FOREST MANAGEMENT PLAN FOR THE SALAMBALA CONSERVANCY CORE AREA

Namibia-Finland Forestry Programme

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TABLE OF CONTENTS

1. Introduction

2. Salambala Conservancy
   2.1 General
   2.2 Core area

3. Description of the area
   3.1 Location
   3.2 Physiography
      3.2.1 Climate
      3.2.2 Soils
      3.2.3 Vegetation

4. Stakeholders

5. Wildlife management
   5.1 Wildlife population
   5.2 Management strategies
      5.2.1 Game translocations
      5.2.2 Water points development
      5.2.3 Law enforcement
      5.2.4 Hunting quota

6. Development of tourism
   6.1 Current tourism
   6.2 Indirect strategies to attract tourism to Salambala
   6.3 Direct strategies to attract tourism to Salambala
   6.4 SWOT Analysis
   6.5 Tourism activities
   6.6 Proposed tourism development by NACOBTA feasibility study 2002

7. Agreement of collaboration

8. Management objectives
   8.1 General
   8.2 Overall management goals of the Conservancy
   8.3 The Management Objectives of the Core Area
      8.3.1 Wildlife
      8.3.2 Birds
      8.3.3 Tourism
      8.3.4 Forestry (wood and non-wood products)
      8.3.5 Conservation
8.3.6 National benefits
8.4. Management priorities in the core area
8.5 Objectives for forest management in the core area

9. Forest resources

9.1 Forest inventory
9.2 Inventory results
   9.2.1 Trees
   9.2.2 Shrubs and regeneration
9.3 Growth of trees
   9.3.1 General
   9.3.2 Growth estimates
   9.3.3 Prediction of diameter distribution

10. Resource utilization survey
  10.1 Objectives and methods of the survey
  10.2 Results
     10.2.1 Respondent rate
     10.2.2 Wood forest products from the broader Conservancy
     10.2.3 Non-wood forest products from the broader conservancy
     10.2.4 Wood products from the core area
     10.2.5 Non-wood forest products from the core area
     10.2.6 Preference of tree species for various products

11. Forest management strategy
  11.1 Research and experience in management
  11.2 Strategies derived from the management objectives
  11.3 Preserving biodiversity, protecting wildlife and promoting tourism
  11.4 Utilization of trees
  11.5 Silviculture
  11.6 Fire management (compiled by Jonas Mwiikinghi)
     11.6.1 Factors affecting the fire risk
     11.6.2 Recommendations for fire management

12. Harvesting potential
  12.1 Restrictions
  12.2 Allowable cut
  13.3 Revenue expected from the harvest

13. Harvesting plan
  13.1 Control by area and number of stems
  13.2 Selection of trees

13. Implementation of the plan
  13.1 Options for implementation
13.2. Collaboration with the District Forestry Office
13.3. Monitoring of the implementation

References

LIST OF MAPS

Map 1. Location of the Salambala Conservancy and the core area
Map 2. Harvesting blocks in the Salambala core area

LIST OF TABLES

Table 1. Different species of birds foraging in the Salambala Conservancy
Table 2. Number of stems per hectare of all species in diameter classes
Table 3. Average annual consumption of different wood products from the broader conservancy
Table 4. Average consumption of forest products from the core area
Table 5. Calculation of allowable cut of Colophospermum mopane (for an area of 5830 hectares)
Table 6. Calculation of allowable cut of Terminalia sericea (for an area of 5830 hectares)
Table 7. Harvesting proposal for Block 1

LIST OF FIGURES

Figure 1. Total annual rainfall in Katima Mulilo (1972-2000), Source: Namibia Meteorological Services, 2002)
Figure 2. Wildlife population in the Salambala Conservancy
Figure 3. Wildlife hunting quota in CWA for 2001-2
Figure 4. Average desirability of activities identified by the Salambala Management Committee
Figure 5. Diameter distribution of the three most frequent tree species
Figure 6. Mean annual increment of diameter at breast height for Colophospermum mopane and Terminalia sericea sample trees from Caprivi
Figure 7. Current and predicted diameter distribution of Colophospermum mopane
Figure 8. Current and predicted diameter distribution of Terminalia sericea

LIST OF APPENDICES

Appendix 1. SWOT Analysis for development of tourism (NACOBTA)
Appendix 2. Harvesting plan
Appendix 3. Satellite image of the core area
FOREST MANAGEMENT PLAN FOR THE SALAMBALA CONSERVANCY
CORE AREA – DRAFT

1. INTRODUCTION

The Forest Management Plan for the Core Area of Salambala Conservancy is the first attempt to utilize the forest resources in the conservancy on a planned basis. The core area is just a small part of the whole conservancy and more plans are needed to cover all forests in the conservancy. Also, the core area is a special area in the conservancy and management proposals given to it may not in many cases be applicable in other parts of the conservancy.

The plan fully recognizes the importance of wildlife management, tourism and biodiversity conservation in the area. For this reason, wildlife management and development of tourism have been discussed briefly in this management plan too. The forestry actions proposed should not contradict with the objectives of higher priority. The spirit of the plan is to be very cautious in utilizing the forest resources. There is no doubt that the forests can be utilized commercially and sustainably. However, lack of information on the dynamics of the forests as well as lack of experience in forestry practices among the Salambala Conservancy staff call for special caution now. In the future, the plan may be easily modified as more information and experience is gained.

The co-operation between the Salambala management committee and the District Forestry Office is crucial in the implementation of the plan. The committee needs supervision in many technical matters and that can only be provided by the staff of the Forestry Office. One of the recommendations of the plan is that an agreement of the forms and conditions of co-operation would be signed between the parties.

Forest management planning of the core area can be seen as a start only in the sustainable use of the forest resources of the conservancy. There is a great need to cover the broader conservancy with a forest management plan as well. Some work is already being carried out by DED in the area.

The forest management planning of the Salambala core area has been an exercise within the Namibia-Finland Forestry Programme. It has been one of the very first forest attempts of forest management planning in Namibia. Therefore, it has also played an important role in the capacity building of the Directorate of Forestry.
2. SALAMBALA CONSERVANCY

2.1. General

The Salambala Conservancy was created in 1994 and it belongs to the first generation of conservancies Namibia (Kamminga, 2001). The Conservancy was officially declared as a Conservancy in 1998 by the Minister of Environment and Tourism (Government Notice 146, 1998). The Constitution stipulates a broad mandate for the sustainable management of not only for wildlife but for all natural resources in general. The total conservancy consists of 93,300 hectares, including 14,000 hectares of the core area (Salambala Management Committee, pers comm.). The core area is designated for wildlife and tourism, and no grazing and illegal wood harvesting is allowed (Mutwa, pers comm.). Southern half of the Conservancy is bordered to the Chobe National Park in Botswana from where wildlife moves freely into the Conservancy. The northern half is classified as woodland namely, Mopane woodland and Kalahari Woodland east of the Katima Mulilo-Ngoma road (Mendelsohn and Roberts, 1997). The Conservancy core area is surrounded by 19 villages with a population of approximately 10,000 people (Katjiua, 1998).

Local people from surrounding communities utilize Salambala forest resources for subsistence needs (cropland, grazing, wood and non-wood forest products), cash earnings and for exchange and barter. According to Kamminga (2001), the 19 member-villages intensively utilize Salambala woodland area for grazing, fuel wood, and wood for construction (poles, rafters), implements, crafts materials, food, fodder and medicines. These resources are essential for their livelihood, including aspects of food security, health and social networks. In recent years it becomes evident that pressures on resources are increasing and conservation is necessary. Therefore, resources should be managed in a sustainable manner.

In 1967, legislation was introduced which allowed commercial farmers to own game on their farms. This provides farmers with an incentive to manage wild animals sustainably whilst receiving revenue from hunting and could hunt animals for their consumption. Yet, until recently rural communities were denied these rights. Hence, the conservancy programme aims at extending similar rights to communal areas and providing capacity building and support to optimize benefits from the sustainable use of natural resources.

By 1995, a policy was developed to formalize the devolution of rights over wildlife management to communal area residents and the national Community Based Natural Resource Management (CBNRM) programme was firmly established. Thus the Nature Conservation Ordinance 4 of 1975 was finally amended in 1996. This Nature Conservation Amendment Act, 1996 (Act 5 of 1996) makes provision for the establishment of Conservancies and Wildlife Councils in communal areas. The act uses Conservancies as the means by which limited rights to manage and benefit from wildlife and tourism are given to a specified group of people living within communal areas. The Act sets a number of conditions, which rural communities have to meet before a conservancy can be registered by the Minister Environment and Tourism. Resource management plan is one of the pre-requisite mentioned above to establish a conservancy.
The Tribal Authority (TA) has devolved rights to the Salambala Management Committee (SMC) to manage natural resources in the Salambala Core Area on behalf the TA and its communities. All nineteen villages have each elected one or more persons to represent them on the SMC. The Management structure ensures that the TA and the entire community are kept informed and their concerns are taken on board. The Salambala Conservancy is managed by 41 members of the Management Committee, including 10 Executive Committee members (Kamminga, 2001). There is about 20 fully employed staff including 1 environmental officer, 3 resource monitors, 8 game guards, 4 fencing crew and 3 campsite workers (Kamminga, 2001). The Salambala Management view that the management of forest resources will contribute positively towards the wildlife and tourism management criteria. The Salambala Management focuses on nature conservation, whilst economic motivations will contribute towards the financial improvement of the communities. The abovementioned Committees are making decisions at all levels for issues concerning the Conservancy. Generally, they receive technical advice from the other stakeholders such as WWF, DoF, Namibia Community Based Tourism Association (NACOBTA), Wildlife and Parks, NNF, and Integrated Rural Development and Nature Conservation (IRDNC).

2.2. Core area

The conservancy has a core wildlife area, whose boundaries on three sides have been declared in the Government Notice. There is no boundary on the southern side of the core area.

The core area is reserved for wildlife management and for tourism. The three sides have been fenced so that human interference through cattle grazing would not disturb wildlife. Also, no settlements and farming are allowed inside the core area. However, there are still people living inside the area as the conservancy has failed to move them out. Today, the fence is broken in many places and cattle seem to grazing there again.

The size of the core area is about 14 000 hectares. As there are very good forests in the core area, there is an interest to study the possibility for sustainable use of trees in order to increase the benefits of the community.

