 4.7).

In a workshop held in January 2003, CRs from Salambala, Mashi and the emerging Nakabolelwa Conservancy reported that in their areas large game species were killed. CRs from Kwando, Mayuni and Wuparo said only small game species were killed by people in their areas (see Table 1 below) (Murphy and Mulonga 2003).

Table 1: Commonly hunted bushmeat species, as observed by CRs

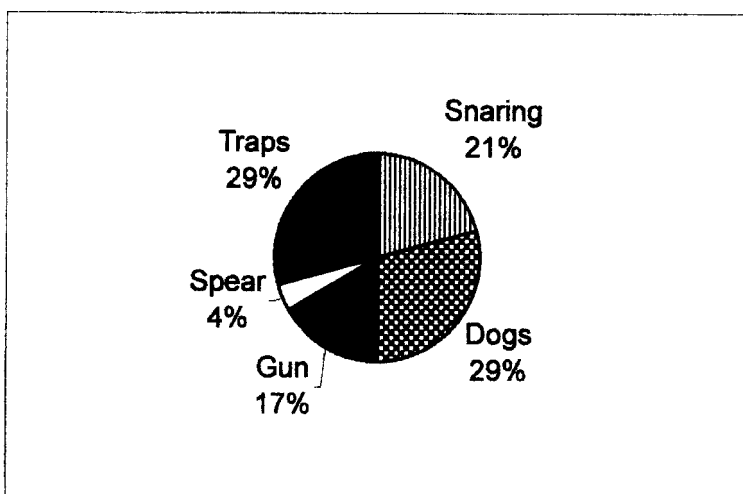
Salambala	Kwando	Mayuni
Duiker	Duiker	Duiker
Impala	Reedbuck	Springhare
Warthog	Lechwes	Guinea fowl
Reedbuck	-	Francolin

Bushmeat forms part of the local diet and is consumed regularly in households with active hunters. With households who do not own livestock and have limited livelihood options, bushmeat harvesting presents a cheaper source of meat given the higher prices of domestic meat.

4.2.3 Hunting methods

Most of the bushmeat-utilising households use traps, dogs and snares. Guns and spears are also used (see Figure 2). In most cases a combination of these methods is used. Guns are mostly used by older male household members, while bird traps and dogs are common among teenage boys. Older men can afford guns, while younger men cannot and have to be taught how to use guns safely.

Figure 1: Hunting methods used to hunt bushmeat species by households interviewed (%)



Bird traps are made from twine for fishing lines or from the plastic material which mealie meal sacks are made from. This is tied to a small bush pole, which is bent down. The use of two types of traps was observed. Feet traps, where the trap is strategically placed in bird-walking trails, and neck traps, which in most cases involves bait in the form of seeds and catches the bird by the neck if it tries to eat the bait. Bird traps were also observed around waterholes and riverbanks frequented by birds such as francolin and guinea fowl.

Snares are mostly made of wire. Strong wire is tied to a pole or tree log or standing tree. The snares are placed in walking trails of wild bushmeat species or at holes of burrowing animals such as springhare. They are checked every day to see if anything has been caught. Sometimes the owner of the snares cannot check the snare, for example if he is ill. This sometimes leads to the trapped meat going rotten. Most snares are non-selective of species, age or sex. They tend to catch anything that happens to encounter the snare. Snares are only selective to the extent that the size and strength of the wires may limit the species targeted.

Active hunting (dogs, guns, spears) involves walking long distances in search of wild animals. The distance may be up to 30km in some instances. During night hunts usually a group of young men will start the hunt two hours after sunset (night hunting is mostly for springhare since they are nocturnal animals and hide in holes during the day) and return in the early hours of the morning. Well-trained dogs are used during hunts and a gun may be carried.

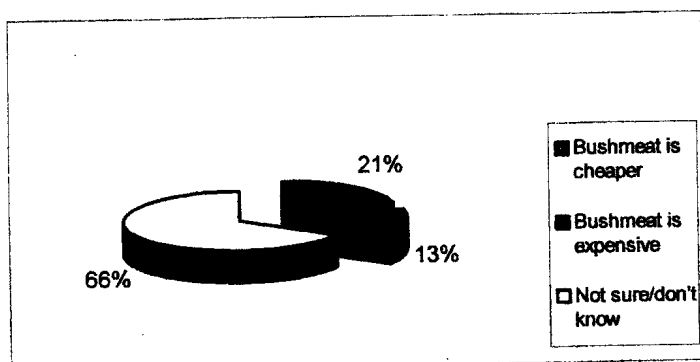
4.2.4 Bushmeat trade

Bushmeat trade is common in areas near the Botswana border due to accessibility of large game species. Meat from large game species such as buffalo, kudu, roan antelope is sold in the villages. Smaller game and bird species such as springhares, rabbits, francolin and guinea fowl are sold for an average of N\$ 10-00 for the whole animal in all the study areas. Bushmeat from prime species such as buffalo and kudus are sold to teachers and other government workers who command good salaries. Bushmeat prices are hard to determine as there are no formal markets and trade is an exclusively underground practice. In most cases carcasses of larger species are not sold whole, rather different parts are sold at different prices. Only long-term trusted customers have buying access to bushmeat. For example, in Linyanti one respondent said he does not sell to everybody, as he has a long-term trusted customer who buys most of his bushmeat. People are very suspicious,

fearing arrest, and will hardly admit that they consume bushmeat. Children are warned not to talk about bushmeat to anyone.

Most of respondents were either not sure or did not know the price differences between bushmeat and domestic meat. Some of the respondents said bushmeat is cheaper than domestic meat, while some said bushmeat was more expensive (see Figure 2).

Figure 2: Price difference between domestic meat and bushmeat (% of respondents)



When asked why bushmeat was cheaper respondents said it was because bushmeat has to be sold quickly after the kill, before information is leaked to law enforcement officers. One respondent said that if bushmeat were sold at a higher price, buyers would report to law enforcement officers because they were angry that the meat has been sold to them at a higher price. Reasons given by the respondents who said bushmeat was expensive include:

- high demand for bushmeat in the community (including well paid GRN and NGO employees);
- because of the labour involved in hunting;
- because it is not common type of meat; and
- because it is much tastier than domestic meat.

One reason for bushmeat being sold at a lower price is the limited shelf life of the meat. Most rural households do not possess freezers, thus fresh meat must be sold quickly to avoid rotting. In some cases bushmeat is cut into smaller pieces and dried¹² and sometimes salted as a way of preserving it for later use or sale.

4.2.5 Other uses of wildlife

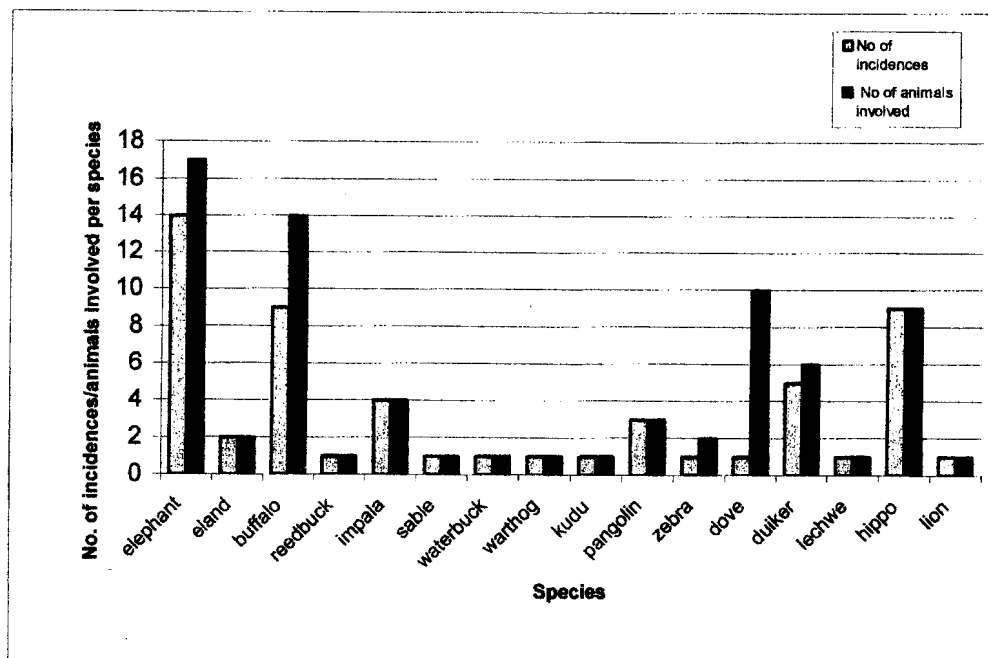
Monkeys are killed for their skins, which are used for blacksmithing, and baboon skins are used for making music drums. These apes together with hyenas and wild dogs are killed as problem animals. The Small-spotted Genet (*Genetta genetta*) and Large-spotted Genet (*Genetta tigrina*) are used extensively by traditional healers for their rituals. The brain of the Lesser Bush Baby (*Galago moholi*), when mixed with *muti* is said to increase local soccer goalkeepers jumping and leaping abilities. (The Lesser Bush Baby is an agile leaper.) Younger men will hunt this animal simply for its brain.

¹² This was observed by the researcher as a common practice for households receiving meat from trophy-hunted elephants.

4.2.6 Poaching incidents recorded by MET

This section analyses the Ministry of Environment and Tourism (MET) Caprivi office records of poaching incidents between 28 September 1998 and 24 April 2003. A total of 55 incidents were recorded involving 75 animals of 16 different species (see Figure 3 below).

Figure 3: Poaching incidents per species and number of animals involved



Most of the incidents (14 out of 55) involved elephants. Eight of these incidents involved elephant tusks. One incident involved removal of meat from a carcass of a dead elephant. There is no indication of what the remaining five incidents involved¹³.

The species with the second highest number of incidents were buffalo and hippo with nine incidents each. However, 14 buffaloes were involved in the nine incidents compared to nine hippos. Duiker, pangolin and impala are the other species with a substantial number of incidents. The most species killed in one incident were doves. Ten birds were killed in one incident, which involved poisoning.

