

A Rapid Rural Appraisal of the Bushmeat market in the Boé region, Guinea-Bissau

An investigation of the interaction between fauna (and flora) and people in the Boé
region, Guinea-Bissau



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Summary

This study was with using participatory group interviews in 21 villages in the Boé region of Guinea-Bissau, and three months observation. There are many opportunities for the conservation and responsible use of the regions natural resources, which all call for the development and support of the local population.

Hunted, wild animals are one of the most important sources of protein for the population of Boé. About 12 % of the men in Boé derive their income from hunting, which makes it after farming (65%) the most important income generating activity.

Hunting is mainly concentrated on a few fast reproducing species like; *Cephalophus* ssp., *Histrix cristata* and *Tragelaphus scriptus*. Where other bigger mammals like Roan antelope (*Hippotragus equinus*) and Giant Eland (*Taurotragus derbianus*) and Buffalo (*Syncerus caffer*) used to be abundant only 20 years ago, now they are rare. Mostly because of land conversion and increased hunting pressure, all year round not only in the hunting season. The situation on the bushmeat market in Boé is different from the findings of Merode (2004) who found that over 90% of both bushmeat and fish production is sold at the local or regional market here 33 % gets sold on the local market inside Boé. However the lack of infrastructure in the Boé region conserved the rich biodiversity enough to call for a region protection and management plan.

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Abbreviations

PADIB	Projecto de Apoio ao desenvolvimento integrado de Boé
CFA	Franc Communauté financière d'Afrique (1 euro = 655 CFA)
NTFP	Non Timber Forest Products
Kg	Kilogram
NGO	Non Governmental Organization
CITES	the Convention on International Trade in Endangered Species of Wild Fauna and Flora
IBAP	Institut pour la Biodiversité et Aires Protégées
RRRM	Rapid Rural Research Methods
WSPA	World Society for the Protection of Animal

1 Introduction

Guinea-Bissau has 46% of the total area (including the protected coastal waters) designated as protected area (WCPA 2008). There are two international recognized parks (Bolama - Bijagós and Lagoa de Cufada) with a total area of 140.000 hectare (3% of the total area). The Boé region, the South-eastern district of the country squeezed in between the Rio Corubal and the border with Guinée Conakry, is designated a 'no hunting zone' in 1989. However this no 'hunting zone' is not actively managed as such by the government nor by NGO's.

In the last twenty years the Boé region has seen a number of development projects and NGOs's. The biggest project was the "Projecto de Apoio ao Desenvolvimento Integrado de Boé" (PADIB). The PADIB project had its focus on creating more diversity in the agricultural system. By intensifying the agricultural system used in the region to alleviate poverty (Gussenhoven & Paulini 1982). The PADIP project was followed up by the Bantahal Boé project, both projects were based in Beli one of the main villages of the region.

The WFP (World Food Program) is stimulating education, by providing food for primary school children. The Firkidja project funded by Unicef has built several primary schools, but unfortunately without a roof, because of a dispute with the contractor. The NGO DivuTec (funded a/o by ICCO) is setting up a micro-credit scheme in the eastern area of Guinea-Bissau and has built a community radio in Beli. However the community radio is hampered by the faulty installation of the antenna and lack of diesel for the generator.

The Dutch NGO Chimbo has taken up the challenge to integrally manage the natural richness of the Boé region to the benefit of biodiversity conservation and the local communities. Chimbo initiated a programme to preserve the population of Chimpanzees in the Boé region. This programme is dedicated to David Goedmakers who died at the age of 18 in 2006. The program funded a research team from the IUCN in Bissau to conduct a project feasibility study for a project to develop tourism for the conservation of the chimpanzees and the profit of the local population.

Despite all efforts not much has changed for the livelihoods of the people in Boé in the last 20 years. The population increased from 6769 in 1985 (Reintjes & Wit 1989) to more than 10.000 (Djarga 2008) in 2008. With this population increase and with the limited agricultural land and agricultural output, there is more pressure on the natural resources now, than ever before.

Chimbo is a Dutch NGO dedicated to the protection of chimpanzees in West Africa. Chimbo asked me to provide a more detailed insight into the local communities' exploitation of the biodiversity in the Boé region. According to a study done by the C.S.Schwarz (2007) there is a need to protect the local chimpanzee population. As the people in Boé are largely dependent on the natural environment, there is likely to be conflict between both species with the increasing number of people living in the area (see Annex 1 ToR). Cimbo has committed a characterisation study to IBAP (The country's agency for Protected Areas) which provided many useful data for this report and study.

Are the people in Boé still as dependent on their natural environment as 20 years ago? This question is broad. Because this research project was limited in time, the main focus is on the bushmeat market. The following research questions were formulated:

1.1 Research question and sub-questions

- What is the importance of natural resources for the livelihoods of the people of the Boé?
 - What are the main income generating activities of the people in Boé?
 - What is the importance of non-timber forest products on the livelihoods of the people in Boé?
- Who are the stakeholders for hunting and the trade in wildlife products?
 - How many stakeholders?
 - What is the approximate trade share for each stakeholder in the bushmeat market, in the Boé region?
 - Do the stakeholder who are not from the area hold a big portion of the market?
 - What period of the year do hunters hunt most in the region?
 - What methods are mostly used when hunting?
 - How aware are the hunters and farmers of the national/international law on hunting?
 - What hunting regulations are used in practice?
- What species hunted in the Boé region?
 - What are the main hunted species
 - What species are still abundant
 - Is there a difference in the meat availability in the Boé region compared to 20 years ago, and if yes, what are possible explanations for this change?