Most of the development activities have taken place in the core area. Most activities related to the core area have been centralized and controlled by the Executive Committee (Kamminga, 2001).

3. GENERAL DESCRIPTION OF THE AREA

3.1. Location

The Salambala Conservancy is situated approximately 47 kilometers northeast of Katima Mulilo along Ngoma-road in the Caprivi region. Its lies at 17 49’ South latitude and 24
34’ East longitudes (see Map 1). Topographically, Salambala is particularly flat. Its elevation is about 957 m above sea level (Mendelsohn and Roberts, 1997).

3.2. Physiography

3.2.1. Climate

The rainfall averages approximately 620 mm per annum (19 year mean between 1972/2000), with 95% of the rain falling between October and April. Figure 1 illustrates a relatively even total annual rainfall over the entire period of 1975 to 2000, although more than twice rainfall was received during 1974. The area is hot during the dry and wet seasons (summer) but cold in winter (June-August). Incidence of frost is insignificant in
this area. Mean maximum temperatures vary from 29 degree centigrade in July to 36 degree centigrade in January while the October figures maybe as high as 38 degree centigrade (Namibia Bureau of Meteorology, 2002). Average daily minimum temperatures vary between 15 and 20 degree Celsius in summer and 5 and 10 degree Celsius in winter (Lindesay et al., 1993).

![Rainfall Chart](image)

Figure 1. Total annual rainfall in Katima Mulilo (1972-2000), Source: Namibia Meteorological Services, 2002)

### 3.2.2. Soils

Salambala is part of the floodplains associated with the riverine drainage dominated by floodpans. Rivers flood these areas when good rains caused river levels to rise (Mendelsohn and Roberts, 1997). This area is covered in thick deposits of Kalahari sands, with very little of the underlying geology exposure (Mendelsohn and Roberts, 1997). The Salambala Conservancy is mostly underlain by deep, sandy soils, however there are some areas where loamy-sandy soils occur. Moreover, there are several floodpans with loamy-clay to pure clay soils.
3.2.3. Vegetation

The area is dominated by flood plains with lush grass cover and interspersed with open woodlands. The open woodlands have distinct communities characterized by *Baikiaea plurijunga* (teak), *Burkea Africana* (burkea), *Pterocarpus angolensis* (kiaat), *Ricinodendron rautanenii* (mangetti), *Guibourtia coleosperma* (false mopane), *Acacia erioloba* (camel thorn), *Terminalia sericea*, *Combretum imberbe* (lead wood), *Cumbersome collinum*, *Combretum hereroense*, *Hyphaena persiana*, *Lonchocarpus nelsii*, *Albizia harveyi*, *Ochna pulchra*, *Garcinia livingstonei*, *Commiphora angolensis*, and *Acacia nigrescens* (knob-thorn) trees are common in some areas, while *Colophospermum mopane* (Kirk ex Benth.) Kirk ex J. Leonard, commonly known as mopane, dominates in most parts of the core area (Brown and Jones, 1994).

Furthermore, the remainder portion is dominated by *Terminalia sericea* followed by *Combretum spp.*, (imberbe, collinum, heroense), *Acacia spp.*, and *Lonchocarpus nelsii*. The main thatching grasses found in the core area are *Itengenja* and *Kasisi*. Although, there is vast number of species in the Conservancy, the woody vegetation in the conservancy core area is dominated by *Colophospermum* but includes some *Terminalia sericea*, *Burkea Africana*, *Combretum spp.*, and *Acacia spp.*, stems.
4. STAKEHOLDERS

The Community-based Natural Resource Management (CBNRM) programme is a partnership between Government, local NGOs and the rural people of Namibia. In a nutshell, CBNRM works by encouraging communities to establish land management units called conservancies (Matengu, 2001). The government hoped that the CBNRM approach and the establishment of conservancies will stimulate rural economic development and further economically empower the majority of the Namibian citizens who inhabit rural areas (Matengu, 2001). The Ministry of Environment and Tourism has taken a lead in policy formulation and coordination of pilot programmes, but receives assistance from non-governmental and community-based organizations in community institution-building, skills and enterprise development and natural resource management (Kamminga, 2001, Matengu, 2001).

The Salambala Conservancy has been supported with grants, administration and technical assistance by the World Wildlife Fund-LIFE Project (WWF-LIFE), which is funded by USAID (Kamminga, 2001). However, the WWF-LIFE Project financial assistance will cease at the end of the August 2002. The project has procured a large number of wildlife (e.g., Common impala) from Botswana and from numerous other game reserves and translocated them to the Salambala Conservancy core wildlife management area (Matengu, 2001). The project has also funded costs for the erection of fence around the core area. It has also paid salaries for all administrative manpower and also paid allowances and running costs (Kamminga, 2001). The project has funded many training programmes which have built capacity of the Salambala Conservancy Management Committee up to the level where it is functioning now (Salambala Management Committee, pers. comm., 2001).

The Namibia Nature Foundation (NNF) has taken over all grant responsibilities for the conservancy. Thus, the NNF will assist the Conservancy with technical assistance and limited funding hereafter. NNF will try to ensure that the conservancy will get funding whether there is a need. Moreover, it has a role to evaluate, monitor and report on the progress of the conservancy (Chris Weaver, pers comm., 2002).

Integrated Rural Development and Nature Conservation (IRDNC) is a local organization currently working with 30 conservancies countrywide (Chris Weaver, pers. comm., 2002). It is a partner in the implementation of CBNRM programme together with MET, WWF-LIFE, NNF, NACOBTA, Rossing Foundation, University of Namibia and Legal Assistance Centre (Omoro, 2002). In past IRDNC was only playing an advisory role. The overall goal of the organization is to link social and economic development of rural communities into conservation of natural resources including wildlife. In Salambala Conservancy, IRDNC has established game guards and resource monitors who look after natural resources (Omoro, 2002). It also facilitates small enterprises (private and communal) development in the conservancy (Chris Weaver, pers. comm., 2002). It works with the management committee of the conservancy, who are elected members of the villages (communities) which constitutes the conservancy. It invests in capacity building for nature resources management and monitoring.
The Directorate of Forestry as the custodian of the forests has supported the conservancy to develop an integrated forest management plan and achievement of the objectives defined by the plan. The Directorate of Forestry has been active in compiling of a forest management plan for the core area. The DoF has helped the conservancy with technical and financial assistance for all necessary data acquisition, analyses and reporting. Implementation of the forest management plan of the core area will require good cooperation between DoF and SMC. Currently, due to the distance of the District Forestry Office from the conservancy, DoF has made arrangements with the SMC to issue forest harvesting permits in the eastern Caprivi (Martin Tubalele and Michael Kawana, *pers. comm.*, 2001). However, these arrangements were temporarily returned to the DoF due to some inconsistencies.

The Directorate of Wildlife and Parks, Parks division assists Salambala communities with the control of problem wild animals. In particular, it helps the conservancy in managing and monitoring wildlife. The Wildlife and Parks department of also allocates hunting quotas.

There are potential opportunities for community-based tourism (CBT) in Salambala. Out of the need for a communal property regime, a local organization called Community-Based Tourism Association (NACOBTA) was formed (Matengu, 2001). This association together with other bodies such as the Federation of Namibia Tourism Association (FENATA) promotes tourism in rural areas. The Namibia Community-Based Tourism Association (NACOBTA) is involved in planning of tourism at regional conservancies (Chris Weaver, *pers. comm.*, 2002). This association is promoting small enterprises such as guide tours, camping, village visits, crafting, game viewing and bird-watching which attract tourists to these remote areas. It also promotes joint ventures between private sector and rural community (Chris Weaver, *pers. comm.*, 2002). Finally, the Namibia Community-Based Tourism Association (NACOBTA) facilitates training in small and medium-sized enterprises in the Salambala Conservancy communities, so that the communities’ trainees being able to access soft loans and credit schemes (Matengu, 2001).

Furthermore, the Legal Assistance Centre (LAC) helps the conservancy to resolve legal conflicts. It also assists the conservancy with drafting and constituting of contractual issues. Finally, LAC facilitates practical capacity building in the villages (Chris Weaver, *pers. comm.*, 2002).

The University of Namibia (UNAM) has been also involved in many student programmes with the conservancy. It is promoting capacity building in the conservancy. It has been involved in socio-economic research and valuation assessment of nature resources in the Salambala Conservancy. It has also conducted a SWOT analysis with Salambala Management Committee (Chris Weaver, *pers. comm.*, 2002).
Furthermore, the Rossing Foundation has a booklet of 23 modules in CBNRM programme of which 2-3 have been offered to the Salambala Conservancy. These modules have included aspects such as committee roles, responsibilities, benefits distribution, joint venture, communication skills, negotiation, conservancy awareness and registration, constitution and implication in support of CBNRM (Paul Collair, pers. comm., 2002). Rossing Foundation is assisting the conservancy to compile a policy document which includes a job description for all conservancy employees. This document will help Salambala Management to counteract labour conflicts effectively (Paul Collair, pers. comm., 2002). Overall, Rossing Foundation focuses in a transferal of skills on partners so that the latter can take up further for training needs.

Finally, the Ministry of Fisheries and Marine Resources has allocated funds for the transboundary fishery management. Their overall aim is to integrate fishery resources into umbrella conservancy (Chris Weaver, pers. comm., 2002).

The Namibia-Finland Forestry Programme Phase I carried out a forest inventory of the core area and conducted training in how to conduct forest inventory including actual measurement of trees, shrubs and groundcover species and identification of species. Moreover, training in prevention and suppression of forest fires and construction of firebreaks or cutlines was provided too. The Programme also carried out a short term consultancy to analyse opportunities for community forest management in Salambala (Kamminga, 2001). The Programme Phase I listed the nationally important strategic forests in Namibia. Salambala woodlands which partly belong to Salambala Conservancy is one of these forests with national value (Hines, C., Viitanen, J. and Tuomasjukka, T., 2001).
5. WILDLIFE MANAGEMENT

5.1 Wildlife population

Salambala is one of the big forest woodlands which has a substantial value to the eastern Caprivi and to the Namibian people as the whole. This conservancy has potentiality in forest woodlands to attract more wildlife. This was quite evident with the formation of the Salambala Conservancy, the introduction of a community game guard system, natural resource monitors and village representative structure, for the areas constituted the Conservancy has enhanced the wildlife resource base for the area over the past five years (Mutwa, 2002). Moreover, the creation of the 14 000 hectare core wildlife management area, development of water points for wildlife at the most strategic sites and fencing-off the core area from three sides to keep out livestock have made the environment a haven for the wildlife species. The number of different species thriving in the conservancy is illustrated in the figure 2. However, animal ecological habitat is disturbed due to presence of settlements inside the core wildlife management area.