Only 37 of the 55 incidents recorded had records of the methods used to hunt the animal(s). 33 of these (87%) involved guns. Other methods include poison, canoe and sticks, and a combination of dogs and spears. Of the 33 incidents involving guns, the most commonly used types of gun were AK 47 (13 out of 33 incidents); shotguns (8 out of 33 incidents); and 308 (four out of 33 incidents). Other type of guns used were 303, 243, 30.06, 2.2, 375, G3, and k502211.

Figure 4 below shows that 43% of the poaching incidents took place in conservancy areas; 33% in protected areas; 12% outside protected areas; 7% in Botswana; and 5% near Katima Mulilo (regional capital). The fact that protected and conservancy areas are closely monitored and patrolled could explain why most incidents were recorded there¹⁴. This is also due to work of CRs who patrol conservancy areas and report incidents of poaching to MET rangers.

¹³ The MET officials recording these incidents did not indicate the type of incident, e.g. elephant tusks or removal of meat.

¹⁴ These areas also have the highest wildlife numbers in the region.

Mashi	Mashi Conservancy	1	1	kudu
Mbambazi	Wuparo Conservancy	1	1	hippo
Mudumu	Mudumu National park	3	5	2 impala, 3 elephant
Ngoma	Salambala Conservancy	2	3	2 zebra, 1 elephant
Salambala	Salambala Conservancy	1	1	duiker
Sauzuo/Mbambazi	Wuparo Conservancy	1	2	2 elephant
Schuckmansburg	Outside of protected areas	1	1	elephant
Singalamwe	Kwandu Conservancy	1	10	10 doves
State forest	Protected area	1	1	duiker
W/Caprivi	Bwabwata Park	5	5	1 hippo, 1 eland, 2 impala, 1 sable antelope
Wuparo	Wuparo Conservancy	1	1	buffalo

The MET-recorded poaching incidents in Table 2 almost exclusively involve larger wildlife species such as elephant, buffalo and hippo. This contrasts to the findings of the household case studies. Most of the interviewees indicated that they mostly utilise smaller species such as springhare, scrub hares, francolin and guinea fowl (see Section 4.2.2). There was only one incident involving a smaller species in the MET poaching incident records (10 doves which were poisoned, see Appendix 2). The fact that more emphasis is placed on high value and protected species than on smaller and abundant species such as springhare could be one of the reasons why most incidents recorded by MET involved larger species.

Evidence from workshops with CRs and discussions with some MET officials points out that in most cases these law enforcement officers will warn rather than arrest an individual caught with a smaller animal such as a bird. However, this depends on factors such as whether the species is specially-protected or not and the location of the incident. If the case becomes public knowledge it will jeopardise the officer's involvement in future cases, as he will be accused of being selective of people he arrests (Field Rangers workshop, Mayuni Conservancy, June 2003). The fact that these smaller species are mostly snared and trapped also reduces the chances of people being arrested. A senior MET official indicated in a meeting with WILD Project staff that people must utilise some of the abundant bird¹⁵ species that eat their crops during harvest time.

"Personally I wouldn't care if people utilise smaller wild animals, as long as species of tourism importance are protected." (Natural Resource Management Officer WWF-LIFE, June 2003)

4.3 Plant-based wild food utilisation

Wild plant species utilised include wild fruits, wild vegetables, wild melons and bulbs. Most of these resources are harvested from the forest, but some are water-based plants harvested from the rivers and water channels (*mulapos*). The prime fruit species is Brown Ivory (*Berchemia discolor*) which is sold in large quantities at Katima Mulilo open market from February to June. Water lilies are a very popular food source in Caprivi. The Blue Waterlily (*Nymphaea nouchali*) is a prime resource that women harvest to sell or consume at home¹⁶. Other common fruit species includes Blue Sourplum (*Ximenia americana*), Large Sourplum (*Ximenia caffra*), Sycamore Fig (*Ficus sycomorus*), Mobola Plum (*Parinari curatellifolia*), Wild Medlar (*Vangueria infausta*) and African Mangosteen (*Garcia livingstonei*). Although the Marula tree grows in Caprivi, marula fruits are not

¹⁵ Queal was specifically mentioned here.

¹⁶ Water lily plants are also dried.

In one poaching incident MET rangers confiscated 17 tusks of elephants in Lizauli (see Appendix 2), which is in Mashi Conservancy, while in another incident in the emerging Kasika Conservancy one man was arrested with six buffalo carcasses. Prime species such as buffaloes, hippo and eland were killed in Mudumu and Mamili National Parks.

It is uncommon for an elephant to be killed for meat purposes only. They are killed mostly for their tusks. This is a result of commercial hunting, which involves AK 47 assault rifles being used. These rifles are said to have been sold and exchanged for food and other necessities during the Angolan civil war by UNITA bandits.

Figure 4: Percentage of poaching incidents per locality

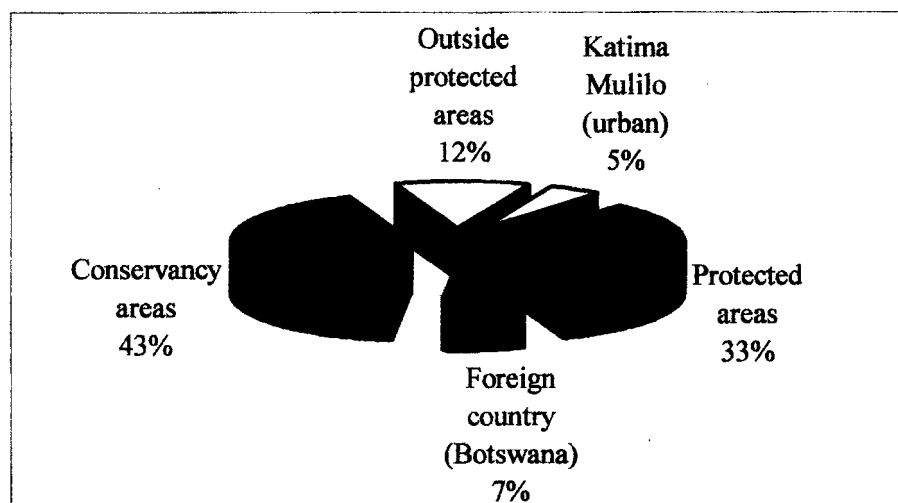


Table 2: Locality, locality type, number of animals and type of species involved in poaching incidents

Locality	Locality type	Number of incidents	Number of animals	Type of species
Batubaja	Outside protected area	1	1	hippo
Botswana	Foreign country	3	4	3 buffalo, 1 lion
Bwabwata	Bwabwata National Park	1	1	reedbuck
Choi	Mayuni Conservancy	1	1	elephant
Choto	Urban (Katima Mulilo)	1	1	pangolin
Ikumwe	Salambala Conservancy	1	1	pangolin
Ivilivinzi	Outside protected areas	1	1	elephant
K/farm	Near Katima Mulilo	1	1	duiker
Kasaya	Outside protected areas	1	3	2 duiker, 1 lechwe
Kwando	Kwando Conservancy	2	2	hippo, duiker
Lizauli	Mashi Conservancy	5	6	1 hippo, 1 pangolin, 4 elephant
Makoma/Kasika	Emerging Kasika Conservancy	1	6	6 buffaloes
Malindi	Outside protected areas	1	1	elephant
Mamili	Mamili National park	4	4	1 hippo, 2 buffalo, 1 warthog

commonly eaten, sold or processed. Common wild vegetables consumed include African Cabbage (*Cleome gynandra*) and Ligusha (*Corchorus tridens*).

Most wild fruits and vegetables tend to be seasonal, ripening for consumption during the rainy season. Some fruits and vegetables are dried for later consumption, however, or sold throughout the year at the market in Katima Mulilo or in villages. Water lilies are very important in the Mayuni Conservancy area along the Kwando River. All the women interviewed in Mayuni Conservancy harvest water lilies. They indicated that water lily was a prime resource in their area. Some of the harvest is sold and the income generated is used to buy mealie meal, relish and sometimes used for clinic and school expenses, especially in very poor households.

“Water lily is very important here in Mayuni and helps us a lot because it is available all year round,” said one respondent from Choi Village, in Mayuni Conservancy.

In Caprivi, Egoh (2002) found that Brown Ivory, Large Sourplum and Wild Medlar were planted in Malundu Village, while a nursery for palms was encountered in Muzuma Village. In some villages where sale of wild fruits is very important people may travel up to 14km in search of these resources (Egoh, 2002). This demonstrates the importance of these resources to rural livelihoods.

4.4 Use of fish resources

Only a few of the people interviewed in the Wild Food Questionnaire were fishers. The areas where this study was carried out are not prime fishing areas. Fishing is popular in the floodplains along the Zambezi and Chobe River further east in Caprivi. The fishery in Caprivi (inland) is important as a crucial source of employment and as a source of protein.

Purvis (2002b) describes the Caprivi inland fishery as being characterised by hundreds of small-scale fishers who use a range of unsophisticated equipment, targeting a multi-species fish resource across a complex network of floodplain water bodies. Catfish species (Purvis 2002b identified four species), Tiger fish (*Hydrocynus vitatus*), Greenhead Tilapia (*Oreochromis macrochir*) and Redbreast Tilapia (*Tilapia rendalli*), are some of the common species.

Fish plays a significant role in people's livelihoods in Caprivi. In a survey done in Kabbe Constituency by UNAM, it was found that on average 7.5 fish are eaten daily by households surveyed (Stephanus *et al.* 2003). However, this survey was undertaken during an extended dry period, which might explain the high reliance on fish. Fish is a traditional dish in Caprivi and is cooked in various ways including the widely-eaten dish of fish and water lilies.

The fish market in Caprivi is well established. Fishmongers travel to rural areas to buy fish from the fishers and sell them at the open market at Katima Mulilo. This market sells large quantities of fish year round. The peak harvesting time is when floodwater is receding. Fish commands good money on the market. One of the respondents interviewed earned around N\$ 350 per week on average.