1.2 General Introduction Guinea-Bissau

Guinea-Bissau is a small country in West Africa, covering an area of 36,544 km. It is similar in size to the Netherlands. The total population is about 1.6 million with 388 thousand living in Bissau, the capital.

Guinea-Bissau is a country building a new future after the long war for independence from Portugal, ending 1973. More recently the country was torn apart by the war between military leaders (1998). Now after the elections for Parliament of 2008 the future looks promising.

Guinea-Bissau is small in size but has a rich culture of hospitality and is home to 10 different ethnic groups, mainly Mandinka and Fula in the East of the country, and Balanta and Papel in the West (Callewaert 2000). The Mandinka and Fula people in the East of the country are Muslims, and the other ethnic groups have a religious mixture of Christian, Animist and Muslim believes. The official religion of the country is Christian.

Guinea-Bissau heavily depends on foreign aid to pay for governmental services and projects (Worldbank STAT 2007). Most of the industry is based on agriculture and depends on manual labour.

Guinea-Bissau has a tropical climate and there is little temperature fluctuation averaging 26.3 degrees Celsius. The average rainfall for Bissau is 2024 mm.

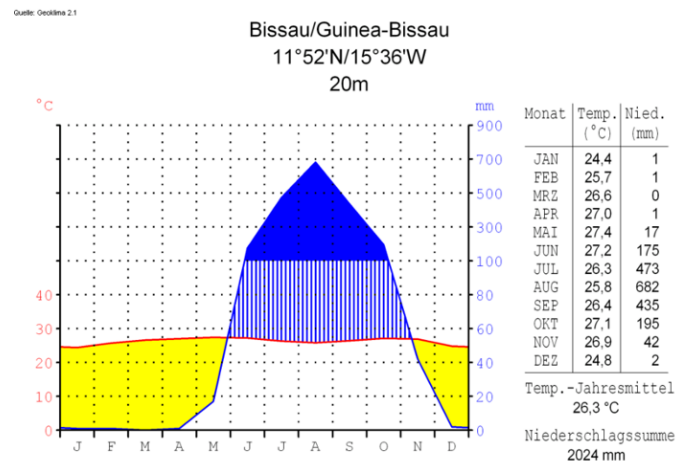


Figure 1 Climate diagram Bissau. (<http://www.w-hanisch.de/geoklima/>)

This is almost entirely accounted for during the rainy season which lasts from June to September/October. The dry season lasts from December to April, with little to no rainfall (fig. 1).

The main types of vegetation are the mangroves in the West, and the savannah landscape in the East. In the South it rains over 2000 mm a year while in the North it is a lot drier and rainfall ranges from 900mm in the Northeast to 1500mm on the Northwest coast (see annex.2).

A large percentage of the total area of Guinea-Bissau is designated as protected areas (see Annex 3). Guinea-Bissau is one of the few places in the world where you might see chimpanzees in their original habitat. Although the country has a poor industry and infrastructure, in biodiversity it is rich. This gives the country a lot of opportunities.

1.3 Laws and Regulations on hunting in Guinea Bissau

1.3.1 International law

Guinea-Bissau is bound by the provisions of CITES since 14 of August 1990. However because there was no national CITES Legislation Plan created by the national CITES

management authority of Guinea-Bissau (Direcção dos Serviços Florestais e Caça), the other parties in the convention are recommended to suspend commercial trade in specimens of CITES-listed species to and from Guinea-Bissau until further notice from 30 April 2004 onwards. (CITES 2008)

Guinea Bissau signed the “African convention on the conservation of nature and natural resources” (ACCNNR) which came into force on 16 June 1969. Guinea Bissau signed this treaty on 8 March 2005 (African Union 2003). This treaty contracts Guinea-Bissau to adopt the measures necessary to ensure conservation, utilization and development of soil, water, flora and faunal resources in accordance with scientific principles and with due regard to the best interests of the people.

Under this treaty countries must have appropriate legislation on hunting and actively monitor the prohibited methods of hunting. There are a number of vulnerable and endangered species recognized by the convention that are present in Boé. The two most important are the Chimpanzee (*Pan troglodytes*) and the Giant Eland (*Taurotragus derbianus*) (for a complete list go to Annex 4), although this species might already be extinct in Guinea Bissau (*internal report IBAP 2008*). Both species are classified “A” under the ACCNNR 2003 agreement, which means that countries are obliged to protect those species from all hunting, killing, capture or collection of specimens except if permitted by the highest competent authority and only if required in the national interest or for scientific purposes. Species Classed “B” under the same agreement (consult the species list in Annex 4) shall also be fully protected, but may be hunted, killed, captured or collected under special authorization granted by the competent authority.

The treaty defines which hunting methods are prohibited±

- Snares
- Live animals used as decoys which are blind or mutilated
- Tape recorders
- Electrical devices capable of killing and stunning
- Artificial light sources
- Mirrors and other dazzling devices
- Devices for illuminating targets
- Sighting devices for night shooting comprising an electronic image magnifier or image converter
- Explosives
- Fire
- Nets (except as specified by the Conference of the Parties)
- Traps
- Poison and poisoned or anaesthetic bait
- Gassing or smoking out

- Semi-automatic or automatic weapons with a magazine capable of holding more than two rounds of ammunition
- Aircraft
- Motor vehicles in motion

1.3.2 National law

Hunting regulation 1980

This Decree establishes the Hunting Regulation. It consists of 56 articles listing; endangered species, animals permitted to be caught, hunting areas, authorized methods, etc. The decree specifies the authorized hunting season (from 1 November to 30 April) and prohibited activities within no hunting areas (forest fires, poisonous substances, etc.). It lists the requirements to be satisfied in order to obtain a hunting licence (good physical and mental health, identification papers, gun licence and knowledgeable about the hunting legislation law). Control is to be carried out by a competent authority and sanctions are to be paid by offenders.