![Figure 2. Wildlife population in the Salambala Conservancy (Source: Salambala Management Committee, 2001).](image)

It is clear from the figure 2 that some herbivores populations are hundreds-fold higher than predators. This implies that should be less livestock losses for the neighboring farmers. However, more pragmatic measures should be employed to keep out livestock from the core area to ensure continuous possibilities of grazing for the wildlife. Moreover, due to the large number of elephants in the core area, it is expected that more damages to cropfields of the communities will occur.
5.2 Management Strategies

There are several management strategies employed to enhance wildlife resources in the Salambala Conservancy including game translocation, development of water points, establishment of an access corridor into the conservancy from Chobe National Park in eastern side, community game guard system and fence-off of the core area.

5.2.1 Game translocations

The natural recovery rate of wildlife in the conservancy has been improved by a number of game translocations over the past half a decade (Mutwa, 2002). Since the donation of Common impalas by MET from the Waterberg in 1999, there has been favourable recovery of wildlife populations in the core wildlife management area (CWA). About 250 Common impalas have already been translocated to the core wildlife management area. Furthermore, another 50 elands and 30 wildebeests will soon be translocated to the CWA. However, the translocation of latter is subjected to the health assessment made by the veterinary services. Also, the existence of unfenced eastern portion of the conservancy allows wildlife entering in the core wildlife management area from the Chobe National Park (CNP). The core area will rapidly repopulate with wildlife as long as the corridor between Botswana and the core area remains sparsely settled. This back and forth movement of wildlife through the key transboundary corridors is essential to boost wildlife populations in the CWA. However, there are wildlife and forest management implications due to the fact that there are about 40 000 elephants in the CNP, which can cause havoc to the grazing and destroy mopane trees in the CWA (Chris Weaver, pers. comm., 2002).

5.2.2 Water points development

The Salambala Conservancy encompasses of 19 villages who utilize all natural resources from the conservancy, hence conflicts between the conservancy and community is inevitable. Boreholes drilled both inside and outside the core area are important to provide water for livestock and wildlife separately and keep out livestock from the core area. Conversely, damages from wildlife to community homesteads, cropfields and livestock will be reduced.

5.2.3 Law enforcement

If mortality and natality are reviewed, it can not be denied that poaching is occurring year round here and there in the other parts of the core wildlife management area. According to the NACOBTA (2002) study on tourism development in eastern Caprivi, increased migration of wildlife in Nakabolelwa area (east of Salambala) should be promoted so that there would be alternatives for the local community to hunt sustainably. Again, this means that more community game guards will be required and tourism facilities (campsites, lodges, etc.) will be expanded. Also, this study has recommended that dry-season grazing areas for herbivores such as zebra, kudu and buffalo would be provided in
Namibia. This in turn will again mean that more wildlife protection will be required through community education by stimulating awareness for the protection of wildlife.

5.2.4 Hunting quota

The recovery of game populations in the CWA has greatly increased conflicts with the communities in the conservancy over the past two years (Mutwa, 2002). Hence, it is essential that a balance needs to be put in place to control the natural resource base effectively. The Salambala Management Committee has been granted a certain yearly quota to maintain its wildlife population. Figure 3 shows the hunting quota of the 2001 and the new approved quota for 2002 hunting season.

![Hunting Quota Chart]

Figure 3. Wildlife hunting quota in CWA for 2001-2 (Source: Mutwa, 2002)

Until last year only elephants were made available for trophy hunting. However, with the effective management mechanisms, additional five other species are requested to be hunted due to the increase in population numbers. In case of impala and zebra the offtake rate of 1 and 2% respectively, will not have impacts on overall population in the CWA.

5.2.5 Recommendations

For the CWA to be continuously populated with wildlife following measures need to be set in place:

- Regular maintenance of boreholes and fences
- Allocation of sound, annual allowable hunting quota
- Tight livestock management around the CWA
- Effective control of problem wildlife by Wildlife and Parks
- Effective control of predators by Wildlife and Parks
- Good monitoring system

In conclusion, in order to avoid serious problems it is important to avoid settling people inside the core area. If human settlements are allowed, deforestation will arise which will result from cutting of poles for housing, kraals and opening big space for farming. If the area is split into isolated islands game will migrate. Maintenance of a wildlife access corridor between Botswana and the core area of Salambala Conservancy should be promoted and extended to ensure increase seasonal migration from both sides during the adversary climatic conditions.

6. DEVELOPMENT OF TOURISM

6.1 Current tourism

The existence of a large, well developed tourism industry adjacent to the eastern Caprivi floodplains provides opportunity for immediate access to and growth of the tourism industry. The core area of Salambala Conservancy has 4 camp places and mostly relies on traffic using the main Ngoma-Katima Mulilo road and seminar and workshop participants. Only about hundred visitors pass through the core area annually (Salambala Management Committee, pers.comm., 2001).

6.2 Indirect strategies to attract tourism to Salambala

Salambala Conservancy should make use of all opportunities to increase tourist numbers by attracting mobile and private (self drive) tourists from the Chobe-river front area of the Chobe National Park. This can be possible when the Chobe National Park (CNP) is near to its carrying capacity. Thus, visitors can easily add the road accessible areas of the floodplains such as Salambala Conservancy to their schedule. According to the study conducted by NACOBTBTA (2002), during the months of March-April and from late June to early November there exists a demand for alternative tourism activities which should be easily absorbed by the Salambala Conservation. However, Salambala Conservancy should all the time make sure that camping facilities are of a high standard.

6.3 Direct strategies to attract tourism to Salambala

It is quite evident that Salambala Conservancy is capable of providing most of the conventional tourism activities such as identified by the Salambala Management Committee and listed below:
- Hiking
- Camping
- Traditional pursuits
- Traditional dances
- Craft markets
- Traditional villages
- Visits to villages
- Wildlife viewing (game, birds) from vehicles
- Hunting
- Guided tours
- Scenic

From the bird watching tourist point of view, Salambala Conservancy is a very important birding area. The Salambala Conservancy CWA does not have the high quality wetland features, thus it will rely more on wildlife tourism activities and self drive tourism. The prime scenic and wildlife assets of the Salambala Conservancy fall between Ngoma and Masikili and to the northwest along the floodplain-dryland interface. Wildlife viewing, particularly viewing from vehicles remains the most desirable reason for visiting the area. The maintenance of a wildlife access corridor between Botswana and the core area of Salambala Conservancy is of the high priority. This will increase game numbers and subsequently boost opportunity for tourism attraction in Salambala Conservancy. The areas of recession agriculture directly adjacent to the CNP provides an essential dry season range for elephant and zebra, they have year round access and could be developed for tourism for the benefit of both the Salambala Conseravancy and Chobe National Park (NACOBTA, 2002).

6.4 SWOT Analysis

A SWOT analysis was carried out on tourism resources and opportunities to evaluate the current status of the Salambala Conservancy while predicting the future developments in the Conservancy (see Appendix 1).

The analysis has shown that the resources are there which can develop a lucrative tourism industry which can attract numerous tourists to this area. Also, opportunities are promising if comprehensive cross-border management structures are established and fully functional. Again, weaknesses are only based on improvement of the infrastructure and skill transfer on to the Salambala Management and adjoining villages. Threats suggest that the long-term and lasting solutions and well-thought strategies are required to boost tourism development in the Caprivi region.

6.5 Tourism activities

The Salambala Management Committee has allocated scores to the tourism activities which they observed the degree of desirability of visits by the tourists during the past few years. The results are illustrated in figure 4.
These results show that more conventional tourism activities scored slightly higher such as game viewing, bird viewing, camping and hunting. The educational activity such as study tours was less desirable compared with other pleasure activities such as wildwalk, village walk and village visits. Wildlife and bird viewing, particularly from vehicles remained the most desirable reason for visiting the area. These results give a good indication of what activities visitors required, hence the Salambala Management should improve on these activities to increase numbers of tourists in the core area.

6.6 Proposed tourism development by NACOBTA feasibility study 2002

Salambala Conservancy can only become a tourism haven if profound developments take place. Thus, it was identified that there is a need to develop a lodge site at Inombolo, one camp at Izingwe (public) for game viewing and a public camp at Ngoma to capture passing trade. Although the feasibility study was conducted by the Nacobta early this year there is still a long way to go before these developments will be getting on the way. Also, the fact the main road passes just along the Salambala Conservancy is a major asset to itself. However, settlement patterns are reducing the natural beauty of the area and with institutionalization of decentralization, the regional authority should revisit this matter. It is also proposed that a craft market area should be developed aside at Ngoma to make the most of tourists passing from both sides. Moreover, Bukalo should be developed further as a cultural centre as it hosts the traditional authorities. Guided tours of the Kuta and visits to the Open Air Museum could be enhanced by development of a formal museum depicting the cultural history of the Basubia tribe.
7. AGREEMENT OF COLLABORATION

In October 2001 the Directorate of Forestry and the Salambala Conservancy signed an agreement for collaboration to compile a forest management plan for the Salambala Conservancy core area under the following conditions:

- **Aim of the Collaboration:** The aim of this collaboration is to develop a forest management plan for the Salambala Conservancy core area as a component of an integrated conservancy management plan in order to use the conservancy natural resources in a sustainable manner.
- **Roles of the parties:** The conservancy is playing a leading role during planning and evaluation of all activities related to the integration of the forest management plan. Directorate of Forestry supports conservancy in designing and drafting of the forest management plan and achievement of the objectives set for the planning.
- **Organizing of the collaboration:** The Salambala Conservancy Management Committee (SCMC) is acting as a mediator between the two parties.

Furthermore, the agreement covers activities of a phase one which aims only at compiling the management plan. The different steps included in the planning are as follows:

- Analysis of forest inventory data and reporting by FMPU.
- Evaluation of resource data against the needs of data for management planning by DoF and SCMC.
- Definition of Management objectives by working group (DoF, SCMC).
- Evaluation of current use of forest resources (wood and non-wood) by working group.
- Incorporation of fire, tourism and wildlife aspects in management plan by working group and relevant stakeholders.
- Drafting of the forest management plan by DoF with the inputs from SCMC and relevant stakeholders.
- Revision and approval of the plan by SCMC, DoF and other stakeholders.