All the fishing households interviewed used gill nets as their main harvesting method with occasional use of drag-netting especially when the water level recedes. Regulations on fishing are enforced by *indunas* (headmen) around Ngoma area, where respondents said that the *induna* prohibits them from using smaller mesh sizes. The Government of the Republic of Namibia through the Ministry of Fisheries and Marine Resources (MFMR) has recently (June 2003) passed the Inland Fisheries Resources Act. Under this act fishers would only be allowed to use modern hook and line and gill nets of not less than three inches in size. Other fishing methods such as drag-

netting, poisoning, fishing at night with lamps, and using mosquito nets would not be allowed (C. Hay, *pers. comm.*). Fishers would have to get a licence at a fee of about N\$ 50-00 a year. A limited number of nets would be allowed per fisher. Inspectors have been employed to oversee the whole process.

4.5 Use of non-food natural resources

Ashley and La Franchi (1997) found that in Caprivi, trees, other wild plants, and river resources provide many of the necessities of life for rural households, along with opportunities for barter, sales, and enterprise development. A traditional Caprivian home usually comprises thatch grass used for the roof, building poles together with clay used for the walls, and reeds or grass used to build the courtyard around the house. Mopane (*Colophospermum mopane*) and Terminalia (*Terminalia sericea*) are preferred species for house construction (Omoro and Otsub 2002)¹⁷. Livestock kraals are mainly constructed using poles only or poles with fencing. Mopane is a common fuel wood used for cooking. Traditional doctors (*naka*) use a variety of wild roots and leaves to cure some illnesses. In addition, some wild animals' internal organs and bones are used in different rituals of *naka* (see Appendix 5).

Palm harvesting is popular among Caprivian women for basket making. Most of the baskets are woven from the young, closed leaves of the indigenous Makalani Palm (*Hyphaena petersiana*). Dye materials are collected from a wide variety of local indigenous plants; a commonly used tree is the *Berchemia discolor* (Bird Plum or Muzinzila) (Suich and Murphy 2002). These species also bear edible fruits. Basket sale income alleviates poverty by enabling women to better cope with the most vulnerable aspects of their lives and that of their families – food security and health (Suich and Murphy 2002; and Murphy and Suich 2003).

It is not only palm that helps generate income, but also thatch grass, building poles and reed mats, which are also sold to generate cash. However, the Caprivi commercial thatching industry crashed during the 1999 unrest and has not yet recovered (C. Murphy, *pers. comm.*)

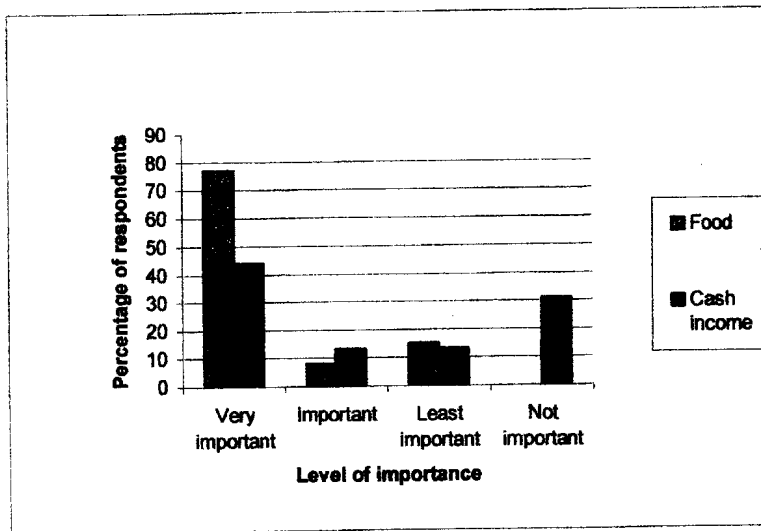
4.6 Wild food and livelihoods

The main livelihood strategies of people in Caprivi comprise livestock keeping (mainly cattle) and mixed cropping (maize, millet and sorghum). Natural resource-based livelihood activities include fishing for sale and home consumption, harvesting of wild food resources and other non-consumable resources such as thatch grass and reeds for sale. School children collect wild fruits on the way to and from school, and herd boys eat them while tending cattle in the wild. Bushmeat plays a significant role as a source of protein for some households.

In the WILD/EEU Questionnaire Survey (n=1194), 38% of households interviewed indicated that they utilised edible plants, consuming just over 90% of that collected within the household (Suich 2003). Most of the respondents interviewed in the Wild Food Questionnaire (n=39) said they harvested wild food (plants and animals) resources mainly for household consumption. Some of these respondents said they harvested both for food and for sale. Only one individual harvested just for sale. Figure 5 show that most of the respondents perceive wild food as a very important source of food and cash income.

¹⁷ An average house uses a total of 346 poles, which comprise 66 big poles and 280 small poles on average (Omoro and Otsub 2002).

Figure 5: Importance of wild food to respondents for food and for cash income (n=39)



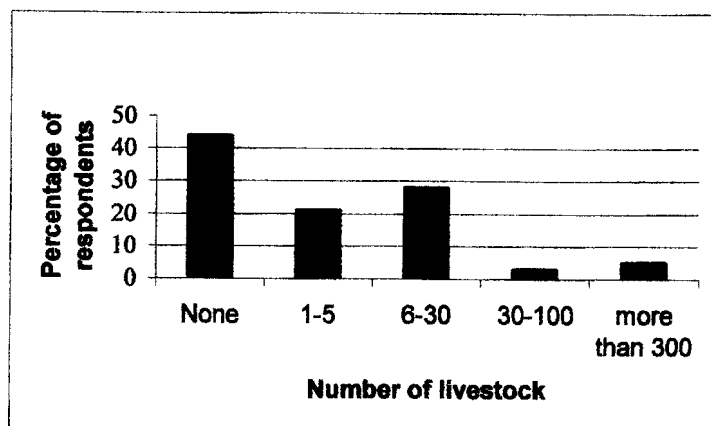
Some households are more dependent on wild food and other NRs for food and cash income and have limited alternative livelihood activities (see Box 1). John Lubinda's livelihood is critically dependent on NR use. His main livelihood activity, which is cropping has been affected by the human wildlife conflict (elephants eating his crops) and this has increased his dependence on NR use for food and cash income. Water lily sales bring in a quarter of his total household income.

Box 1: The role of wild food and other natural resources in rural livelihoods case study

John Lubinda is 54 years old and lives with his family at Kandiana Village near Choi in Mayuni Conservancy. He lives with his wife; three children aged 10, 15 and 21, three grandchildren and an elderly sister who also depends on him. John stopped schooling when he was in Grade 5 due to lack of fees. John is unemployed and does not have cattle or any other livestock. His main sources of money are thatch grass (50%), water lilies (25%), and reeds (25%). He sometimes gets remittance from his wife's brother who is a teacher. He buys food when he gets money and when he has harvested crops his wife pounds mealie meal. However, his harvests have been reduced in recent years by persistent human wildlife conflict and drought. John fishes sometimes. His wife constantly harvests water lilies, which are sold at the school to teachers and in villages. The money she gets is used to buy mealie meal and relish.

Cattle ownership in Caprivi have been found to be very useful in identifying secure and insecure households (Ashley and La Franchi 1998; MAWRD 1999; Murphy and Mulonga 2002; and Suich 2003). As many as 50% of households own none or just a few cattle (Murphy and Mulonga 2002; and Suich 2003). Households without cattle mostly have smaller crop fields due to lack of draught power. Other options are available to households who own cattle, e.g. ploughing using cattle and selling cattle to raise cash. As Figure 6 shows, the most common group of respondents in the Wild Food Questionnaire did not own cattle, indicating that they are from the poorest or least secure households. However, it is hard to extrapolate this to the wider population because of the sensitivity of bushmeat in villages, as illustrated in Section 4.1.

Figure 6: Livestock holding of respondents¹⁸ (n=39)



Extended dry periods and loss of crops to wild animals are some of the factors that exacerbate the dependence of rural people on wild food. This is partly due to the greater reliance of Caprivian households on a single activity as the most important activity contributing to household livelihood – 60% rely on arable production for own use (Suich 2003).

As this report is showing, the importance of wild food to people is dictated by a number of factors including financial limitations, preference and cultural values (Yaa Ntiamoah 1997). The cultural values arise from thousands of years of living with wildlife across the African continent.

4.7 Social, traditional, cultural and religious aspects of wild food use in Caprivi

Most of the people interviewed said they were taught how to harvest NRs by their parents along gender lines (women by their mothers and men by their fathers). Other respondents were either taught by their grandparents, uncles/aunts or friends.

Women take the lead in harvesting wild fruits, vegetables, roots and bulbs, while men do the hunting (all hunters interviewed were men). From a very young age, both boys and girls are taught how to harvest wild food NRs. Boys are taught how to track wild animals, how to use guns and how to make snares and traps, while girls are taught wild fruit and vegetable harvesting, gathering and preparation. Taboos and customs associated with hunting and harvesting are also passed on.

Wild food use helps build social networks in communities as people share NRs harvested in everyday life. Most of the respondents share their harvests with other households. These comprise family members, neighbours, and other people – so they can return the favour in turn (reciprocity). Some individuals harvesting bushmeat indicated that they share their harvests with immediate households because these households will report them to conservancy staff and MET, if they don't get a share of the meat.

Although people's traditions are fading in the face of modern living, some of the old traditional rules, regulations and taboos are still practised by people in certain areas in Caprivi. Some of these form part of the old traditional management systems, through which indigenous people managed NRs for centuries before colonialism. Respondents were asked to indicate rules and regulations on harvesting NRs (see Table 3 below).

¹⁸ N.B. Respondents selected were regular wild food users, as identified by people living in the community.