Important Prohibitions:

- It is prohibited to hunt young animals and pregnant animals.
- Hunting is only allowed if you have a hunting permit during the hunting season which is from the 1st of November to the 30th of April.
- It is prohibited to hunt animals considered useful for agriculture or cattle-raising. There are a few animals for which an exception can be given, if they form a big nuisance. (See Capital 2, article 5 Regulamento de Caça 1980.
- It is forbidden to hunt *Hippotragus equinus*, *Tragelaphus oryx*, *Kobus ellipsiprymnus defassa*, *Tragelaphus spekei gratus*, *Panthera pardus*, *Orycteropus afer*, *Loxodonta africana cyclotis*, *Colobus polycomos polycomos*, *Pan troglodytes*, *Manis gigantean*. (Annex 5)

Law on national parks 1997 (an updated version of this law will be signed soon)

Organization of a National park

The president of a National Park is legally appointed by the Minister of Tourism, Environment and Handcrafts. The board of the National Park is composed of representatives of the ministries of Tourism, Environment and Handcrafts, Agriculture, Education, Finance, Fishery and Natural Resources and Public works, who vote on the annual budget.

Before the creation of the first draft statutes, that defines the responsibilities of the provisional president and the internal organization of the protected area. The president and board of the National Park must be installed by the ministry of Tourism Environment and Handcraft.

The statutes will be adopted by the board within a year after the date the National Park is designated.

After the decisions have been approved by the board of the National park, they will be presented to the minister by the president of the board of the National Park.

The president of the board of the National Park will be responsible to assign guards and technical persons which are under his authority.

Concerning the local population

1. The proposal for the creation of the park and its zoning will be formulated in collaboration with local communities
2. For the objective of collaboration, the Minister for Tourism, Environment and Craftwork will install a "Commission Ad Hoc Concertação" chaired by a representative of his Ministry.
- 3 The Commission prepares a stakeholder report which contains the minutes of the meetings and all other documents that are created to clarify the opinions of all participants.

1.3.3 Hunting regulation in practice

The hunting regulation is enforced by the forest guard for Boé, but the guard is based in Gabu and visits the area rarely. However he has local assistants in several villages to keep an eye on things in the region. They enforce the law by collecting tax on honey and other forest products that are going to the market in Gabu, by collecting fines on major offences. There is an overseeing assistant forest guard in Dandum, CheChe, Beli and Pataque. In Dandum it was the most active hunter.

It is illegal to hunt in the hunting reserve of Boé without a permit. But exceptions are made for hunting done by the local population; this meat may not be sold. It is possible to get a hunting permit. This costs about 10.000 CFA and can be purchased from a forest guard, either in Gabu or from one of the forest guards in the villages. However most of the local hunters do not have a hunting permit (personal communication with Amadal Camera, forest guard of Beli).

Everybody who wants to hunt needs a gun and when you own a gun, it is obligatory to buy a licence. Licences are sold by the military officers in Beli. Licences range from 2000 CFA for an African made shotgun to 5000 CFA for a European made shotgun (double barrel shotgun).

1.4 Introduction to the Boé region

The Boé region lies in the South- Eastern corner of Guinea-Bissau. The region's Northern border is the Rio Corubal (river), in the South and the East the Boé region shares the international boundary with Guinea Conakry. The geographical position of Boé is 13°45' to 14°30' longitude. The total area is 3 287.8 km² (Gussenhoven in Reintjes & Wit 1986).

The ethnical background of the people living in Boé is mainly Fula. The main language spoken in the area is Fula-Poular.

In the Boé region is a rich biodiversity (Schwarz c.s., 2007), larger than in other areas of the country, mainly due to the remoteness of the area and the lack of infrastructure. The flagship species of this region is the Chimpanzee. The North-east of the Boé region

has a rich biodiversity with many threatened species (Annex 6). The estimated population of Chimpanzees is at least 710 Chimpanzees for the whole of Boé (Schwarz 2007).

The majority of the large mammal species in Boé is threatened either directly by hunting or indirectly by the degradation of their habitat, because of the land converted for agriculture. The most affected species of mammals are those of medium to larger size (Fa et al. 2004), in particular the carnivores and ungulate species. The group of the primates suffers less in spite of impact from human pressure in this area. This is because of the traditional and/or religious taboo of the eating of primates (Schwarz c.s., 2007).

Bushmeat, the meat of wild animals, is one of the most valuable tropical forest products after timber. It is an important source of protein, widely consumed in both rural and urban areas (several authors, e.g., Wilkie and Carpenter, 1999).

The bushmeat trade in Africa consists of five groups of professional stakeholders: commercial hunters and farmer hunters, wholesalers, market traders and restaurant/ bar owners (Mendelson 2003). The consumer is the final stakeholder. For Guinea Bissau the main stakeholders are not as apparent as in other parts of Africa. You rarely see people selling bushmeat on the side of the road.