The agreement also established a working group for the planning. According to the agreement Salambala Conservancy appointed four conservancy members to work closely with the DoF staff. The working group members were: Ms. Florence Siyambango, Mr. Charles Mushabati, Ms. Othielia Sakachele and Mr. Vincent Sitali.

In the agreement, a second phase of the collaboration was anticipated for the implementation of the plan. Signing a new agreement is entirely dependent on the outcome of the phase 1 and whether the stakeholders agree to implement the plan. It is necessary to get technical assistance from the DoF to the SMC for the implementation.
8. MANAGEMENT OBJECTIVES

8.1 General

In order to make a feasible plan for resource utilisation, objectives for the management must be defined. That means that the various benefits expected from the forests must be described. Also, some kind of priority must be set between different benefits. Hence, management recommendations for a given stand of trees can vary dramatically depending upon the objectives set. Priorities provide the framework for developing forest management recommendations.

It was clear in this case that the Salambala Management Committee aims at developing a forest management plan that considers both wood and non-wood benefits. They have emphasized that they are especially looking at management for wildlife, rare and endangered plants and animals, recreational opportunities and heritage (cultural) sites.

Therefore, the Salambala Management Committee has prioritized possible and available emphasis, which could maximize their benefits as following; (i). Wildlife (ii) Tourism (iii), Birds (iv) Forests, (v) National benefits (e.g. Biodiversity, Amenity, Research, Cultural, Environmental education, Gross Domestic Production and Employment creation).

8.2 Overall management goals of the Conservancy

The overall management goal of the conservancy is to enhance conservation and protection ways, while utilizing natural resources in order to maximize the contribution towards the socio-economic and environmental benefits in the Salambala Conservancy, through optimal multiple-use, sustained yield management of the Conservancy with the participation of local communities.

8.3 The Management Objectives of the Core Area

Members of the Salambala Management Committee defined management objectives for the Salambala Conservancy. They came up with the 6 management objectives below.

8.3.1 Wildlife

Salambala Conservancy serves as a corridor as well as a refuge to a large number of wildlife species. Generally, wildlife moves between Botswana and Salambala area driven by factors such as climatic variation, availability of habitat, food resources, seasonality, and many more others. This area was severely deprived from its wildlife by poaching, drought, settlement, etc. Lots of efforts were made and the Conservancy is busy with a comprehensive wildlife re-translocation programme. Currently, wildlife is the only natural resource, which has brought considerable income for the Conservancy. Therefore, it is of utmost important to manage this resource appropriately and guarantee its sustainable utilization.
In the future too, wildlife will be the major income-generating enterprise for the Salambala Conservancy. Therefore, the requirements for wildlife management dictate the other use of woody resources.

8.3.2 Birds

Salambala Conservancy has a large number of birds and attracts considerable number of birdwatchers and hunters since its proclamation. Following birds types are common in the Conservancy. Table 1 illustrates the significance of the conservation of birds in the Conservancy, hence the well-being of the bird population is highly emphasized for income-generation as well as adding aesthetic values to the Conservancy.

Table 1. Different species of birds foraging in the Salambala Conservancy

<table>
<thead>
<tr>
<th>BIRD SPECIES</th>
<th>POPULATION COUNTS</th>
<th>EMPHASIS</th>
<th>INCOME ($) / YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geese</td>
<td>Hunting</td>
<td></td>
<td>25,000</td>
</tr>
<tr>
<td>Ducks</td>
<td>Hunting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red bellied francolin</td>
<td>70</td>
<td>Hunting</td>
<td></td>
</tr>
<tr>
<td>Swainson francolin</td>
<td>540</td>
<td>Hunting</td>
<td></td>
</tr>
<tr>
<td>Cape turtle doves</td>
<td>3,500</td>
<td>Hunting</td>
<td></td>
</tr>
<tr>
<td>Laughing doves</td>
<td>&lt;200</td>
<td>Hunting</td>
<td></td>
</tr>
<tr>
<td>Kurricane buttonquail</td>
<td>750</td>
<td>Hunting</td>
<td></td>
</tr>
</tbody>
</table>

8.3.3 Tourism

Salambala Management Committee has great expectations for tourism to increase and bring more income. Campsite facilities already exist and have been used by various camping groups, individuals and training institutions. More than a hundred tourists visit these sites annually. This number is envisaged to increase with the improving security situation. Again, emphasis on a tourism management plan was highly reiterated and there is big desire from the side of the Salambala Conservancy Management Committee to incorporate it into the other management plans.

8.3.4 Forestry (wood and non-wood products)

Forests are an integral part of all natural resources; hence the Conservancy Management Committee regards forest resources as vital to the existence of its ecosystems. Salambala community is interested in obtaining more than one product or amenity from their forests, for example timber harvesting, wildlife habitat enhancement and maintenance of aesthetic quality. The core has a potential to provide several products. These include
wood products; poles, fuelwood, fruits, medicines, crafts, dyes, canoes and sledges. Also, following non-wood products such as waterlillies, grass, mushrooms, green leaves, honey and mopane worms is available in the core area. Most of these products are used domestically and sold on the local markets too. The use of these products was surveyed in the Participatory Rural Appraisal (PRA) and is discussed in chapter 10.

8.3.5 Conservation

Salambala Management Committee has also conservation emphasizes in the mind. One of their main objectives is to conserve biodiversity for the future generations. This is in line with the Nature Conservation Amended Act 1996 (Act 5 of 1996) which makes provision for the establishment of Conservancies and Wildlife Councils in communal areas. The Act uses Conservancies as the means by which limited rights to manage and benefit from wildlife and tourism are given to specified group of people living within communal areas. This provides Salambala Community with incentive to manage fauna and flora as they could receive revenue from hunting game and harvesting wood and non-wood products. The end-result will be less destruction and sustainable utilization of natural resources.

8.3.6 National benefits

The Committee has identified also other benefits, which the whole nation could derive from proper management of natural resources in the Salambala. These benefits include research, environmental education, employment creation and cultural heritage sites and wildlife. The importance of these benefits must not be underestimated; hence they should be incorporated in the whole management planning process of the Salambala.

8.4 Management priorities in the core area

The Salambala Conservancy Management Committee has unanimously made it clear that the emphasis is to conserve natural resources by promoting biodiversity conservation through creating the necessary conditions for sustainable use. Wildlife management was viewed as highest priority because of the significant income it generates for the Salambala Community. Birds were also highly prioritized because they attract a reasonably large number of bird-lovers and also bring sizeable income for the Salambala Community. Tourism was also identified as promising for the Salambala Conservancy because the backbone of a conservancy is tourism. Forestry was fifth on the priority list. Finally, national benefits are being taken into account.

It is the authors’ understanding that utilization of wood resources in the core area, especially commercial, has a place only after the requirements for wildlife management, tourism, and biodiversity conservation have been met. This management plan has been prepared keeping these management priorities in mind.
8.5 Objectives for forest management in the core area

The highest priority in the management of the core area is given to wildlife and tourism. Therefore, the objectives for forest management must not conflict with those objectives. Also, conserving biodiversity has a high priority.

The objectives for forest management in the core area are:

- to sustainably generate an income to the Conservancy by selling wood from the area
- maintain the structure of the forests favourable for wildlife management and attractive to tourism
- maintain the structure of the forest suitable for utilization of non-wood forest products as well
- to maintain the forests vital
- to maintain the biological diversity of the forests

The strategies how to meet the objectives are discussed in the Chapter 11.

9. FOREST RESOURCES

9.1 Forest inventory

A forest inventory in the Salambala core area was carried out in year 2000 as a co-operation between the Conservancy and the District Forestry Office (supported by the Namibia-Finland Forestry Programme). The inventory and its results are described in more details in the “Inventory Report on the Woody Resources in the Salambala Core Area” (Laamanen, Otsub and Tubalele, 2002). The report is available at the Directorate of Forestry in Windhoek.

The inventory area was defined together with Salambala representatives. The size of the area inventoried is 8362 hectares. So, the whole core area was not included in the inventory.

For the inventory purposes, specific forests were defined inside the core area. The inventory area was formed of these forests. Then, inventory clusters were randomly placed over this area. Altogether 18 clusters with a total of 72 sample plots were located in the field. The cluster and plot locations were determined with a gps-device.

Each cluster consisted of four sample plots. The radius of a sample plot was 15 metres. All trees with diameter at breast height (dbh) more than 5 cm were enumerated within a sample plot and every 1st and 6th tree of each species was measured as a sample tree (dbh and height). Shrubs, bushes and trees with dbh less than 5 cm were enumerated on a sub-plot with a radius of 4 metres. The 1st and then every 10th shrub was a sample (height, nr
of coppices/shoots). See detailed description of the inventory methodology in “Assessment of Forest Resources” by Marja Ojanen-Jarlind and Carlos Salinas.

There is a lot of variation in the vegetation and tree layer inside the core area. The inventory results do not describe this variation and no mapping was included in the inventory. A Landsat TM image from year 2000 (Appendix 4) reveals a lot of this variation.

9.2 Inventory results

9.2.1 Trees

Only a brief summary of the inventory results is given here.

Altogether 18 tree species were identified in the inventory with a total of 162 stems per hectare. The most frequent species is *Colophospermum mopane* with 107 trees growing per hectare in the core area. The second most frequent species is *Terminalia sericea*, however, with only 22 stems growing per hectare. The third most frequent species is *Combretum collinum* with 11 trees per hectare. All other trees have a significantly smaller number of stems. There are five species of which only one specimen could be found in the inventory (see Table 2).