Table 3: Rules and regulations on harvesting wild food

Rules and regulations	Reasons for rule
Traditional rules and regulations	
A person must not have sex if he/she is going to hunt the next day	They may be hurt by wild animals if they have sex before going to hunt
Individuals should not kill more than one animal per day	To save for the future (sustainable use)
Pregnant female species should not be killed	To save for the future (sustainable use)
Must never shoot at a group of birds	To avoid killing an unnecessary number (sustainable use)
Fishers should not use smaller mesh sizes and must not use drag-netting	So as not to kill small fish (sustainable use)
Women must not eat the back part or head of bushmeat species	If they eat they will bring bad luck
You should share your harvests with other households	Sharing of resources
The courtyard (<i>lapa</i>) must be calm when a household member goes to hunt or harvest NRs	If there is too much noise in the courtyard and children run around the individual may be attacked by wild animals
Women must not eat bushmeat while menstruating	They bring bad luck if they do
When a young man kills for the first time all the meat must go to the elders	This is for blessings and opens the way for him to kill more
Orphans should not be given bushmeat	Orphans brings bad luck if they eat
MET/Conservancy rules and regulations	
People should not hunt	To protect wildlife
People should not put traps and snares	To protect wildlife
People should not harvest immature plants	Sustainable use of natural resources

Most of these rules and regulations were effective and everybody was compelled to adhere to them in pre-colonial times (M. Saisai, *pers. comm.*). However, things changed during the colonial period when rights to resources were shifted from Traditional Authorities to the central Government, and some of the rules and regulations have been lost. A study done in West Caprivi by Van Rhyn (1995) found that knowledge about traditional methods of hunting is diminishing. Older men stopped hunting when the SADF took control over the Caprivi Game Park (present-day Bwabwata Park) and younger men were recruited as soldiers (Van Rhyn 1995). The extent to which people presently follow their traditional rules and regulations is hard to determine because bushmeat activities involve a lot of privacy and most young people do not believe in taboos and other traditional practices (Van Rhyn 1995).

Elderly, rural people perceive wild food as important for health. During one of the informal discussions held by the researcher with a group of elderly people at Linyanti, they stressed that the cause of illnesses and deaths in recent years was partly perpetuated by not eating wild food resources, which had protected people for centuries from illnesses before modern medicines were introduced in Africa. Scientific research reveals that wild food resources contain higher amounts of vitamins and minerals than domestic ones. For example, Marula fruits contain four times as much Vitamin C as orange juice (Roodt 1998). The fruits can be eaten ripe but are far more popularly used to brew beer. This beer is antiscorbutic (preventative for scurvy which is caused by a lack of Vitamin C) (Roodt 1998). Analyses of the nutrient content of Manketti nuts and fruits (*Schinziophyton rautanenii*) have shown that they compare favourably with some of the world's most nutritious foods (Van Wyk and Gericke 2000).

Wild food is not only consumed for food requirements, but also for its taste and the cultural pride of people. Many people in urban areas have enough to eat but still buy wild food due to their cultural links to these resources.

Food preference is also influenced by religion in Caprivi. Most Caprivians belongs to the Seventh Day Adventist church (SDA). People who belong to this church are the most selective when it comes to food and some members do not eat meat altogether (wild or domesticated meat). Only ruminant herbivores with cloven hooves can be consumed by members of this church (B. Kamwi, *pers. comm.*). Carnivores, reptiles, apes and herbivores who do not have cloven hooves but are ruminants, e.g. hippo etc., are all considered unholy. Scale-less fish such as catfish species are also considered unholy and are not eaten by many people. This is based on the Kosher eating rules of the Old Testament in the Bible – which are the same as Jewish eating rules (K. Rousset. *pers. comm.*)

5. FACTORS INFLUENCING WILD FOOD USE AND AVAILABILITY

A number of factors influence wild food use and availability in rural areas in Caprivi. Table 4 below shows the changes that have occurred to NRs in the last ten years, according to respondents in the Wild Food Questionnaire.

Table 4: Changes that have occurred to natural resources in the last 10 years according to respondents (n=39)

Locality	Change	Reason for the change
Salambala Conservancy		
	Reduction in number of tortoise	Drought
	Reduction in number of waterbucks	Unlawful hunting
	Reduction in water lily resources	Drought
	Reduction in number of wild animals	Drought
	Increase in wild animal numbers	Less hunters
	Less fish	Low flooding, over fishing
	Some wild fruits are becoming scarce	Drought and increase in wild animal numbers
	Fruit trees bear less fruits	Drought
	Reduced Mobola Plum resources	Drought
	Less <i>inkuma</i> resources	Increase in number of harvesters
	African Mangosteen don't ripen well in recent years	Drought
	Increase in wild animal numbers, closer proximity to villages	Due to Salambala Conservancy
	No change	NA
Mayuni Conservancy		
	Reduction in wild plant food resources	Drought
	Tight law enforcement by both MET and conservancy rangers	Conservancy, MET
	Increase in wild animal numbers	Conservancy, less hunters
	Reduction in wild plant food	Prohibition of harvesting in areas rich in

resources available for harvesting	wild plant food resources
People have started to harvest sustainably	Due to conservancy
People have stopped poaching, improved understanding and awareness about conservation	IRDNC environmental education
No change	NA
Linyanti (non-conservancy area)	
The Linyanti river is drying up, thus reduction in water lily and fish resources	Drought, lack of rainfall
Reduction in number of wild animals	Over-hunting, increase in number of hunters and dogs
Wild animals numbers are getting low, they are getting far from villages	Drought, no water and food for wild animals
Wild plant food resources are becoming scarce	Drought
No change	NA

5.1 Natural factors

Drought was mentioned by most respondents as having contributed greatly to low harvests of wild food in recent years in all the study areas (see Table 4). Some fruit species don't ripen on time and the capacity of some species to bear wild fruits have been severely reduced due to lack of rainfall. One respondent in Linyanti said there was no water in the forest and grazing was limited and this has contributed to low wildlife numbers in recent years.

Most respondents described the flooding in recent years as being low, and this is said to have a negative effect on availability of fish, water lilies and many other roots and tubers harvested in the rivers and channels¹⁹.

5.2 Local and government institutions

5.2.1 Bwabwata National Park

Bwabwata National Park²⁰ (formerly known as West Caprivi Game Reserve) shares a common border to the west with Mayuni and Kwando Conservancies. It was proclaimed in 1968 (M. Saisai, *pers. comm.*). People harvested wild fruits and vegetables in this area until 1989 (B. Munembo, *pers. comm.*). From 1989, a permit was required by MET for anyone who entered or harvested plant products in the park and surrounding islands in the Kwando River. This according to respondents has had a considerable impact on NR harvesting, including grass and reeds. Subsection 18 of the Nature Conservation Ordinance (No. 4 of 1975) states that: "No person shall without the written permission of the executive committee (g) pick any indigenous plant in a game park or a nature reserve" (GRN, 1975).

¹⁹ However, during the 2003 floods on the Zambezi/Chobe Rivers severely reduced access to these resources due to vast amounts of water covering large areas and less fish were available on the market.

²⁰ West Caprivi Game Reserve was proclaimed in 1968 and at the time of writing this paper, the reserve was still awaiting re-proclamation as Bwabwata National Park.

During interviews this area was described by most of the respondents from Mayuni Conservancy as rich in wild fruits and vegetables. The introduction of the permit system was seen as a hindrance to the community to access these resources. The nearest MET office where people can get permits is Susuwe Camp about 20km away from the main settlement in Mayuni Conservancy (Choi Village)²¹.

5.2.2 Communal area conservancies

Negative impact

Ashley and La Franchi (1997: 73) reported that “the cost of lost access to plant and river resources can be just as great as the cost of lost access to grazing”. Halstead (2003) recognises that a key success factor for tourism enterprises in communal areas was the ability to negotiate successfully the change in land use from open access to tourism, which requires reduced access (i.e. reduction or prohibition on livelihood activities such as grazing, cropping and veld food gathering).

Conservancies were mentioned as having some influence on wild food harvesting. Some of the people interviewed said that the monitoring and management of NRs (mostly wildlife) and the exclusive use of some sites for tourism purposes had affected their wild food harvesting to a certain extent. In the Wild Food Questionnaire, respondents in Mayuni and Salambala Conservancies indicated that they now cannot harvest NRs in some areas where they previously harvested (see Table 5). Areas mentioned were Salambala core wildlife area, areas around Susuwe Island Lodge²², Chihoko, and Kubunyana Campsite²³. These areas are exclusively used for tourism. Otsub and Omoro (2002) found that grazing and firewood collection are also not allowed in the Salambala core wildlife area. However, cattle can be seen grazing in this area as part of the ongoing dispute between the conservancy and people refusing to move out of the area²⁴. This area is reserved for tourism and wildlife purposes.

Table 5: Changes that have been brought by the conservancy to NR harvesting

Locality	Changes brought by conservancy
Salambala	<ul style="list-style-type: none"> People have been prohibited from harvesting NRs in some areas (e.g. core wild area) People have stopped hunting Restrictions on harvesting wild fruits and medicinal plants in some areas (e.g. core wild area) Reduction in poaching People are not allowed to cut building poles in some areas (e.g. core wild area) Less wild fruits due to competition with wild animals People hunt in fear No change

²¹ Mayuni Conservancy have, however, been able to build a campsite at Nambwa in Bwabwata National Park.

²² A privately-owned luxury lodge providing a joint venture fee to Mayuni Conservancy.

²³ A rustic campsite owned by Mayuni Conservancy.

²⁴ Refer to Murphy (2002) for a discussion on this in the context of a historical view of Salambala Campsite.

Mayuni

Conservancy has educated people sustainable harvesting of NRs
Conservancy prevents people from harvesting at Kubunyana, Chihoko and Susuwe
People hunt only when tending cattle
People do not hunt regularly due to fear of arrest
People hunt in fear
Conservancy rangers prohibit dogs to move around with their owners/shoots dogs
Conservancy has brought no change to NR harvesting

One respondent from Ngoma indicated that he could not hunt game meat species in areas around Limai and Ibbu, which were his prime hunting areas, because of strict law enforcement by Community Rangers (CRs). Some of the bushmeat-harvesting households indicated that they hunt in fear of CRs and they do not hunt as regularly as they used to as a result. The chances of getting caught are said to have increased since CRs started patrolling. In some cases people have changed their hunting tactics to avoid being apprehended by law enforcement officers (MET and CRs). Some respondents reported that they now avoid using active methods such as dogs and guns and instead use 'set-and-wait' methods such as snares and traps. Senior CRs interviewed said that they are increasingly encountering snares and traps when patrolling.