The main stakeholders in the trade of wildlife products in Guinea-Bissau are the commercial hunters from; Bissau, Guinea Conakry from the South and in the other parts of the region the soldiers that want to supplement their wages (Schwarz c.s., 2007). This leaves the rural population with less of a valuable resource. One of the questions to answer by this research project is, whether this is also the case for Boé?

2 Methodology

The ToR stated for the researcher, to make a quantitative assessment of the importance of hunting and the trade in wildlife products for the livelihoods of the people of the Boé. During field work it was noticed that due too the lack of exposure to previous questionnaires the interviewees were very willing to do an interview but giving answers to the scaling questions used in structured interviewing proved difficult. A possibility would have been to analyse the bushmeat market using household surveys on what they eat/ use every day. But nourishment can be different in the each season and may even be different in some years. The other problem with the household survey method was that there was no possibility to achieve a sufficient sampling size or repeat the survey in different months of the year.

An other way to collect quantitative data would be to analyse the availability, species and weight of the bushmeat sold on markets, however this was not an option as there was nearly no meat sold on markets in the region.

To get an overview of the bushmeat market in the Boé region, her stakeholders and how they contribute to the livelihoods of the local people. A more general approach was used utilizing Rapid Rural Research Methods (RRRM). The Rapid rural research methods would produce can give a fairly accurate data in a relatively short time and with few funds (Crawford 1997).The Downside is that compared with empirical research methods RRRM is less accurate and less easy to replicate.

The research questions were tackled by doing a group interview with the hunters of each village. There are 71 villages in Boé and about 12000 inhabitants. The goal was to do an semi structured interview in every village (for a village map see annex 7). However due to transport difficulties only 21 villages were reached, with 20 completed questionnaires.

2.1 Interviews with Key-persons

The interviewing started with interviews with different key-persons. These key-persons were selected according to knowledgeability and social status. My key-persons were Djarga Sila (former governor of Boé), Julio Djaló (the nephew of the governor in Gabu) both active in politics and Amadú Sané (Daridibo's local project officer).

The key-persons were asked to provide names of hunters in different villages. Other names I got from Amadal Camerá (Forest guard of Beli) and Malam Banjai (former hunter from Pataque).

During these first interviews the research questions were addressed. To get a general view on what to expect from the answers to the questions in the group interviews for feedback on the questions on the questionnaire and topics.

During the semi-structured group interview the villagers were asked to sort the cards found in Annex 8 These cards were created with the use of the species list (Annex 6)

created with Amadal Camera, Malam Banjai (former hunter and animator for the Banthal Boé project) and Bucari Camera using the Stuarts “Field Guide to the larger mammals of Africa” and the species list produced by the IBAB (Schwartz 2007).

After the group interviews were completed the preliminary discussion and conclusions was discussed with the key persons. To get feedback on the validity and accuracy of the conclusions.

2.2 *Semi-Structured group interviews*

It was possible to notify and interest the population of the selected villages on the night before, using the local radio. The local radio served the purpose of preparing the field for the interviews. By discussing the research and research goals on the local radio. Made them less sceptical and more willing to answer questions about their village and their livelihoods. More importantly it made sure there were still some people there to do the interview with, because normally they would have left for work on their farmland early in the morning.

The interviews were held in small group discussions, ranging from two hunters to five and many interested onlookers.

During the introduction of the interviews personal questions were asked, to produce a list of names and the occupation of the different respondents. This was used to create a general picture about the main income generating activities and how many people rely on natural resources and hunting. These personal questions, were used to create a familiar atmosphere and gave time to explain the motives of Chimbo/ Daridibo in the Boé. The downside of conducting ‘personal’ interviews is that sensitive issues, like hunting outside the hunting season and on prohibited species are not always answered truthfully. However during the testing interviews, interviewees lost interest half way the interview, if they had told the interviews would be anonymous.

After the introduction, the interview would continue to more general questions about the village. (the total population, number of hunters, fishers and beekeepers, for the full questionnaire see Annex 9). The question on total population could in all villages be answered because in every village they keep their own record of deaths and newborns. This information could be used to calculate the population increase in the last 20 years. The number of hunters, fishermen and beekeepers was used to estimate the amount of people who directly derive their main income from natural resources. It partly answers the question on who the stakeholders are in the bushmeat market in the Boé region. The questions on non timber forest products (NTFPs) were asked to provide more information on how important the natural resources are for their livelihood. This included the question: if people from Guinea Conakry or Senegal come to Boé to harvest NTFPs or hunt. There are many migrants from Guinea Conakry in the Boé, people with a different cultural background less bound by the social regulations in Boé and likely to have a different way of exploiting the natural resources in the region. Next to that they

create bushmeat marketing possibilities for the local population, because they can sell their bushmeat to their richer relatives in Guinea Conakry

The question on what methods the interviewees use to protect their fields from browsing animal measured the attitude towards crop destruction, and the prohibiting laws on poisoning.

The research question on what species are hunted in the Boé region was answered by the sorting nine cards with pictures of animals and the names of the species in Fula. On each card similar species that are previously identified as animals that are caught for food consumption. These cards are sorted according to; availability of species, (species that the villagers see but can not or do not shoot) and what species they prefer.

The species selected after recognition by the interviewees were classified in food and non food species. The species generally used for food were selected to be used on the cards in the interviews. This had two reasons. First these species would be recognized by nearly all people interviewed and second there is no taboo on talking about food, where there is a taboo on talking about things used for magical purposes.