Table 2. Number of stems per hectare of all species in diameter classes

<table>
<thead>
<tr>
<th>Species / Diameter class</th>
<th>5-10</th>
<th>10-15</th>
<th>15-20</th>
<th>20-25</th>
<th>25-30</th>
<th>30-35</th>
<th>35-40</th>
<th>40-45</th>
<th>45-50</th>
<th>&gt;50</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Colophospermum mopane</em></td>
<td>43.2</td>
<td>21.6</td>
<td>14.4</td>
<td>7.2</td>
<td>8.1</td>
<td>2.7</td>
<td>3.6</td>
<td>4.5</td>
<td>1.8</td>
<td>107.0</td>
<td></td>
</tr>
<tr>
<td><em>Terminalia sericea</em></td>
<td>8.3</td>
<td>4.1</td>
<td>3.4</td>
<td>2.1</td>
<td>1.4</td>
<td>1.4</td>
<td>1.4</td>
<td></td>
<td></td>
<td>22.0</td>
<td></td>
</tr>
<tr>
<td><em>Combretum collinum</em></td>
<td>0.6</td>
<td>1.0</td>
<td>1.8</td>
<td>2.2</td>
<td>2.6</td>
<td>3.0</td>
<td></td>
<td></td>
<td></td>
<td>11.0</td>
<td></td>
</tr>
<tr>
<td><em>Acacia nigrescens</em></td>
<td>0.9</td>
<td>1.7</td>
<td>0.9</td>
<td>0.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.3</td>
<td></td>
</tr>
<tr>
<td><em>Lonchocarpus nelsii</em></td>
<td>1.0</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td><em>Acacia erioloba</em></td>
<td>1.3</td>
<td>0.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.6</td>
<td></td>
</tr>
<tr>
<td><em>Albizia harveyi</em></td>
<td>1.2</td>
<td>0.6</td>
<td>0.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td><em>Burkea africana</em></td>
<td>0.3</td>
<td></td>
<td></td>
<td>1.0</td>
<td>0.3</td>
<td>0.3</td>
<td></td>
<td></td>
<td></td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td><em>Combretum imberbe</em></td>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td><em>Combretum hereorense</em></td>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td><em>Ochna pulchra</em></td>
<td>0.4</td>
<td>0.8</td>
<td>0.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td><em>Baughinia thonningia</em></td>
<td>0.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td><em>Garcinia livingstonei</em></td>
<td>0.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td><em>Pterocarpus angolensis</em></td>
<td>0.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.2</td>
<td></td>
<td></td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td><em>Diospyros mespiliformis</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.2</td>
<td></td>
<td></td>
<td></td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td><em>Commiphora angolensis</em></td>
<td>0.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td><em>Manilkara mochisia</em></td>
<td>0.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td><em>Amblygonocarpus andongensis</em></td>
<td>0.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>58.7</td>
<td>31.3</td>
<td>21.0</td>
<td>12.5</td>
<td>14.5</td>
<td>7.4</td>
<td>8.3</td>
<td>5.7</td>
<td>0.0</td>
<td>1.8</td>
<td>161.8</td>
</tr>
</tbody>
</table>
The diameter distribution of the three most common species has been illustrated in figure 5. The diameter distribution of mopane is very good, there is a big number of small trees and some, however not many, big trees too. About 65% of all mopane stems are less than 15 cm at breast height. This gives a potential for harvesting some poles without risking the future of the forest. The distribution of *Terminalia* is not as good even though it has got more small trees than big ones. The distribution of *Combretum* is very different: there are more big trees than small trees. The possibilities for sustainable utilization of trees in the core area are mainly related to *Colophospermum mopane* and *Terminalia sericea*.

![Diameter distribution of the three most frequent tree species](image)

Figure 5. Diameter distribution of the three most frequent tree species

According to the classification of trees done in the inventory, there are about 400 000 mopane poles suitable for fencing, 200 000 poles for making houses and about 70 000 poles suitable for making kraals. Respectively, there are about 17 000 *Terminalia* poles suitable for construction, about 74 000 poles suitable for fencing and 17 000 poles suitable for kraals.

The volume of all tree species is 34 m$^3$ per hectare. *Colophospermum mopane* has got the highest volume, 18 m$^3$/ha. Other tree species have far less volume, the next highest volumes being with *Combretum collinum* (6 m$^3$ per hectare) and *Terminalia sericea* (4 m$^3$ per hectare).
9.2.2 Shrubs and regeneration

Altogether 1346 shrubs and saplings per hectare were recorded growing in the core area. 14 different species were identified. *Colophospermum mopane* has got a very vigorous regeneration with 840 shrubs or saplings per hectare. Part of these shrubs or saplings will grow to become trees first in the smaller diameter classes and replacing trees which will grow into bigger classes or which might be harvested. There is also a relatively good number of small *Terminalia sericea* shrubs or saplings – 135 per hectare. The number *Combretum collinum* shrubs and saplings is 47 per hectare.

9.3 Growth of trees

9.3.1 General

Only *Colophospermum mopane* and *Terminalia sericea* have been included in the following analysis of growth and harvesting potential. This is because these two species are the ones that have a majority of stems in the area and are having a diameter distribution which may allow harvesting. The main potential in utilizing the forests is in harvesting poles.

9.3.2 Growth estimates

The following analysis of the growth of *Colophospermum mopane* and *Terminalia sericea* trees is based on a growth study that was carried out by the Directorate of Forestry in 1998 (Worbes, 2001). Sample trees were felled and the annual diameter growth of these tree analysed by counting the annual rings of disks cut at breast height and by measuring the diameter of the disks. In this sample, there were 8 *Colophospermum* trees and 11 *Terminalia* trees from Caprivi. The mean annual increment of diameter at breast height for each sample tree was then calculated (see figure 6).
Figure 6. Mean annual increment of diameter at breast height for *Colophospermum mopane* and *Terminalia sericea* sample trees from Caprivi

The mean annual increment of diameter at breast height was 0.164 centimetres for *Colophospermum mopane* in this study. For *Terminalia sericea* the mean annual increment was 0.605 centimetres. Mushove P.T. et al (1995) found an average ring width of 0.9 mm for *Colophospermum mopane* in a study carried out Zimbabwe. This observation corresponds with a 0.18 centimeter annual diameter growth.

**9.3.3 Prediction of diameter distribution**

The diameter distributions of *Colophospermum mopane* and *Terminalia sericea* were predicted for year 2011, that is ten years after the inventory. For this prediction, the mean annual diameter increments obtained from the growth study were applied. Inside a certain diameter class, an even distribution of stems was assumed.
Figure 7. Current and predicted diameter distribution of *Colophospermum mopane*

Figure 8. Current and predicted diameter distribution of *Terminalia sericea*

The predicted diameter distribution here (figure 7 and figure 8) means a situation which would be reached if there would be no natural reasons for the trees to die (competition, fire, wildlife etc.) and if there would be no human impact. This is just a theoretical situation as there will always be natural mortality in all diameter classes. In the
calculations for harvesting possibilities, the main objective is to maintain the same kind of diameter distribution like it is today.

10. RESOURCE UTILIZATION SURVEY

10.1 Objectives and methods of the survey

A participatory rural appraisal (PRA) was conducted between the 19th and 23rd December 2001. The appraisal team comprised of Salambala Conservancy’s working group, staff of the Namibia-Finland Forestry Programme Phase and DoF. A complete description of the survey is given in the PRA report (Omoro and Otsub, 2002) obtainable from the DoF on request. In the following, a short summary of the survey and findings of it is given.

All nineteen villages forming the Conservancy were surveyed including: Ibbu, Iseke, Ikumwe, Isuzwe, Izymwe, Ioma, Limai, Mahundu, Marazburg, Masikili, Mutikitila, Muyako, Salambala, Silumbi, Sikanjabuka, Ngoma Sabelo, Ngala, Bwara, Bukalo. The villages have a total population of approximately 10,220 with the average household size of between 5 and 6 people according the research conducted by (CSO, 1996, DEA Research Discussion Paper No. 20 as quoted Ashley and LaFranchi, 1997). The ratio of adult to children in these villages was that there were at least two children for each parent.

Local people from the abovementioned nineteen villages utilize Salambala forest resources for their subsistence needs such as for grazing, supply of fuel wood, wood for construction (poles, rafters), implements, crafts materials, food, fodder, and medicines. These resources are essential for their livelihood. In recent years it has become evident that pressures on resources are increasing and conservation and planning of sustainable use is necessary.

The survey sought to find out if the communities around the conservancy extract and use the forest resources (wood and non-wood) especially from the core area. It also sought to quantify these products. In addition, the resource use in general in the communities was surveyed.

Specific objectives of the survey can be listed as followes:

- To identify and quantify woody forest resources used by the community from the core area.
- To identify non-woody forest resources including wildlife used by the community from the core area.
- To identify and document management practices in place for sustainable use of forest resources.

Various appropriate participatory rural appraisal (PRA) techniques such as semi-structured interviews (SSI) were employed in combination with matrix ranking and
scoring, resource mapping and time line. The enumerators were divided into three teams of three people each. The survey took three days and on each day the survey teams visited a minimum of two villages each.

10.2 Results

10.2.1 Respondent rate

The households covered during the entire survey were about 2900, whereas the enumerated interviewees totaled 1200. The respondent rate of 35 percent was obtained during the survey. These figures only include adult interviewees.

10.2.2 Wood forest products from the broader Conservancy

The survey found that there is very little trade in woody forest products in the survey area, the exceptions being small amounts of firewood and poles. The number of poles and rafters used in different homestead construction (huts and palisades), kraal and courtyard is shown in Table 3 below.

Table 3. Average annual consumption of different wood products from the broader conservancy

<table>
<thead>
<tr>
<th>Product</th>
<th>Consumption</th>
<th>Average nr per year constructed</th>
<th>Average size</th>
<th>Total nr of poles/year extracted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poles large</td>
<td>66/house</td>
<td>76 houses</td>
<td>2.1m x 8.78cm</td>
<td>5016</td>
</tr>
<tr>
<td>Poles-small/Rafters</td>
<td>280/house</td>
<td>76 houses</td>
<td>2.95m x 3.18cm</td>
<td>21280</td>
</tr>
<tr>
<td>Poles</td>
<td>41/kraal</td>
<td>306 kraals</td>
<td>2.8mx10cm</td>
<td>12546</td>
</tr>
<tr>
<td>Poles</td>
<td>60/courtyard</td>
<td>153 courtyards</td>
<td>2.27mx8.87cm</td>
<td>9180</td>
</tr>
</tbody>
</table>

Construction of a traditional village house consumes a total of 346 poles. This amount applies for both renovation and construction of a new house. It was also enumerated that at average about 26 new houses are constructed while the renovation is done on 50 houses annually. The total consumption is about 48 022 poles and rafters annually as indicated in table 3.