Positive impact

Respondents in the two conservancy areas reported that they had observed that wildlife populations are recovering. The CBNRM programme was described as having helped educate people about sustainable harvesting of NRs. Conversely respondents in Linyanti reported an increasing reduction in wildlife numbers²⁵.

In Salambala and Mayuni Conservancies, respondents said that there is an increase in wildlife law enforcement because of regular CR patrols. The use of wild plant resources is monitored by Community Resource Monitors (CRMs²⁶).

The CRs' enforcement of MET regulations appears to have brought about a locally mediated system of control. A good demonstration of this localised management of wildlife is a poaching case, which was withdrawn from court by MET as the Mayuni *Khuta* (traditional court) fined the suspect after he was arrested by CRs (see Appendix 2, MET poaching incident records). In both Caprivi and Kunene there is qualitative evidence²⁷ to suggest that CRs (or Game Guards/Environmental Shepherds as they are known in Kunene) may be more lenient in their law enforcement if they apprehend a poor household hunting small and/or abundant species for home consumption. If this practice is sustainable from a wildlife perspective, the positive livelihood implications are obvious. The 'poacher-to-game-keeper' aspect of some of the CRs' careers (refer to Jones 2001; and Murphy 2003) gives them a strong background in illegal hunting to be able to carry out this localised management.

²⁵ Wildlife number here refers to wildlife seen by respondents when they walk around their areas no statistical or census results are referred to.

²⁶ The CRMs are women resident in conservancy areas, who have been selected to promote the participation of women within the work of the conservancy and monitor the use of resources used mainly by women. Their work includes: supporting the craft industry through monitoring the use of craft raw materials (palm and dye trees); assisting with training and general organisation, including the collection of craft from producers to take to markets; returning money to them following sale; and in some instances giving assistance in the collection of the palm and dye materials used to make these crafts.

²⁷ For example, refer to Vaughan *et al.* 2003, for information gleaned from discussions from a role play where a very poor person is apprehended for poaching.

6. CONCLUSIONS AND RECOMMENDATIONS

Wild food resources play a significant role in rural livelihoods in Caprivi. Traditional knowledge on harvesting and use still exists and is practised. Different types of resources are used with use linked to livelihood status, local taboos, norms and enforcement of regulations by conservancies and the Government. Dry periods and floods influence availability of resources to people. Evidence from WILD Project research suggests that it is mostly insecure households who are critically dependent on wild food use, as they have limited livelihood options. Due to the importance of wild food to rural livelihoods, wild food use must be taken into consideration when following development and conservation agendas.

6.1 Monitoring of resource utilisation

The use of key natural resources needs to be identified and monitored²⁸. This can help conservancies make better and informed management plans, e.g. Salambala forest management plan. Wildlife censuses carried out by CRs are important here. Inclusion of key fruit, vegetable and other species utilised in communities is important. However, some species can have low consumption or tourism potential but could be keystone species in their ecosystems, making assistance from conservation biologists useful.

6.2 Potential for post-harvest processing

The potential for post-harvest processing of some wild foods especially fruits and vegetables needs urgent consideration in Caprivi, i.e. adding value to resources harvested by producing quality products which could be sold to generate much higher income than local sales of these resources²⁹.

A good platform for this initiative is the Indigenous Fruit Task Team (IFTT) that is working among other goals towards promoting use of wild foods and identifying potential products and markets for these resources (NASSP 2003). Most of the fruits identified by the IFTT's Promotion of Indigenous Fruit (PIF) Project as priority species can be found in Caprivi³⁰. CRIAA has also conducted two studies in Caprivi (CRIAA 2000 and CRIAA 2003) where this potential and the potential for processing of plants for cosmetic use has been stressed. There is an urgent need to diversify the Caprivi craft programme due to scarcity of palm in key weaving areas (the palm sources occur in areas remote from most producers) and a perceived market saturation. Due to the inherently risky nature of tourism, diversification of community enterprises in Caprivi is warranted.

This post-harvesting process fits well with CBNRM enterprise development by involving local people in small enterprises such as Marula wine or oil productions, producing skin cream from Sausage tree (*Kigelia africana*) and many others. Instead of communities waiting for benefits from the conservancies they could start earning money from NRs processing and sale. Markets need to be

²⁸ Progress is being made with wildlife in the context of conservancies, with fish (Ministry of Fisheries and Marine Resources) and forestry (Directorate of Forestry). There is even some cross over, with CRs in the eastern floodplains including fishing activities in their 'Event Book' monitoring system (refer to Stuart-Hill 2003 and Stuart-Hill *et al.* 2003 for more detail on Event Books).

²⁹ The effect of commercialisation on subsistence use by the poor needs careful attention. Research on the impact of commercialising the Mangetti nut harvest in West Caprivi revealed that local people wanted to safeguard their source for home consumption (K. Rousset, *pers. comm.*).

³⁰ The PIF 1 priority species are; Marula, Manketti, melon seed, Makalani, Inara. The second team species are: *Berchemia discolor* (Bird Plum, Brown Ivory), *Ximenia spp* (Sourplum), *Diospyros mespiliformis* (Jackal Berry), *Adansonia digitata* (Baobab).

identified and production rate and quantity of products produced at a time must be dependent on the amount of available resources, taking factors such as seasonality into consideration.

6.3 Identification of declining species

Declining or endangered species that are being used need to be identified. These can then be given special protection status (if they do not have them already). Currently the harvesting of wild fruits, vegetables and many roots and tubers eaten or used for traditional medicinal purposes is not closely monitored. Recently there has been an increase in harvest of Devil's Claw (*Harpagophytum spp*) for sale in Caprivi, even though the species is said to have no market in Caprivi (Ben Bennett, *pers. comm.*, P. Lindeque, *pers. comm.*)

6.4 Community hunting as an option to reduce illegal bushmeat use

The introduction of community hunting should be considered as this increases the sense of ownership already felt by most people (especially those in conservancy areas) towards wildlife. This also prevents traditional knowledge of hunting from being lost. Traditional and cultural practices should be incorporated in game meat use³¹ options for conservancies. Although there are no own-use quotas for Caprivi conservancies due to low wildlife numbers, apparently the abundant hippo population may have potential for use in an own-use quota system (S. Mayes, *pers. comm.*).

6.5 Site-specific exclusion with new tourism land-use plans

Consideration must be given to local people's wild food harvesting activities at key sites that are identified for conservation or tourist use, as this new land use will most likely preclude their wild food harvesting activities.

6.6 Benefit distribution to mitigate wild food use

Poor people need to be identified and benefits channelled to them, which could help reduce their dependence on wild food, especially bushmeat.

6.7 Environmental education and sustainable harvesting of natural resources

Teaching communities about the environment and sustainable harvesting of resources is important for increased awareness of sustainable utilisation. Respondents said IRDNC and conservancy environmental awareness programmes have helped educate people on the importance of NRs and sustainable harvesting of some of the NRs.

6.8 Cultivation of wild-plant species and domestication of some wild animal species

Some wild fruits have been successfully cultivated in other countries for increased production of resources to combat hunger and starvation and help food security, e.g. Marula tree plantations have been successful in Israel. Domestication of some of the wild animal species used for bushmeat can increase production of these species and reduce dependence on hunting. Guinea fowl is a good example of a species that have been successfully domesticated.

³¹ Conservancies in Namibia have the right to utilise huntable game species depending on the availability of the species in the conservancy.

7. REFERENCES

- Abbott, J. 2003. The 2002 joint frame survey of fisheries on the Upper Zambezi River (Namibia/Zambia). *DEA Research Discussion Paper No. 58*. Windhoek: MET
- Ashley, C. 1998. Intangibles matter: Non-financial dividends of CBNRM in Namibia. *WWF-Life report*. Windhoek
- Ashley, C., and La Franchi, C. 1997. Livelihood Strategies and rural households in Caprivi. Implications for conservancies and Natural Resource Management. *DEA Research Discussion Paper No. 20*. Windhoek: MET
- CRIAA SA-DC. 2000. Opportunities and support services capacity for rural micro-enterprise development in the Kavango and Caprivi Regions, Namibia. *Prepared for DFID - Southern Africa Namibia Field Office*
- CRIAA SA-DC. 2003. Marketing study for non-timber forest products for the north-eastern regions of Namibia. *Prepared for The Namibia-Finland Forestry Programme*.
- Diggle, R. 2003. A Business Assessment of Community-based Tourism in Caprivi. *MSc thesis in Tourism, Conservation and sustainable development*. UK: University of Greenwich
- Egoh, B.N. 2002. Spatial pattern of natural resource use by communities in eastern Caprivi. *Msc thesis in Conservation Biology*. RSA: Fitzpatrick Institute of African Ornithology, University of Cape Town.
- Elliot, J. 2002. Wildlife and poverty study. *DFID Livestock and Wildlife advisory group (LWG)*. UK: DFID
- GRN. 1975a. Nature Conservation Ordinance 1975 (No 4 of 1975). *Chapter 3, Subsection 28 (a)*
- GRN. 1975a. Nature Conservation Ordinance 1975 (No 4 of 1975). *Chapter 2, Subsection 18 (g)*
- Halstead, L. 2003. Making community-based tourism work – An assessment of factors contributing to successful CBT development in Caprivi, Namibia. *DEA Research Discussion Paper No. 60*. Windhoek: MET
- Jones, B.T. 1996. Institutional relationships, capacity and sustainability. Lessons learned from a community-based conservation project, eastern Tsumkwe District, Namibia, 1991-1996. *DEA Research Discussion paper No. 11*. Windhoek: MET
- Long, S.A. 2002. An overview of processes and methods for household level research. Windhoek
- MAWRD. 1999. Farm-Household Economics Survey of the Caprivi Region Namibia, Sept 1996-June 1997. *Analysis Report 1*. Windhoek: Directorate of Planning, MAWRD
- Mendelsohn, J. and Roberts, C. 1998. An environmental profile and atlas of Caprivi. Windhoek: Gamsberg Macmillan
- MET. (Year unknown). Caprivi tourist guide. Katima Mulilo, Namibia: MET
- Mulonga, S., Suich, H. and Murphy, C. 2003. The conflict continues: Human wildlife conflict and livelihoods in Caprivi. *DEA Research Discussion Paper No. 59*. Windhoek: MET
- Murphy, C. and Mulonga, S. 2002. A Profile of the Livelihoods of People in Two Conservancies in Caprivi. *WILD Working Paper No 7*. Windhoek: MET
- Murphy, C. and Mulonga, S. 2003. Senior community rangers' workshop in Caprivi. *WILD Working Paper No. 13*. Caprivi, Namibia: MET
- Murphy, C. 2002. Proceedings of workshops to evaluate five community-based tourism enterprises in Caprivi. *WILD Working Paper No. 10*. Windhoek: MET
- Murphy, C. 2003. Proceedings of WILD Project feedback workshops in Caprivi. *WILD Working Paper No. 19*. Windhoek: MET
- Murphy, C. and Suich, H. 2003 Mashi Craft Market – Crafts and livelihoods in Caprivi. *DEA Research Discussion Paper No. 57*. Windhoek: MET