The species were sorted according to similar phenotype characteristics (big ungulates, small ungulates, monkeys etc. and put in seven classes: monkeys, night animals, pigs, buffaloes, bigger gazelles and antelopes, waterbucks (lives near water), smaller gazelles and duikers. Two additional classes were added, one for birds and one for domestic animals to get a total of nine. These classes were put on cards. (See annex 8) During the interviews these nine classes were sorted, giving 9 points for what they eat most, 8 points for second most etc. Species that, according to the villagers, they did not see, eat or prefer were given 0 points.

The villagers were asked to sort these nine cards for each question:

1. What species are preferred?
2. What species are eaten?
3. What species are seen most?

Later these points would be summed for all villages to see what the main preferred species are, what species are seen most, and on what species they hunt most.

The question on the difference in the meat availability compared to 20 years ago and if yes, what the possible are explanations for this change? Was asked to see what change in abundance of game the people in Boé perceived over the last 20 years and to what they attribute that change.

I concluded my interview with a group photo of the hunters and other participants of these discussions. These photos helped to draw my conclusions and make sure that if my research would be verified or repeated the same people can be found again through recognition of the faces on the group photos included in annex 10.

After the interview I showed my book of larger animals of Africa and asked for additional information on species not noted on the cards and personal hunting experiences.

2.3 Structured observation

Structured observation of the weekly market in Beli and in the small village shops in the centre of Beli was done every Monday around 11.00 for a period of 4 months. A photo was taken of one stand for each Monday to see what change there is in availability of products, with emphasis on materials needed for hunting, e.g. Bullets, steel wire, flashlights and guns. The merchants were asked if they sold ammo and how much. The purpose was to determine the amount of ammo sold in the village and to see if this would change over time, for observing the hunting pattern in which weeks is the demand for hunting related material the highest. Buying ammo in the city of Gabu of course is much cheaper but during a more busy hunting period, hunters might not have time to go to the city.

Village transect lines were walked from South to North with attention paid to the work people were doing, what agricultural crops are produced and what animals were sold, eaten or kept.

2.4 Analysis and Documentation

The analysis was done using MsAccess and MsExcel. The interview data were entered into an MsAccess database. This made it easier to summarize data using queries. Graphs were produced using MsExcel.

2.4.1 Data quality

The hunting on bushmeat is quite a controversial subject I expected a lot more resistance, because at the start of most interviews the interviewees were quite cautious on what will happen to the information, but that soon settled after explaining the goal of the research and I had no village who refused to discuss the subject

In the village interviews usually the older males of the villages were interviewed. The women have less time than men in Boé and men usually have more to do with village level decision making and hunting activities. When I tested the interviews with 3 different women in Beli and one in Pataque, most of the questions on hunting were seen as ‘men only business’, or responded with meat is meat it does not matter where it is from.

This could have influenced data quality but it is important to note that because the older men have a more selective diet, it is more likely that they eat something rare more often.

Fortunately the translator was from the area and from the same ethnical background, and although young he had some reputation in the area (he was the disk jockey on the local radio, Radio Boé). This gave the people some confidence and made the responses more truthful. Of course asking for the names in the beginning of the interviews did influence the truthfulness. In the local culture it is important to create a relationship between people before any matters are discussed; asking about the families and occupations is both polite and builds the necessary relationship.

3 Results

In 21 of the 71 villages in the Boé region participatory group interviews were held.(see villages highlighted on the map in Annex 11.) The interviews were held during the period from the end of March till the beginning of July 2008.

There were 228 participants in the interviews. My questions were mostly only answered by men, because mostly the women were working on their agricultural fields or orchards and hunting is seen as men business.

3.1 What is the importance of natural resources for the livelihoods of the people of the Boé?

There are no official figures of how many people live in Boé at the moment, but estimates from Djarga Sila (2007) and Amadu Sane (2007) range from 12000 to 15000 inhabitants. According to Reintjes & Wit (1986) there were 6769 people living in the region in 1985. In the 21 villages visited during the research the total population was 5911, with four new villages compared to, 2593 inhabitants in the same villages in 1985. This makes an increase of 228 %. Reintjes & Wit (1986) estimates the maximum population that could be sustained in the area with their agricultural system is about 10000 people. With the population growth now it is likely that in the coming years the stress on the natural resources will reach critical conditions, with soil degradation problems on the agricultural fields and very low biodiversity.

The interviewees had 20 different jobs. Only in Cobolom it was not possible due to time constraints to note the occupation of the interviewees. All of the interviewees had fields for subsistence farming. The interviewees get their main income from farming (65%). The second biggest income generating activity was hunting (12%), with 25 hunters. The results for the hunters are possibly a little biased compared to other occupations, because I specifically asked for hunters to participate in my interviews. The third income generating activity is shop keeping (4%). The fourth highest is Tailor or blacksmith (2% each)

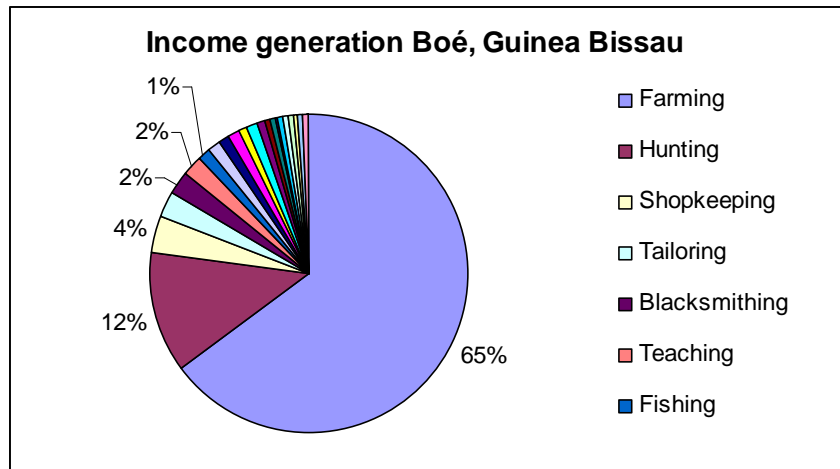


Figure 2 Income generation Boé, Guinea Bissau

The average household of the interviewees is 7. On average each household had 5 children.