Similarly, the survey has found that a bundle of firewood is needed per household weekly, with an average weight of 9.3 kg in an average village with 153 households. This results in 74 tons of fuelwood per annum. If all villages are considered about 1.41 megatons of firewood is extracted from the Salambalan woodlands annually. This accounts for a per capita firewood consumption of 0.14 tonnes amongst these villages.
10.2.3 Non-wood forest products from the broader conservancy

Furthermore, the survey discovered that 500 bundles of thatching grass are used to construct a village house. On an average of 76 (26 new houses and 50 under renovation) are found in each of these villages annually. Hence, 380 tons of thatching grass is used per village for the typical construction. This accounts of 7220 tons extracted from the conservancy annually. Similar figure applies for reeds resource harvesting in the broader conservancy area.

10.2.4 Wood products from the core area

According to the survey people from the villages do not use wood resources from the core area. However, there are people still living inside the area who are using the resources in the area. These people were not interviewed in the survey.

The estimated quantities of products used by residents of the core area have been computed using the average results from the adjacent villages. It has been assumed that the families in the core area use as much as those outside and these estimates are presented in table 4. In the core area where some families are still settled, the houses that are constructed annually are one in five years for each of the 3 households (corresponds with 0.6 new houses every year). Each settlement renovates one house every second year (1.5 houses renovated per year). Moreover, three kraals and three courtyards are constructed by the settlements annually.

Table 4. Average consumption of forest products from the core area

<table>
<thead>
<tr>
<th>Product</th>
<th>Consumption</th>
<th>Average nr per year constructed</th>
<th>Average size</th>
<th>Total nr of poles/year extracted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poles large</td>
<td>66/house</td>
<td>2.1 (0.6+1.5)</td>
<td>2.1mx8.78cm</td>
<td>139</td>
</tr>
<tr>
<td>Poles - small/Rafters</td>
<td>280/house</td>
<td>2.1 (0.6+1.5)</td>
<td>2.95mx3.18cm</td>
<td>588</td>
</tr>
<tr>
<td>Poles</td>
<td>41/kraal</td>
<td>6</td>
<td>2.8mx10cm</td>
<td>246</td>
</tr>
<tr>
<td>Poles</td>
<td>60/Courtyard</td>
<td>3</td>
<td>2.27mx8.87cm</td>
<td>180</td>
</tr>
</tbody>
</table>

Here again, it was found that at average about 0.6 new houses are constructed while the renovation is done on 1.5 houses annually. The settlements consume about 1153 poles annually as indicated in table 4. This may not be worrying for now but will impact conservancy’s forest resources availability such as wildlife habitat and foraging and poles in the near future.
Also, it was found that a bundle of firewood is needed per household weekly, with an average weight of 9.3 kg in and there are 3 households remaining in the core area. Thus, about 1.5 tons of fuelwood is utilized per annum.

10.2.5 Non-wood forest products from the core area

The survey also found that 500 bundles of thatching grass are used to construct a house at the settlement in the core area. On an average of 2.1 (0.6 new houses and 1.5 under renovation) are found in the core area annually. Hence about 10.5 tons of thatching grass is needed for a typical homestead construction annually. Same figure applies for reeds resource harvesting in the core area.

10.2.6 Preference of tree species for various products

*Colophospermum mopane* scored highest as species for firewood and poles in many of the villages, followed by *Combretum imberbe*. In isolated villages *Combretum collinum* scored as high as *Cholophospermum mopane*. This indicates that in consideration for species preferred for firewood and poles, *Terminalia sericea*, *Combretum collinum*, *Combretum imberbe* and *Colophospermum mopane* are quite important. The species least considered for firewood were motonu, *Trichilia emetica* and *Acacia nigrescens*, the latter two had the same scores. Other species considered least important as firewood are mukumbumba and *Burkea africana*.

The species preference generally shows that there are alternatives of species of trees that can be used as sources of poles and firewood. It also indicates the distribution pattern and abundance of some species over others even though there may be higher preferences for a particular species. For instance, one species may be more prevalent in one area than others and hence used intensively for a particular purpose. The case in point established during this survey was that *Combretum collinum* is the first tree species preferred for fuelwood in the absence of *Colophospermum mopane* and *Terminalia sericea*.

11. FOREST MANAGEMENT STRATEGY

11.1 Research and experience in management

There is only little information available how *Mopane* and *Terminalia* dominated forests like the forests in Salambala core area should be managed. Geldenhuys (1996) has discussed the management planning of Eastern Caprivi forests in the seventies and proposed harvesting of large mature *Baikiea*, *Burkea*, *Pterocarpus* and *Guibourtia* trees. The proposal is based on the abundance of the mature and overmature trees found in the inventory in late sixties. The mature trees are proposed to be harvested before they are destroyed by elephants.

According to the forest inventory of the core area, there are not many mature trees available for harvesting. Also, the importance of wildlife management and development
of tourism do not support harvesting of big trees. Coe (1991) has proposed that thinning of young *Colophospermum mopane* trees should be incorporated into any management regime because of the clear positive effect of thinning on the growth in natural indigenous mopane woodlands. Tietema (1987) suggests that early thinning of mopane shoots could be a way to facilitate the production of poles in desired size classes. Cunningham (1996) has studied the benefits of thinning of mopane forests for charcoal production in South Africa. According to his study, strategy of harvesting 25% every 5 years would ensure the best harvestable yields for up to 60 years after which there would be a long-term decrease in mopane wood. One of the benefits of thinning mopane is the improved visibility of animals for ecotourism. The study areas of Cunningham had a dense mopane vegetation from 727 trees per hectare up to 2289 trees per hectare (starting from trees with a circumference of 3 cm). Smit (1996) has observed a significant increase on the growth and reproduction of remaining trees after thinning due to reduced inter-tree competition.

Damage and mortality caused by elephants to trees is an important factor in the management of Salambala forests. Lewis (1991) estimated the mortality of mopane coppices and mature trees in Luangwa valley in Zambia. With elephant densities from 0.7 to 1.4 per km² the annual mortality of coppiced mopane trees was 0.5%. Damage to mature mopane trees was very low.

According to Erkkilä and Siiskonen (1992) opening up the canopy of a *Colophospermum mopane* forest will increase the invasion of coarse grasses and increase the fire hazard greatly.

Chobe forest inventory and management plan (1993) proposes zoning of the Chobe Forest Reserves into integrated local community co-management areas, timber production areas, educational areas, ecotourism recreational areas, wildlife utilization areas and research and monitoring areas. In the timber production areas, salvage cutting of damages, diseased and dying *Pterocarpus angolensis* is proposed.

### 11.2 Strategies derived from the management objectives

The objective for forest management – derived from the general objectives of the management of the Core area – is to sustainably produce a steady income by harvesting and selling poles and firewood. This will be done according to analysis of allowable cut. In the calculation of allowable cut, the other main objectives – management of wildlife, promotion of tourism and conserving biodiversity – will be strictly limiting factors. This means that forest operations in the core area are planned so that there will be no harm made to the above mentioned other objectives. If such a conflict would occur, the planned forestry operations are to be reconsidered.

The forest management plan covers a ten year period. The main guideline in managing the forest is to maintain the current structure of the forest during this period. The management activities are planned so that after the implementation of the plan the forest
will look as much as possible like it does today. In addition, wildlife and tourism will not be disturbed. This main guideline will be followed by applying the following strategies:

Strategy for preserving biodiversity, protecting wildlife and promoting tourism:

- To preserve biologically rich or sensitive sites or culturally important sites for protecting biodiversity and cultural heritage
- To leave a buffer zone around the campsites and the tracks inside the core area
- To protect the flora and fauna from fire with active fire management
- To apply only light silvicultural measures.

Strategy for utilization of trees:

- To harvest less than the annual growth in the area
- To cut *Colophospermum* and *Terminalia* trees only
- To harvest only by thinning: selective cutting of small sized trees
- To control harvesting by the number of stems in diameter classes
- To control harvesting by dividing the area into annual harvesting blocks

Strategy for silviculture:

- To utilize natural regeneration
- Not to do any planting of trees
- To manage Mopane shrubs to increase growth

There is a great potential of non-wood forest products in the core area. However, as there is not enough data of the amounts available, no strategy or plan of utilizing these resources has been included here. According to visual observation in early 2002, cattle is grazing inside the core area even if not allowed so. In any case, forestry operations will not cause any harm for any grazing, be it by cattle or wildlife. Possible fire management actions must be planned carefully keeping in mind the grazing.

The key elements of the strategies listed above will be discussed in the following chapters.

**11.3 Preserving biodiversity, protecting wildlife and promoting tourism**

As one of the main objectives for the management of the Core area is biodiversity, it is proposed that a significant portion of the area is left outside any human activities. The management proposals of this plan are given only to the inventory area which did not cover the whole area. Therefore, large areas have been left out of any management scheme. In addition, it is proposed that inside the inventory area, approximately 20% of the area will be left outside harvesting activities.
Prior to harvesting, sites with rich or sensitive flora should be located in the field. Also, samples of all kinds of vegetation and soil types existing in the area should be delineated in the field and be left out of activities. If possible, it would be a great asset if these areas could be mapped with a GPS and included in the update of this plan.

Dead trees should not all be collected from the area. Dead trees are necessary for certain cave nesting mammals, birds and insects too.

By carrying out only thinnings and only on a certain area annually should not cause unnecessary harm to wildlife. No big trees are harvested as they seem to be important part of wildlife habitat. Wild fires are prevented through active fire management. Fire management is discussed in more details in chapter 8.5.

This plan does not include specific activities to encourage tourism in the area. Instead, other activities are planned so, that no harm for tourism will be caused. For tourists, it is important to be able to stay in areas which are in natural condition. Therefore, the area around the campsite should be kept in natural state. Also, it is proposed that a buffer zone along the tracks should be left out of forestry activities. Any area having some potential as a tourist attraction in the future should be left out of forestry activities.
11.4 Utilization of trees

The forest inventory results have indicated that there is a clear potential for commercial utilization of the forests. However, the main objectives of the core area management dictate that all forestry operations must be very careful.

The structure of the forest is a typical uneven aged structure. Harvesting in a forest such as this can be done by thinning, that is by cutting a portion of trees from certain diameter classes over a large area. Based on the increment of the trees, it can be calculated how many trees can be removed without changing the structure of the forest in the long run (see Chapter 13. Harvesting plan). Lack of information on the dynamics of the managed *Colophospermum* and *Terminalia* trees again calls for specific caution when planning the level of harvesting.

11.5 Silviculture

Based on the inventory results, there is a good number of saplings (shrubs) in the area, more than 1300 per hectare. Major portion of this are mopane shrubs. With this number of natural saplings the future of the forest is secured. There is no need for planting trees.