- NASSP. 2003. Proceedings of the 2nd National Indigenous Fruit Stakeholders Workshop. Tsumeb, 8-9 May 2003. *NASSP Workshop Report No. 1/2003*. Windhoek.
- Omoror, L. and Otsub, M. 2002. An assessment of the forest resources of Salambala Conservancy. A participatory rural appraisal report. *DOF-NFFP programme*. Katima Mulilo, Namibia.
- Øakland, F., Hay, C.J., Naesje, T.F. and Thorstad, E.B. Movements and habitat utilisation of cichlids in the Zambezi River, Namibia. A radio telemetry study in 1999-2000. *NINA-NIKU Project report Number 011*. Windhoek: Directorate of Resource Management: MFMR
- Purvis, J. 2002a. Post-harvest fisheries on the eastern floodplains, Caprivi. *DEA Research Discussion Paper No. 51*. Windhoek: MET
- Purvis, J. 2002b. Fish and livelihoods: Fisheries on the eastern floodplains, Caprivi. *DEA Research Discussion paper No. 52*. Windhoek: MET
- Rice, M. 1997. IRDNC Community-based Natural Resource Management Project in the Caprivi Region of Namibia. *Unpublished*. Caprivi, Namibia: IRDNC
- Rodwell, T.C., Tagg, T. and Grobler, M. 1995. Wildlife Resources in Caprivi, Namibia: The results of an aerial census in 1994 and comparisons with past surveys. *DEA Research Discussion paper No. 9*. Windhoek: MET
- Roodt, V. 1998. Trees and shrubs of the Okavango Delta. Medicinal uses and nutritional value. Gaborone, Botswana: Shell oil Botswana (PTY) Ltd
- Stephanus, K., Msangi, J. and Fuller, B. 2002. Shared fisheries resource management on the Zambezi/Chobe River systems. Household survey. Windhoek: UNAM
- Stuart-Hill, G. 2003. Implementation Manual for the Conservancy Monitoring System (The 'Event Book System'). *Working draft, 13/01/03*
- Stuart-Hill, G., Ward, D., Munali, B. and Tagg, J. 2003. The Event Book System: a community-based natural resource monitoring system from Namibia. *Working draft, 13/01/03*. Natural Resource Working Group. Namibia: Association of Conservancy Support Organisations
- Suich, H. and Murphy, C. 2002. Crafty women: The livelihood impact of craft income in Caprivi. *DEA Research Discussion paper No. 48*. Windhoek: MET
- Suich, H. 2002. Summary of partial results from the socio-economic household survey regarding CBNRM and livelihoods in Caprivi and Kunene. *WILD Project Working Paper No. 12*. Windhoek: MET
- Tvedten, I. *et al.* 1994. Freshwater fisheries and fish management in Namibia. A socio-economic background. Windhoek: SSD, MRC, UNAM
- Van Rhyn. 1995. Working document on field observations in West Caprivi. *Social Science Division Discussion Paper No. 12. Multi-Disciplinary Research Centre*. Windhoek: UNAM
- Van Wyk, B. and Gericke, N. 2000. People's plants. A guide to useful plants of southern Africa. *Briza publication*. Pretoria, RSA.
- Yaa Ntiamo, B. 1997. Wildlife and food security in Africa. *FAO Conservation Guide No. 33*. Rome, Italy: FAO

Personal Communication

Ben Bennet, Technical Advisor, Ministry of Agriculture, Water and Rural Development
 Dr Clinton Hay, Chief Fisheries Biologist, MFMR, Hardap
 Bronah Kamwi, SDA church member
 Dr Pauline Lindeque, Director Scientific Services, MET, Windhoek
 Carol Murphy, Senior Field Researcher, WILD Project Caprivi
 Karin Rousset, IRDNC facilitator, Caprivi Region
 Morgan Maiba Saisai, CBNRM warden, Caprivi Region



APPENDIX 1: BUSHMEAT SPECIES UTILISED BY HOUSEHOLDS INTERVIEWED

<i>Common Name</i>	<i>Silozi Name</i>	<i>Latin Name</i>
<u>Mammals</u>		
Common duiker	Kaputi	<i>Cephalophus grimmia</i>
Springhare	Kankuyu	<i>Pedetes Capensis</i>
Scrub hare	Shakame	<i>Lepus saxatilis</i>
Reedbuck	Mutobo	<i>Redunca arundinum</i>
Impala	Pala	<i>Aepyceros melampus</i>
Roan Antelope	Nkwalata	<i>Hippotragus equinus</i>
Sable	Nkwalata	<i>Hippotragus niger</i>
Warthog	Ngili	<i>Phacochoerus aethiopicus</i>
Bush pig	Sipongo	<i>Potamochoerus porcus</i>
Porcupine	Licakala	<i>Hystrix africae australis</i>
Steenbok	Kahu	<i>Raphicerus campestris</i>
Buffalo	Nali	<i>Syncerus caffer</i>
Kudu	Tolo	<i>Tragelaphus strepsiceros</i>
Hippopotamus	Kubu	<i>Hippopotamus amphibius</i>
<u>Bird species</u>		
Dove	Liiba	different dove species
Hornbill	Sikobe	different hornbill species
Francolin	Likwali	different francolin species
Helmeted Guinea fowl	Likaka	<i>Numida meleagris</i>
Water ducks	Lifuli	different water ducks
<u>Predators</u>		
Spotted genet	Sipa	<i>Genetta genetta</i>
<u>Other Species</u>		
Tortoise	Kulu	unknown

APPENDIX 2: POACHING INCIDENTS RECORDED BY MET FOR 1998-2003

Date	Locality	Species	Date of incident	Method used	Additional info
28/9/98	K/farm	duiker	26/09/98	2.2 rifle	2.2 fitted with a silencer, binocular, spotlight
30/09/98	W/caprivi	hippo	24/09/98	Ak 47 rifle	NA
19/10/98	W/caprivi	eland	24/06/98	G3 rifle	NA
10/5/99	Choi	elephant	5/5/1999	G3 rifle	NA
9/11/98	Lizauli	hippo	NA	375 rifle	NA
24/05/99	Ikumwe	pangolin	18/05/99	none	live sale of pangolin
8/12/98	Mudumu NP	impala	NA	shortgun	NA
18/06/99	Mudumu NP	3 elephant	NA	K502211 rifle	4 pairs of tusks recovered
30/06/99	Sauzuo, Mbambazi	2 elephant	NA	NA	one pair of tusks recovered
8/7/99	NA	elephant	NA	NA	possession of two elephant tusks (lady)
1/9/99	Ngoma	2 zebra	NA	303 & 243 rifles	NA
13/10/99	Schukmansburg	elephant	NA	NA	removal of carcass already poached
13/10/99	Malindi	elephant	NA	30.06 rifle	NA
15/11/99	Choto	pangolin	12/11/1999	NA	live sale of pangolin, Zambian national
17/11/99	Botswana	buffalo	13/11/99	shortgun	NA
25/01/00	Ngoma	elephant	NA	NA	possession of one tusk, Zambian national
12/2/00	Salambala	duiker	12/2/2000	shortgun	one suspect arrested
21/03/00	Mamili	hippo	21/03/00	308 rifle	NA
28/03/00	Mamili	buffalo	28/03/00	Ak 47 rifle	NA
11/5/00	Mudumu NP	impala	NA	2.2 rifle	NA
22/06/00	W/caprivi	impala	NA	shortgun	case cancelled because the suspect was fined by Mayuni khuta
6/7/00	Lizauli	pangolin	NA	NA	Sale of pangolin skin
7/8/00	Mbambazi	hippo	NA	Ak 47 rifle	possession of game meat
5/1/01	Mashi	kudu	NA	shortgun	NA
22/12/00	Wuparo	buffalo	NA	Ak 47 rifle	NA
12/2/01	Kwandu	hippo	NA	NA	possession of unlicensed automatic fire arm
NA	Lizauli	elephant	23/02/01	NA	possession of two elephant tusks, 2nam and 2
5/3/01	NA	hippo	NA	Ak 47 rifle	possession of two tusks, Zambian national
8/5/01	Batubanja	hippo	NA	NA	NA
1/06/01	Singalamwe	10 doves	NA	Poison	NA
1/07/01	Namushasha		NA	NA	NA
1/07/01	Mamili	buffalo	NA	Ak 47 rifle	NA
1/07/01	NA	eland	NA	Ak 47 rifle	soldier involved
6/5/01	W/caprivi	sable	NA	Ak 47 rifle	NA
6/11/00	Bwabwata	reedbuck	NA	Shortgun	the reedbuck was not shot at the spot
30/09/01	Makoma/kasika	6 buffalo	NA	Ak 47 rifle	rifle not confiscated
23/02/02	Kwandu	duiker	NA	shortgun	NA
11/5/02	Botswana	buffalo	NA	Ak 47 rifle	NA
11/5/02	Botswana	lion, buffalo	11/5/2002	Ak 47 rifle	NA
20/06/02	NA	buffalo	NA	308 rifle	NA
7/7/02	Mamili	warthog	NA	NA	NA
6/8/02	Lizauli	2 elephant	NA	NA	NA
20/08/02	NA	elephant	NA	NA	NA
21/08/02	Ivilivinzi	elephant	NA	308 rifle	two tusks recovered
29/08/02	State forest	duiker	NA	308 rifle	NA