The farmers work on rice fields (slash and burn) and usually have a few orchards with cashew, mango etc. The men prepare their rice fields in the dry season when they live with their families in the villages. In the rainy season the families live and work isolated on their fields, because the rain makes traveling very difficult and to guard against wild animals.

Table 1 Preferred method of protecting fields from wild animals

method of protection	N villages
guns, slings and traps	12
guns and slings	3
poison, guns, traps, slings	2
not asked ¹	4

Nearly all men own a gun. They use their gun to protect their fields against wild animals (like warthogs and duikers), in the rainy season, or for opportunity hunting when clearing their fields in the dry season. In table 1 we can see that guns, slings and traps are the most used methods of protecting fields from scavenging wild animals. In the villages of Pataque, Famredji and Limbi Manga Tamba they don't use traps. There were two villages that did use poison. In Dandum poison is used to poison Cane rats (*Thryonomys swinderianus*) specifically and in TcheTche all small rodents and mongoose are killed with poison. Most poison is made from broken glass stamped in a pilon to fine meal, which is mixed with rice.

In the four villages there was not asked what method of protection was used because of time constraints.

¹ Not asked in Gogoré, Uncire, Lugajole and Cobolom.

3.1.1 Honey gathering

The only village that has active beekeepers was CheChe. During the PADIB project there were a lot of beekeepers trained in Boé, but after the project stopped, the transport stopped and the small honey processing factory quit and the export market for honey collapsed.

In CheChe they said that there is one man from Bissau that collects honey and wax once a year in the West of Boé. None of the other villages visited mentioned this. Some honey is sold in Gabu through 'public' transport. The price of one kg honey is 450 CFA from this price 100 CFA is tax to be paid to the forest-guard.



Picture 1 honey gathering from a tree trunk

In all the other villages honey is collected from wild beehives. It takes around 2 days walking to find a beehive (A. Lala, pers. comm. April 17th, 2007). Usually beehives are found when clearing new fields. The process of collecting honey from wild hives is done by boys. First they cut the tree, containing the hive. Secondly the boys smoke out the bees with a fire and fresh leaves. Thirdly they cut a hole in the trunk containing the beehive whereby you open up the hive to take the honey combs, meanwhile keeping the bees well smoked. Back in the village the boys separate the honey from the wax by cooking and sieving (picture 3).



Picture 3 Honey sieving



Picture 3 Collected honey

3.1.2 Wild plants

There are 33 plant species commonly used by the people in Boé of which 13 are sold in local and national markets. (See annex 7.) Faroba, palmoil and lalu are usually sold by the women in the market, while folia is collected and sold by small boys. The mayor NTFPs used are faroba (*Parkia biglobosa*), palm oil (*Elaeis guineensis*), lalu (*Ceratotherca sesamoides* no picture, harvested in December), folia (*Landolphia heudelotii*), bamboo (*Oxytenanthera abyssinica*).

There are some traditional healers that still have the knowledge of how to use the traditional medicinal plants native to Boé, or how to create charms/ amulets and negotiate with the Iran (spiritual beings). They have great renown throughout the country and are visited by everybody who needs some help. Because of this reputation it is not necessary for them to sell any products on markets elsewhere. It was difficult to ask after traditional medicines because how they work and what works is not shared with outsiders.

Except for commonly known medicinal plants known and used by everybody, the roots from those commonly used plants are sold on markets in Bissau. However none of my interviewees admitted selling medicinal plants. They clearly where uneasy with the subject because they do have stocks of powders and liquids, but if this uneasiness was because I am white and not from there or because they are aware of the law was not clear.



Picture 5 Bundles of Faroba (*Parkia biglobosa*)



Picture 5 folia (*Landolphia heudelotii*)

3.2 Who are the stakeholders for hunting and the trade in wildlife products?

3.2.1 Local hunters

From observation was learned that there are three generations in working age 16 – 30 (the boys), 30 - 40 and 40 and up. Most heavy work is done by the boys, who are allowed to eat all meat including meat that is religiously prohibited (like pork or meat from monkeys). Pork is about 50-75% of the price of other species. The boys don't make a big distinction between meat, be it from pigs or monkeys or other meat. Pig- and monkey meat is a lot cheaper and used as a snack.

Table 2 shows that the top 5 villages with the most hunters are Sutamaca, CheChe, Beli Gogore, Cobolom. Looking at the main area's described by the hunters in the villages, we see a trend there are four area's used for hunting (see Annex 6), these include the Northern part and the area around the southern part of the Rio Féfine, the area around lake Vendu Tcham, and the eastern villages around and across the Rio Corubal.

The villages listed in table 2 who say they do not have active hunters; Limbi Manga Tamba, Limbi Lucum and Limbi Afia are surrounded by villages close by and relatively undisturbed forests is quite a distance from the villages.