According to the inventory results, there are about 5 shoots per shrub as an average in each mopane shrub. Based on ongoing trials in North-Western Namibia (Ontanda Forest Committee et al, 2000), by thinning and pruning, it is possible to improve the growth of the mopane shoots (diameter in particular) and to improve the quality of shoots. This might also improve the survival rate of the saplings as they reach bigger dimensions sooner. Furthermore, this may lead to a higher potential for harvesting in the future after this planning period.

Thinning and pruning of mopane shrubs is in no case necessary for securing the future of the forest. However, based on the clear advantages of such treatment it is proposed that this treatment is carried out in the areas that have been harvested.

In the thinning of trees, trees with low quality and trees which have been damaged are selected in preference to vital and good quality trees. This is done to secure the vitality of the forest and to avoid genetic degradation of the forest.

11.6 Fire management (compiled by Jonas Mwiikinghi)

11.6.1 Factors affecting fire risk

Logs, branches and dead tree either standing or lying on the ground are heavy fuels for forest fires. They burn slowly but longer and have a serious effect on the ground. They facilitate the fire to jump ahead and in to tree crowns. It is dangerous if the area has a lot of dead trees. However, in Salambala core area, there is not much heavy fuel. The
reason for this is that there has not been a severe drought in recent years and the fires have not killed many trees. Also, no cuttings have taken place there.

Small branches, annual grasses and herbs are fine fuels. They burn vigorously the core area is dominated by tall *Colophospermum mopane* in most parts. Some parts are dominated by *Terminalia sericea*. Areas dominated by *Colophospermum mopane* have loamy clay soil or clay soil and the grass cover on the ground is scattered and short. Areas where *Terminalia spp* and *Lonchocarpus nelsii* are growing have loamy sand soil. Tall grass is attached to these areas. There are also several flood pans with pure clay soils. Water is collecting in these pans during rains and tall grasses are growing there. The core area is relatively flat with some valleys. The slopes most likely do not have and affect on the fire because they are not very steep (Trollope 2001).

According to observations made in February 2002, a lot of cattle are grazing inside the core area, even though it is not allowed according to the by-laws of the Conservancy. It seems that the carrying capacity of the area is more than what the wildlife and cattle are using currently and there is no overgrazing.

### 11.6.2 Recommendations for fire management

In order to protect the resources in the core area – especially the wildlife- active fire management actions are recommended. The objective with these actions is to reduce the fire hazards and to avoid uncontrolled fires.

In a wildlife area it is recommended that prescribed burning should be applied when the grass sward is dormant in order to avoid any detrimental effects on the regrowth and basal cover of the sward. (Trollope – lecture 2001).

As it is not clear how much grazing is actually taking place in the core area, it is proposed that the level of grazing is observed (for fuel assessment) regularly after each month if there is a high load of grass towards the dry season, prescribed burning of some sites is recommended. Areas where fire can start and spread rapidly should be considered first for prescribed burning. One can recommend implementing the livestock grazing to control the fuel load but it is difficult to practice it within the conservancy because the livestock movement will not comfort the wildlife. Sites suitable for prescribed burning are sites dominated by *Terminalia seircea* and *Acacia spp*. where the grass is tall and thick. On areas dominated by *Colophospermum mopane* the fire risk is low. Prescribed burning should be done in May- June when the moisture content of the fuel is still higher and the air temperature is low and high relative humidity.

Prescribed burning should also be done in the flood pans where tall grasses are growing and this will help to reduce fire from starting in there and green bites to grow in there to attract wildlife.
Fire cut lines should be maintained and cleared regularly to stop wild fires from spreading. There is a good structure of cut lines in the area and no new lines are needed. Depending on the amount of dead wood available in the area, systematic sustainable extraction of dead wood either as fire wood or poles should be practiced as an income generating venture or own use by the surrounding community to reduce the fire hazard.

12. Harvesting potential

In the following analysis, only the harvesting potential of *Colophospermum mopane* and *Terminalia sericea* are discussed. According to the inventory results they are the only species with actual potential for harvesting.

12.1 Restrictions

**Area restrictions**

The total inventory area was 8362 hectares which is much less than the whole area of the core area (approximately 14 000 hectares). But, because the inventory covered only the smaller area, all calculations have to be restricted to deal with this area only.

For **securing biodiversity**, it is proposed that 20% of the inventory area will be protected from any kind of human impact. These areas will preserve samples of the natural conditions of the area for future generations. These areas could also be used for carrying out research activities. 20% of the inventory area is 1673 hectares.

For **promoting tourism**, it is proposed that no harvesting will be done near the campsite or along the tracks inside the core area (see map x). Leaving a buffer zone with a 500 metres radius around the campsite will reduce the potential harvesting area with about 80 hectares. It was estimated that there are about 39 kilometres of tracks inside the inventory area. Leaving a hundred meter wide buffer zone on both sides of the tracks will reduce the potential harvesting area with 780 hectares.

The total area restrictions are 2533 hectares. Therefore, in the further calculations an area of 5830 hectares can be used.

**Natural mortality of trees**

This is a subject with a great lack of information. The inventory of the core area did not include any data collection of damages which would have allowed to make some analysis of the amount of dying trees. Therefore, external information must be used for this analysis.

There are some important reasons for natural mortality: competition between trees, diseases, fire and wild animals. Elephants pushing trees over is probably a major cause for damaging trees and finally killing them also in the core area of Salambala. This has been reported to happen in other areas too (Dudley et al., 1996). A forest inventory in the
Chobe Forest Reserves in Botswana revealed that 18% of all *Pterocarpus angolensis* trees had been pushed over by elephants or had their tops completely broken off. In some areas this figure is as high as 50%. Also, fire was reported to burn 55% of the first year shoots of all species (Chobe Forest Inventory and Management Plan, 1993).

A smaller area in the conservancy very close to the core area was inventoried in August 2001 by the Directorate of Forestry (Laamanen and Angombe, 2001). All plots (57 plots) were classified according to level of damage. 95% of the plots were found with damages caused by elephants. 37% of these damaged plots were severely damaged (most of the trees damaged seriously), 30% were moderately damaged (damages are decreasing the vitality of the trees) and 28% with mild severity (damages observed but not affecting the trees). On the other hand, according to the local knowledge, the damages caused by elephants are not that serious inside the core area. This could also be supported by the reasonably low number of dead trees found in the 1996 inventory in the Salambala area.

**Current use of trees**

According to the survey of resource use carried out in the 19 villages of Salambala, people living in the villages are not extracting wood from the core area. However, there are settlements in three different places inside the core area. These settlements were not interviewed in the survey. It was assumed that the use of wood in these settlements is at the same level as in the villages. An estimate of annual use of 1150 poles and 1.5 tons of fuelwood is consumed by the settlements. One of areas of settlement is totally outside of the inventory area and another one very close to the edge. Therefore, it is estimated that about 600 poles is extracted by the settlements from the inventory area. The use of fuelwood is not taken into account here as much of it comes from dead wood and branches.

**12.2 Allowable cut**

In the following table 5 a calculation for the allowable harvest of *Colophospermum mopane* is presented. The calculation is based on the growth of the trees and the movement of stems from smaller diameter classes into bigger (see chapter 9.3.3 Prediction of diameter distribution). The main restriction in the calculation is that the diameter distribution during the ten years period of the implementation of the plan, will not change. This means that the structure of the forest would remain the same in the future too.

Harvesting is proposed to be done only in the three smallest diameter classes as the inventory showed that the number of big trees is not enough. Also, is has been suggested that the wildlife specifically benefits of larger trees. A mortality rate on the increase of stem numbers in each diameter class has been assumed. It is assumed that 80% of the increase of stems in the 5-10 cm class will die naturally. Respectively, it is assumed that 60% of the increase of stems in the 10-15 cm class will die because of natural reasons and 40% of the increase of stems in the 15-20 cm class will die. In practice, a portion of
these dying trees can be harvested. However, in the following calculation this has not been taken into account.

Table 5. Calculation of allowable cut of *Colophospermum mopane* (for an area of 5830 hectares)

<table>
<thead>
<tr>
<th>Diam. Class</th>
<th>2001 stems/ha</th>
<th>2011 stems/ha</th>
<th>Diff.</th>
<th>Available total nr of stems</th>
<th>% of natural death</th>
<th>Proposed cut, nr of stems</th>
<th>Annual cut, nr of stems</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-10</td>
<td>43</td>
<td>60</td>
<td>17</td>
<td>96922</td>
<td>80</td>
<td>19384</td>
<td>1938</td>
</tr>
<tr>
<td>10-15</td>
<td>22</td>
<td>30</td>
<td>9</td>
<td>50324</td>
<td>60</td>
<td>20130</td>
<td>2013</td>
</tr>
<tr>
<td>15-20</td>
<td>14</td>
<td>17</td>
<td>3</td>
<td>16775</td>
<td>40</td>
<td>10065</td>
<td>1006</td>
</tr>
<tr>
<td>Total</td>
<td>4958</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4958</td>
</tr>
</tbody>
</table>

The calculation above results in the following proposal of annual harvest of *Colophospermum mopane*: about 1900 stems with average diameter of 7.5 cm, 2000 stems with average diameter of 12.5 cm and 1000 stems with average diameter of 17.5 cm.

Respectively, the calculation of the allowable cut for *Terminalia sericea* is presented in the following table 6. According to the inventory, there is no increase in the number of stems in the diameter class 5-10 cm. Therefore, no cutting is proposed in this class. Same assumption of the natural mortality was made as with mopane.

Table 6. Calculation of allowable cut of *Terminalia sericea* (for an area of 5830 hectares)

<table>
<thead>
<tr>
<th>Diam. Class</th>
<th>2001 stems/ha</th>
<th>2011 stems/ha</th>
<th>Diff.</th>
<th>Available total nr of stems</th>
<th>% of natural death</th>
<th>Proposed cut, nr of stems</th>
<th>Annual cut, nr of stems</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-10</td>
<td>8</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>80</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10-15</td>
<td>4</td>
<td>8</td>
<td>4</td>
<td>23320</td>
<td>60</td>
<td>13992</td>
<td>1399</td>
</tr>
<tr>
<td>15-20</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>5830</td>
<td>40</td>
<td>2332</td>
<td>233</td>
</tr>
<tr>
<td>Total</td>
<td>1632</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1632</td>
</tr>
</tbody>
</table>

This calculation results in a proposal of an annual harvest of 1400 *Terminalia sericea* stems with average diameter of 12.5 cm and 230 stems with average diameter of 17.5 cm.