29/08/02	NA	waterbuck	NA	dogs and spear	removal of carcass
24/09/02	NA	hippo	NA	Ak 47	NA
28/11/02	NA	hippo	NA	NA	NA
28/11/02	NA	elephant calf	NA	NA	NA
30/04/03	Kasaya	2 duiker	NA	Canoe & sticks	NA
24/04/03	Kasaya	lechewe	NA	Canoe & sticks	NA
24/04/03	NA	buffalo	NA	NA	buying of game meat already poached
24/04/03	NA	elephant	NA	NA	one pair of tusks recovered
24/04/03	Lizauli	elephant	NA	NA	17 pairs of tusks recovered

APPENDIX 3: PREFERRED BUSHMEAT SPECIES OF HOUSEHOLDS

Mayuni	Ngoma	Linyanti
Duiker	Duiker	Duiker
Impala	Reedbuck	Francolin
Guinea fowl	Francolin	Reedbuck
Bush pig	Rabbits	Water ducks
Tsessebe	Impala	Guinea fowl
Kudu	Porcupine	Warthog
Lechwe	Warthog	Kudu
Eland		Porcupine
Kamunda		Rabbits

APPENDIX 4: SOME PLANT SPECIES USED FOR FOOD IN CAPRIVI

Silozi/Sisubia/Sifwe	Common Name	Latin Name	Type ³²	Season	Dried	Abundance ³³
Bisansa	Mbilingwa	<i>Phoenix reclinata</i>	3	Rain	no	5
Delele	Ligusha	<i>Corchorus tridens</i>	4	Rain	yes	5
Buonde	Blue water lily	<i>Nymphaea nouchali</i>	4,5	Year round	yes	5
Mbowa	Mushroom	NA	4	Rain	yes	1
Mondo	NA	NA	NA	Spring	no	5
Mubula	Mobola plum	<i>Parinari curatellifolia</i>	3	Rain	NA	NA
Mabilo	Wild medlar	<i>Vangueria infausta</i>	3	Winter	yes	
Muhuluhulu	Monkey apple	<i>Strychnos spinosa</i>	3	Summer	no	5
Muhuluhulu	Monkey orange	<i>Strychnos pungens</i>	3	summer	no	5
Mubuyu	Baobab	<i>Adansonia digitata</i>	3	Rain	no	5
Mucaba	Sycamore fig	<i>Ficus sycomorus</i>	3	Year round	yes	5
Mucenje	Jackal Berry	<i>Diospyros mespiliformis</i>		Summer	yes	5
Muchika	NA	NA	NA	Winter	no	5
Muhwana	Velvet raisin bush	<i>Grewia flava</i>	3	Winter	yes	5
Mukononga	African mangosteen	<i>Garcia livingstonei</i>	3	Autumn	no	5
Mulula	Marula	<i>Sclerocarya birrea</i>	3	Winter	no	5
Munganda	Makalani palm/Real fan palm	<i>Hyphaena petersiana</i>	3	Autum	yes	5
Mupundu	Kalahari sand raisin	<i>Grewia retinervis</i>	3	Winter	yes	5
Mukisa	Zulu milkberry	<i>Manilkara concolor</i>	3	Rain	no	-
Mutente	Blue sourplum	<i>Ximenia americana</i>	3	Rain	no	1
Chiminashakati	Large sourplum	<i>Ximenia caffra</i>	3	Rain	no	5
Muzinzila	Brown ivory	<i>Berchemia discolor</i>	3	Rain	yes	5
Manyangwe	Marama bean	<i>Tylosema esculanta</i>	5	Year round	no	NA
Tanga Lyanyambe	Jelly melon	<i>Cucumis metuliferus</i>	3	Rain	no	4
Mwanawakula	Cowpea	<i>Vigna unguiculanta</i>	1	NA	yes	NA
Kalyulyu	Wild gherkin	<i>Cucumis anguria</i>	3	NA	no	NA
Muomba	Wild grape	<i>Lennea edulis</i>	3	NA	no	3
Injilikilwa	Uintjie	<i>Cyperus fulgens</i>	5	Rain	no	5
Umbwiti	Gembok cucumber	<i>Acanthosicyos naudiana</i>	3	Rain	no	5
Sishingwa	African cabbage	<i>Cleome gynandra</i>	4	Rain	no	5

NA=Not Available

³² Type of wild food as indicated in Appendix 4: 1=Cereals; 2=Seeds and nuts; 3=Fruits and berries; 4=vegetables; 5=Roots, bulbs and tubers.

³³ Abundance of species as indicated by people interviewed in Ngoma, Linyanti and Mayuni areas: Scale 1-5: 1=less abundant, 5=very abundant.

APPENDIX 5: CURRENT AND POTENTIAL USES OF SOME PLANT AND ANIMAL SPECIES USED FOR FOOD IN CAPRIVI

Common Name	Latin Name	Uses	Potential uses of some of the resources (Sources: Roodt 1998 and van Wyk and Gericke 2000)
Animals			
Porcupine	<i>Hystrix africaeaustralis</i>	Meat is eaten. The spikes of the porcupine are used as medicine for sick people (type of disease not indicated).	
African Elephant	<i>Loxodonta africana</i>	Meat is eaten. Faeces used to cure blood-related diseases including excessive menstruation.	
African Python	<i>Python sebae natalensis</i>	Meat is eaten. Bones and skin of python used for medicine. Fat used as lotion to put on when a person is going into the veld. It is believed that such a person cannot be bitten by snakes.	
Steenbok	<i>Raphicerus campestris</i>	Meat is eaten. Skin is used as medicine (type of disease not indicated).	
Plants			
Sycamore Fig	<i>Ficus sycomorus</i>	Edible fruits. Leaves are used to treat cough. Roots used to treat a disease called Njangula. Used to treat people who pass out.	Wood ideal for making drums.
Marula	<i>Sclerocarya birrea</i>	Fruit is eaten. It is also used to make an alcoholic drink and jam, leaves are used to treat diarrhoea.	Fruits can be used to make oil and soap. Ideal for making pestles to stamp grain. Jelly can be made from the pulp. Roots are a source of water. Can be used to preserve meat for up to six months. Oil is extracted from the nut. This can either be used as a condiment/cooking oil (although quite expensive if used for this purpose) or as a massage/moisturising body oil. The oil can also be used to make soaps.
Brown Ivory	<i>Berchemia discolor</i>	The fruit is edible. The bark is used as die for baskets. Roots are used to cure toothache.	Can be used to prepare an alcoholic beverage by adding water and allowing it to ferment.
Wild date palm	<i>Phoenix reclinata</i>	The fruit is edible. Roots are used to cure toothache.	During spring, the sap can be tapped for the preparation of a very potent alcoholic beverage. This species is a relative of the commercial date palm, <i>phoenix dactylifera</i> , that is not indigenous to southern Africa. Although wild date palm yields less pulp it is still quite palatable. Thus potential markets can be found.
Velvet raisin bush	<i>Grewia flava</i>	The fruits are edible and are also used for making an alcoholic drink.	
Wild medlar	<i>Vangueria infausta</i>	The fruit is edible. Root used to protect a child against diarrhoea if the mother is pregnant.	

Candle-pod Acacia	<i>Acacia hebeclada</i>	Roots are used to heal syphilis.	
Zulu Milkberry	<i>Manilkara concolor</i>	The fruit is edible. Roots are used to heal syphilis.	
Monkey Orange	<i>Strychnos Pungens</i>	The fruit is edible. It is also used to cure back bone (part of plant used not indicated).	It is widely held that unripe fruits and seeds of this species can help ease snake bites (Cobra and Mamba attacks). There maybe a scientific rationale behind this since strychnine or strychnine-type alkaloids that are found in the seeds of this plant may overcome the respiratory depression that causes death in cobra and mamba bites. Containers can be made from the dry fruit.
Mukanangwe	-	For chasing away evil spirits.	
Sausage tree	<i>Kigelia Africana</i>	Used by men to induce their sexual appetite.	Sunburn cream can be produced from this tree. It has been produced in Victoria Falls, Zimbabwe, and in South Africa.
African Mangosteen	<i>Garcia livingstonei</i>	The fruit is edible, also used to stop running stomach (part of plant used not indicated).	An alcoholic beverage can be prepared from the fruit by allowing it to ferment. A liquor can be distilled by soaking the fruits in alcohol and then thickening the abstract with sugar syrup. The tree also yields an edible gum.
Muchika	-	Used to treat infertility.	
Baobab	<i>Andasonia digitata</i>	The fruit is edible. This species is used to treat a wide range of illnesses such as madness, <i>njangula</i> , and evil spirits.	The fruit pulp can be used as a substitute for yeast. Tartaric acid, potassium acid tartrate and citric acid has been found in the fruit. The fruit pulp yields one of the highest known contents of Vitamin C, mixed with water it makes a slightly acid but very refreshing drink. The shoots of the germinating seeds can be used as asparagus. The roots of a young baobab are edible. Bulbs and terminals of roots can be used to make porridge. A gum is obtained although bitter it is edible. The fluid extracted from the trunk can be used to dilute milk. The ash from the burnt wood can be used as a substitute for table salt.
Unkatula	-	Leaves are chewed by women suffering from heavy periods.	