Table 2 Amount of hunters in the visited villages

Village	Total population	Total hunters	Main source of animal protein	Preferred source of animal protein
Sutamaca	904	7	fish	meat
CheChe	540	7	fish	meat
Beli	650	5	fish	meat
Gogoré	59	4	meat	meat
Cobolom	360	4	meat	meat
Diquel	220	4	fish	meat
Unicere	65	3	meat	meat
Iugadjol	116	3	fish	meat
Monde Ali	230	3	fish	meat
Ore Limbi	57	3	meat	meat
Canquidima	150	3	meat	meat
Burquelem	376	3	fish	meat
Balandugo	243	2	fish	meat
Boloba	320	2	fish	meat
Dandum	380	1	fish	meat
Limbi Manga Tamba	120	0	fish	meat
Limbi Locum	172	0	fish	meat
Limbi Afia	390	0	fish	meat

Beli Sino	70	0	meat	meat
Pataque	326	0	fish	fish
Famaredji	163	0	meat	meat

The definition of a professional hunter in Boé is a s someone whose income is dependent on hunting. There are on average 2.5 professional hunters in each village. In some villages there were no professional hunters and in some of the bigger villages there are 7 (Figure 2). In one village (Pataque where I did my first interview) they said, that there were no hunters in the village and that they prefer to eat fish. When I came back two weeks later I could find five hunters. . Therefore it is possible that they prefer meat and not fish, like is true in all the villages visited where people prefer meat.

In the months of June and July most animals are shot (M. Banjai, pers. comm. May 15, 2007). This is the time when the animals give birth to their young and when the young grass is growing up. The second big hunting phase is just after the rainy season, in December and January, because then they burn the savannah and drive out any animals hiding in the grass. After the burning when the new grass sprouts from fire shock they hunt the animals that are attracted. They hunt by tracking animals in the dry season and when the rains start again at the end of May and the animals are less careful and attracted by the green grass on the savannah.

3.2.2 Foreign hunters

None of the interviewed villages lets people who are passing through from Senegal or Guinea Conakry collect NTFPs or hunt in their area. The general feeling under the villagers is that the NTFPs are for local use in times of need. In Sutamaca and CheChe the villagers said the Senegalese generally do not cross the ‘Rio Corubal’ to collect NTFPs.

The only “outsiders” that collect and hunt in the area are migrants from Guinea Conakry. There are two types of migrants in the Boé temporary migrants and permanent migrants. The permanent migrants moved into the area about 12 years ago. Most of them are cow farmers, whom moved to Boé after the degradation of their own environment. The biggest herd is around 400 animals. There are about 6 other herds. They have permission from the local village chief to graze around the villages.

The seasonal migrants get their permission from the authorities in Beli and they only stay for the duration of the rain season. Only the villages south of Beli reported difficulties with seasonal migrants, which they claimed ‘eat away all their natural resources’. In the other villages only the villages with the permanent cow farmers had problems with cows invading their fields and gardens. Surprisingly, in the village of Beli this seemed not to be a big problem even though it had the biggest herd.

3.2.3 Market of the bushmeat

The sale of the meat is usually done from the back of a bike. Either the hunter rides around the village or stays in the centre of the village and lets some boys go past the houses to tell that he has meat for sale.

Bushmeat is sold usually in the village the day it is shot or the day after. The meat is shared 1/3 for friends and family, 1/3 for neighbours and the last 1/3 is sold to the more economically powerful in the village or next village (personal communication Djarga Sila). If there is more than one village can buy and eat, the hunter will go to the next village.

The price varies from 350 -500 CFA/kg for Gazelle (*Tragelaphus scriptus*) and duiker. Meat that is less preferred like for pork or monkey meat, is sold for 100-200 CFA/kg. The price depends on quality and species. Usually the best meat is sold (the meat from legs and back of an animal). The other parts of the animal are eaten by the hunter and family or given to friends. The reason given to hunt, by the hunter in Uncire is that that the wild animals are cheaper than domesticated animals. The hunters example is that for Guinean fowl (*Numida meleagris*) the price would be around half (800 CFA for the whole animal) of that for a chicken of similar size (1600 CFA for the whole alive animal).

This does not hold true for mammal species with a price roughly comparable to goat. One living goat costs around 7.000 CFA, with about 20-25 kg this would be roughly 350 CFA/kg. Sheep are more expensive especially rams 30.000 – 50.000 CFA, but this is for religious reasons. Cows are sold for around 100.000 CFA (one kg beef costs around 750 CFA in Gabu). This means that the larger animals are sold under the price for a similar domesticated animal, with the exception of animals similar in size to goats.

The meat that isn't much in demand is smoked for later use. During the research I only saw one smoking rack for a pig. I did not see any other signs of smoking.

But during the rainy season when the people live on their agricultural fields far from the villages, all animals are hunted that come to forage. Those animals will probably be smoked. The animals that are not preferred food species will be shot after the third time they return to forage on the food crops, because the farmers believe that after the third time the animals will mark that field as foraging area. Animals that are preferred will be shot on first sight.

On the Monday market in Beli you can buy bullets for the 'home made' hunting rifles. As well as flashlights and wire to construct traps. However, meat or fish is rarely sold, and if it is for sale there are only live chickens or dried fish. The demand for Bullets and flashlights go up during the months of June and July.