The total harvest potential is 6590 poles annually. The estimate for current use by the settlements inside the inventory area is about 600 poles. Therefore, a total of 6000 poles can be extracted annually.

It must be noted that the calculation of allowable cut here is very sensitive to the estimate for the natural mortality per cents used for the diameter classes. Very high mortality rates were used here. If they would for example be only half of the ones used, the allowable cut would be twice as much as given here. It must also be kept in mind that the inventory and the calculation here do not cover the whole core area.
12.3 Revenue expected from the harvest

The average price used in the calculation here for a small sized pole is 2 N$ and for a large size pole it is 5 N$. An annual revenue of 15 400 N$ may be expected from selling the poles. Whether selling the poles is financially feasible, depends on the cost of labour needed for cutting the poles and transporting them to the markets. These cost calculations have not been included here.

13. HARVESTING PLAN

13.1 Control by area and number of stems

In order to facilitate the practical implementation of the harvest proposal and especially controlling of it, the core area and the inventory area has been divided in 11 blocks (see Map 2 below). In the field these blocks are demarcated by the outer fence of the core area and the cutlines inside the core area. In the south, the block boundaries coincide with inventory boundary and can not be seen in the field. Instead, the map must be used for estimating the location of the boundary.

One block is proposed to be harvested annually with the exception of blocks 3 and 4 which are proposed to be cut in one year. The aim is to keep the harvesting yield at a reasonably constant level. The amount of trees to be harvested varies from year to year because the sizes of the blocks are varying. The number of stems to be cut in each block is based on the proportion of the area of each block. In the proposal, an assumption is made that 20 % of each block will be left out for biodiversity protection. In reality, this may not be the case and adjustments may have to done to the harvesting plan respectively. The buffer zones for the tracks and campsites have been deducted from the areas. Also, the current use of poles by the settlements has been taken into account in the harvest plan for blocks 1, 2, 5, 6 and 10. In the following table 7, the harvesting proposal for Block 1 is given as an example. Harvesting proposals for the other blocks can be seen in Appendix 3.

Table 7. Harvesting proposal for Block 1

<table>
<thead>
<tr>
<th>Block 1</th>
<th>Harvesting area: 409 ha (7 % of total)</th>
<th>Proposed harvest year: 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Diameter, cm</td>
<td>Nr of mopane stems to cut</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Distance between trees to cut</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nr of Terminalia stems to cut</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Distance between trees to cut</td>
</tr>
<tr>
<td>7.5</td>
<td>940</td>
<td>65 m</td>
</tr>
<tr>
<td>12.5</td>
<td>990</td>
<td>65 m</td>
</tr>
<tr>
<td>17.5</td>
<td>530</td>
<td>90 m</td>
</tr>
<tr>
<td>Total</td>
<td>2460</td>
<td>960</td>
</tr>
</tbody>
</table>
Map 2. Harvesting blocks in the Salambala core area

The column “Distance between trees to cut” indicates the average distance that should be kept in between trees that are being cut in order to reach the desired number of cut trees in total. This distance is a theoretical one and could be applied if the trees grew evenly. However, in reality they grow in patches and the distances can only be used as an indicative guideline. Also, the diameters given in the table 3 are guidelines. During the harvest, a control enumeration of the trees cut can be carried for example by measuring the diameter of every 20th tree which has been cut.

13.2 Selection of trees

In practice, the selection of trees will differ from the proposed structure. It is not possible to cut trees following a certain strict rule for average diameter. Some rules of thumb are given here to facilitate the selection of trees:
Mopane:

- No mopane trees with dbh less than 5 cm should be cut
- No mopane trees with dbh bigger than 20 cm should be cut
- All sizes between 5 and 15 cm should be cut
- All sizes between 15 and 20 should be cut
- The distance between mopane trees to be cut is specifies by block and by diameter class (see Harvesting plan in Appendix 3)

Terminalia:

- No Terminalia trees with dbh less than 10 cm should be cut
- No Terminalia trees with dbh bigger than 20 cm should be cut
- All sizes between 10 and 15 cm should be cut
- All sizes between 15 and 20 should be cut
- The distance between Terminalia trees to be cut is specifies by block and by diameter class (see Harvesting plan in Appendix 3)

Damaged trees and trees with lower quality should be preferred when selecting trees. It is better to let the vital trees with good quality grow into big trees. However, it also important to have dead trees available for example for cave nesting animals.

13. Implementation of the plan

13.1. Options for implementation

The Conservancy does not have the resources immediately available to carry out the activities planned in this management plan. The critical resources needed are manpower, supervision of the work and monitoring of the work. It also needs technical advice from the District Forestry Office. Perhaps the most practical way for implementation would be to have contractor to carry out clearly defined tasks. For example, harvesting of a certain block in a certain year could be given to a contractor and the payment would be done according to number of poles harvested. The contractor would be obliged to hire labour from the villages in the conservancy. In the case that operations are given to outside contractors, the definition of the work must be very clear and monitoring of the work must be well arranged.

Another option for the implementation would be that the Management Committee hires labour directly to carry out the activities. However, in this case, a lot of inputs are needed from the Committee to supervise the several phases of the work.
Third option could be that the people Salambala villages will be allowed to harvest poles according to the plan. This option calls for close interaction with the communities so that it is possible to follow the plan in reality.

Whatever is the option selected for implementation, it is recommended that a plan for implementation for each year will be made together with the District Forestry Office. In this plan, the tasks and roles for each stakeholder would be specified. The implementation plan should also have the schedule for each activity. The plan should be made on early basis so that the lessons learned in one year can be taken into account when planning the activities of another year.

13.2. Collaboration with the District Forestry Office

In order to be able to implement the management plan, the Salambala Management Committee needs technical advice as well as some other services from the District Forestry Office. Assistance from the Forestry Office is needed at least in the following matters related to the implementation of the plan:

- Preparation of the annual implementation plan
- Issuing necessary permits
- Planning the field operations
- Demarcating areas for protection
- Training the workers to select trees
- Monitoring that the possible contractor is following the instructions
- Monitoring that the activities done in the field are following the management plan
- Reporting

The role of the District Forestry Office should be an advisory role. The responsibility of the implementation of the plan can only be on the Salambala Management Committee.

13.3. Monitoring of the implementation

Monitoring of the implementation should be done by the Salambala staff assisted by the District Forestry Office staff. The monitoring should include at least the following activities:

- During and after harvesting: control of the number of trees harvested from each block. This is done by counting the number of poles removed from the area and checking that they are of correct size (no big trees harvested) and checking that an appropriate distance is kept between harvested trees (distance between stumps).
- Controlling that the other management recommendations of this plan have been respected. One of the most important ones is to leave a portion of the land untouched.
- Monitoring regularly (monthly) any other changes in the forests in all blocks (illegal cutting, damages by elephants, forest fires etc.). This could be done by
the game guards when they are patrolling in the area following the idea of the “Event book” applied in monitoring wildlife.

- After five years of implementation, an intermediate forest inventory on the blocks that have been harvested. This inventory should be designed so that accurate enough results can be obtained for each block. The inventory should reveal the number of trees and saplings left after the harvesting.
REFERENCES

Agreement of Collaboration between Salambala Conservancy and Directorate of Forestry (DoF), 11 October 2001, Directorate of Forestry, Windhoek.


Matengu, K.K., 2001. The Quest for Sustainable Community-Based Tourism in Salambala Conservancy, Caprivi Region, Namibia, Master Thesis. University of Joensuu, Joensuu, Finland.


Interviews

Weaver, Chris, Chief of Party WWF-LiFe Project. 10.08.2001, 8.10.2001 and 27.3.2002.


Collair, Paul, Training Officer, Rossing Foundation, 28.3.2002.
APPENDIX 1. SWOT Analysis for development of tourism (Source: NACOBTA, 2002)

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
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<tr>
<td>- Traditional (cultural and infrastructure)</td>
<td>- Limited entry of wildlife into the area</td>
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<tr>
<td>- Presence of a protected area and resident (low density) wildlife population</td>
<td>- Cattle migrate into the eastern section of Salambala during flooding (increase in temporary settlement and high levels of poaching)</td>
</tr>
<tr>
<td>- Panoramic landscape and views to the south</td>
<td>- Few traditional products and activities to market</td>
</tr>
<tr>
<td>- Tourism industry in Ngoma area is already developed and needing to expand activities</td>
<td>- Limited tourism appeal of the core area</td>
</tr>
<tr>
<td>- Broad-based support for tourism development</td>
<td>- Access poor and travel difficult</td>
</tr>
<tr>
<td>- Presence and experience of the Salambala Conservancy Trust</td>
<td>- Road Fund cross border charge permit and border hours serve to prevent day-visitor tourists from Botswana</td>
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<td>- Few business skills available in the communities</td>
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<table>
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<tr>
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<th>Opportunities</th>
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<td>- Modernisation of infrastructure</td>
<td>- Capitalise on the road access through the conservancy and the presence of tourist lodges in the Chobe Enclave.</td>
</tr>
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<td>- Settlement along the Ngoma-Katima main road reducing its appeal</td>
<td>- Increase links to Botswana tourism and other infrastructure</td>
</tr>
<tr>
<td>- Conflicting land use developments (settlement, arable agriculture, livestock)</td>
<td>- Use the areas opposite Chobe National park for tourism developments</td>
</tr>
<tr>
<td>- Political instability in Caprivi</td>
<td>- Capitalise on the presence of regional road route through the area</td>
</tr>
<tr>
<td></td>
<td>- Develop the hydro-geological story behind the changes in Lake Liambezi flooding</td>
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<td></td>
<td>- Improved use and protection of ecologically important areas</td>
</tr>
<tr>
<td></td>
<td>- Increase wildlife densities in key areas</td>
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APPENDIX 2 (Page 1). Harvesting plan for the Salambala Core area.

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<tr>
<th>Block 1</th>
<th>Diameter, cm</th>
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<th>Nr of Terminalia stems to cut</th>
<th>Distance between trees to cut</th>
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### APPENDIX 2 (Page 2). Harvesting plan for the Salambala Core area.

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APPENDIX 3. Satellite image of the core area