APPENDIX 6: WILD FOOD RECORDING TABLES

Bushmeat recording table

Week	Date of harvest	Species (age,sex)	Day hunt	Night hunt	Overnight hunt	Time hunting (hours)	No. of whole animals	Method (e.g. gun, snare, dog, spear)	Portion eaten	Portion sold	Age of hunter

Wild plant harvest recording table

Week	Date of harvest	Species collected	Type of plant	Time to collect (hrs)	No. of people	Quantity	Sold N\$ per unit (Kg, cup)	Amount consumed (container)	Comments

APPENDIX 7: WILD FOOD QUESTIONNAIRE

Questionnaire No. _____ Number _____

Version 6 (03 November 2002)

Wild Food Use Household Survey Questionnaire-Significance On Livelihoods

Wild resources use part of WILD Project
Prepared by **Samson Mulonga** (WILD Project Caprivi)

Enumerator _____
Supervisor Check _____

Age _____	Gender _____
Area _____	Level of cooperation: 1.L 2.M. 3. H
Village _____	Date _____
Conservancy _____	No of people in HH _____
Wealth status (No. of cattle more than 3 secure, less than 3 insecure) _____	

1) What types of resources do you normally harvest? (Please indicate in order of importance the top 5)

Plants (circle option)	Animals (circle option)
1. Wild fruits	1. Guinea fowl
2. Honey	2. Duiker
3. Palm	3. Springhare
4. Wild vegetables	4. Francolin
5. Water lilies	5. Rabbits
6. Plants for medicines	6. Others Specify
7. Others Specify _____	_____
_____	_____
_____	_____

1a) Which of the top 5 are the most important for money and which ones are important for food?

Money	Food
1)	1)
2)	2)
3)	3)
4)	4)
5)	5)

1b) What is the most important reason for you harvesting natural resources?

Reason
1. Food
2. Cash Income
3. Both
4. Other (specify)

2) How regularly do you go for harvesting/hunting (your top five)?

Frequency	Time scale (day, month, week etc)	Natural resources	Animals
Once			
Twice			
3-4 times			
5-6 times			
More than 6 times			



Other Research Discussion Papers in this series (continued)...

20. **Ashley, C. and LaFranchi, C. 1997.** Livelihood strategies of rural households in Caprivi: Implications for conservancies and natural resource management. *DEA Research Discussion Paper 20.* 96pp.
21. **Byers, BA. (Roberts, CS., ed.) 1997.** Environmental threats and opportunities in Namibia: A comprehensive assessment. *DEA Research Discussion Paper 21.* 65pp.
22. **Day, JA. (Barnard, P. ed.) 1997.** The status of freshwater resources in Namibia. *DEA Research Discussion Paper 22.* 46pp.
23. **O'Toole, MJ. (Barnard, P. ed.) 1997.** Marine environmental threats in Namibia. *DEA Research Discussion Paper 23.* 48pp.
24. **Jones, BTB., 1997.** Parks and resident peoples. Linking Namibian protected areas with local communities. *DEA Research Discussion Paper 24.* 39pp.
25. **Environmental Evaluation Unit, University of Cape Town (Tarr, JG., ed.) 1998.** Summary report of a retrospective study of the environmental impacts of emergency borehole supply in the Gam and Khorixas area of Namibia. *DEA Research Discussion Paper 25.* 27pp.
26. **Auer, C. 1998.** Water availability and chemical water quality as important factors for sustainable wildlife management in the Etosha National Park and for domestic stock in farming areas of Namibia. *DEA Research Discussion Paper 26.* 30pp.
27. **Barnes, JI. 1998.** Wildlife conservation and utilisation as complements to agriculture in southern African development. *DEA Research Discussion Paper 27.* 18pp.
28. **Blackie, R. and Tarr, P. 1998.** Government policies on sustainable development in Namibia. *DEA Research Discussion Paper 28.* 21pp.
29. **Blackie, R. 1998.** Communities and natural resources. Trends in equitable and efficient use. *DEA Research Discussion Paper 29,* in press.
30. **Tarr, P. 1999.** Knowledge, opinions and attitudes regarding Environmental Assessment in Namibia: Results of a national survey conducted in 1997. *DEA Research Discussion Paper 30.* 20pp.
31. **Simmons, RE., Barnes, KN., Jarvis, AM. and Robertson, A. 1999.** Important bird areas in Namibia. *DEA Research Discussion Paper 31.* 66pp.
32. **Environmental and Geographical Science Masters Students, University of Cape Town (Blackie, R. ed.) 1999.** A preliminary environmental assessment of Namibia's resettlement programme. *DEA Research Discussion Paper 32.* 29pp.
33. **Robertson, A. and Jarvis, AM. 1999.** Bird data in Namibia: A model for biodiversity information system development. Avifaunal database user manual. *DEA Research Discussion Paper 33.* 122pp.
34. **Tarr, P. and Figueira, M. 1999.** Namibia's Environmental Assessment framework: The evolution of policy and practice. *DEA Research Discussion Paper 34.* 20pp.
35. **Margules, C. (Barnard, P. ed.) 1999.** Biodiversity planning and monitoring in Namibia. *DEA Research Discussion Paper 35.* 27pp.
36. **Nghileendele, NP and Uisso, V. 1999.** The state of Namibia's freshwater environment. *DEA Research Discussion Paper 36.*
37. **Nghileendele, NP and Uisso, V. 1999.** The state of Namibia's socio-economic environment. *DEA Research Discussion Paper 37.*
38. **McGann, JA. 1999.** The Environmental Investment Fund: An initiative for the conservation and protection of the environmental and natural resource base of Namibia. *DEA Research Discussion Paper 38.* 57pp.
39. **McGann, JA. 1999.** Towards the establishment of the Environmental Investment Fund: Opportunities, constraints, and lessons learned. *DEA Research Discussion Paper 39.* 47pp.
40. **Jones, BTB. and Mosimane, A. 2000.** Empowering communities to manage natural resources: where does the new power lie? Case studies from Namibia. *DEA Research Discussion Paper 40.* 32pp.

continued overleaf...



Other Research Discussion Papers in this series (continued)...

41. **Corbett, A. and Jones, BTB. 2000.** The legal aspects of governance in CBNRM in Namibia. *DEA Research Discussion Paper 41.* 25pp.
42. **Barnes, JI., MacGregor, J. and Weaver, LC. 2001.** Economic analysis of community wildlife use initiatives in Namibia. *DEA Research Discussion Paper 42.* 20pp.
43. **Poonyth, D., Barnes, JI., Suich, H. and Monamati, M. 2001.** Satellite and resource accounting as tools for tourism planning in southern Africa. *DEA Research Discussion Paper 43.* 21pp.
44. **Suich, H. 2001.** Development of preliminary tourism satellite accounts for Namibia. *DEA Research Discussion Paper 44.* 20pp.
45. **Krug, W., Suich, H. and Haimbodi, N. 2002.** Park pricing and economic efficiency in Namibia. *DEA Research Discussion Paper 45.* 31pp.
46. **Krugmann, H. 2002.** Fundamental issues and the threats to sustainable development in Namibia. *DEA Research Discussion Paper 46.* 50pp.
47. **Humavindu, MN. 2002.** An econometric analysis of fixed investment in Namibia. *DEA Research Discussion Paper 47.* 22p.
48. **Suich, H. and Murphy, C. 2002.** Crafty women: The livelihood impact of craft income in Caprivi. *DEA Research Discussion Paper 48.* 31pp.
49. **Humavindu, MN. 2002.** Economics without markets: Policy inferences from nature-based tourism studies in Namibia. *DEA Research Discussion Paper 49.* 23pp.
50. **Barnes, JI., Zeybrandt, F., Kirchner, CH. and Sakko, AL. 2002.** The economic value of Namibia's recreational shore fishery: A review. *DEA Research Discussion Paper 50.* 21pp.
51. **Purvis, J. 2002.** Postharvest fisheries on the eastern floodplains, Caprivi. *DEA Research Discussion Paper 51.* 29pp.
52. **Purvis, J. 2002.** Fish and livelihoods: Fisheries on the eastern floodplains, Caprivi. *DEA Research Discussion Paper 52.* 44pp.
53. **Long, SA. 2002.** Disentangling benefits: Livelihoods, natural resource management and managing revenue from tourism. The experience of the Torra Conservancy, Namibia. *DEA Research Discussion Paper 53.* 22pp.
54. **Lange, G-M. 2003.** The contribution of minerals to sustainable economic development: Mineral resource accounts in Namibia. *DEA Research Discussion Paper 54.* 29pp.
55. **Lange, G-M. 2003.** The value of Namibia's commercial fisheries. *DEA Research Discussion Paper 55.* 19pp.
56. **Lange, G-M. 2003.** National wealth, natural capital and sustainable development in Namibia. *DEA Research Discussion Paper 56.* 15pp.
57. **Murphy, C. and Suich, H. 2003.** Mashu Craft Market - Crafts and livelihoods in Caprivi. *DEA Research Discussion Paper 57.* 29pp.
58. **Abbott, J. with C. Hay, M. Kalonga, T. Naesje and J. Purvis, 2003.** The 2002 joint frame survey of fisheries of the Upper Zambezi River (Namibia/Zambia). *DEA Research Discussion Paper 58.* 39pp.
59. **Mulonga, S., Suich H., and Murphy, C. 2003.** The conflict continues: Human wildlife conflict and livelihoods in Caprivi. *DEA Research Discussion Paper 59.* 29pp.
60. **Halstead, L. 2003.** Making community-based tourism work: An assessment of factors contributing to successful community-owned tourism development in Caprivi. *DEA Research Discussion Paper 60.*
61. **Murphy, C. and Halstead, L. 2003.** "The person with the idea for the campsite is a hero." Institutional arrangements and livelihood change of community-owned tourism enterprises in Namibia. *DEA Research Discussion Paper 61.*
62. **Mulonga, S. 2003.** Wild food: Use of natural resources for food in eastern Caprivi. *DEA Research Discussion Paper 62.* 41pp.