3.2.4 Trade in live animals

Wildlife trade occurs in two ways, with most of the trade done by Africans themselves. Most animals are caught on demand to be sold or for pets in the city, e.g. last year in Sutamaca a driver from Gabu asked if they could catch a young baboon for him. He later returned and picked it up. They told me he wanted to keep it as a pet.

In Uncire the hunter said that sometimes they give animals to the soldiers or to other people from Bissau. Most of the trade is done within the family, family in the city ask their rural relatives for a pet and usually they provide one. The family in Bissau then sells the animals or keep them as pets (see photo 1). Even in Boé some people keep a very young patas monkey (*Erythrocebus patas patas*) as a pet.

On the other hand there are stories about white men coming to catch animals e.g. in Dandum the people said that 10 years ago there was a white man who bought all the animals he could lay his hands on. Either he was English or Dutch. In Burquelem I heard the same story.

The story goes that he bought all animals that were offered to him or that he could catch. The buyer stayed in Dandum for a few days or weeks.



Picture 6 Young male Chimpanzee, Bissau centre.

3.3 What species are hunted in the Boé region?

The animals mostly eaten are summarized in table 3. The animals eaten most were given 9 points, second most 8 etc. The animals not eaten at all were not given any points.

The smaller gazelle class incorporating Duiker (*Cephalophus spp.*) and Bushbuck (*Tragelaphus scriptus*) species were the most eaten species, seconded by bird species (mainly Guinea fowl (*Numida meleagris*) and Francolin (*Francolin spp.*).

This is followed by night animals (Porcupines *Hystrix cristata* or *Lepus spp.*). Although the pangolins are displayed on the same card only in the interviewees in Unicef told me they last saw one in 2007, but all the people interviewed agreed that the pangolin has very tasty meat.)

Table 3 The animals they eat most

Animals they eat most	
Animal class	frequency
Smaller gazelles and duikers	147
Birds	114.5
Night animals	93
Domestic animals	68
Pigs	61
Waterbuck	59.5
Bigger gazelles and antelopes	14
Monkeys	8
Buffalo	8

Table 4 The animals seen most

Animals they see most	
Animal class	Frequency
Monkeys	149
Pigs	145
Birds	136
Smaller gazelles and duikers	100
Night animals	58
Waterbuck	23
Bigger gazelles and antelopes	18
Buffalo	8

The animals mostly seen are summarized in table 4. The animals seen most were given 9 points, second most 8 etc. The animals not eaten at all were not given any points.

People mostly see monkeys (baboons *Papio papio* or Patas monkeys *Erythrocebus patas*) in the field (the green monkey (in the same category are seen less frequent). Seconded by pigs,

mainly Warthogs *Phacochoerus aethiopicus* and Red pigs *Potamochoerus porcus*. Birds are third, and bushbuck, kob, gazelle and duikers fourth. The night animals are on the fifth place. The other classes were rarely seen. Therefore in some villages they did not select them which give those species 0 points. The waterbuck (*Kobus Defussa*) is seen a little more often than the other antelope species. The bushbuck (*Tragelaphus scriptus*) on the other hand is quite often seen and shot. Only one village placed the domestic animals on top that is why they score 9 points in the other villages they responded that they see them everyday, therefore they left that card out.

Table 5 The animals that have the best taste

Animals that have the best taste	
Animal class	Frequency
Smaller gazelles and duikers	159
Bigger gazelles and antelopes	110
Birds	110
Night animals	104
Domestic animals	69
Buffalo	67
Waterbuck	51
Pigs	28.5
Monkeys	5.5

I was surprised to find that they all voted the meat of red-flanked duiker (*Cephalophus rufilatus*) as most preferred. This meat has a similar taste to goat's meat. They did not choose the buffalo meat, which is more similar to beef. Second Antelopes bigger Gazelle and birds, closely followed by night animals and of the night animals especially the porcupine was seen as having the best taste.

According to the all the people interviewed in Boé there now are less animals then 20 years ago no matter what species. The reasons the interviewees gave is that now there are more people and more land is used for agriculture. On the question what happened to the animals the opinions are divided (table 7). Most believe that the increase in human population caused the animal decline, but some believe they are just hiding because the animals don't like the humans very much.

Table 6 Reasons for game decline given by the local population

Reasons for game decline	Number of villages
the animals are hiding	7
no room for animals	5
we ate all the animals	4
different species are now abundant (like duikers)	1
not asked	4

4 Discussion & Opportunities

4.1 What is the importance of natural resources for the livelihoods of the people of the Boé?

Due to a high population increase it will be increasingly difficult to get sufficient yields from the available agricultural land. As is mentioned by Reintjes & Wit (1986) the Boé landscape, does not have a lot of suitable agricultural land. The slash and burn agricultural system that the population uses for growing their rice and cassava is needs a 20 year rotation. These 20 years are needed to restore to the previous levels of carbon and nutrients. As agricultural land gets more scarce, this restoration time is not allowed for. Most income is derived directly from natural resource related commodities (agriculture and hunting). Since harvesting in an unsustainable way is executed, without this sustainability the poverty in the region is likely to increase.

4.1.1 Wild plants

The mayor NTFPs used are faroba (*Parkia biglobosa*), palm oil (*Elaeis guineensis*), lalu (*Ceratotheca sesamoides* no picture, harvested in December), folia (*Landolphia heudelotii*), bamboo (*Oxytenanthera abyssinica*). The NTFPs are especially important in the lean season when there is much less rice and meat available for most families. The most utilized species during this time are faroba (*Parkia biglobosa*) and wild yam.

4.1.2 Honey gathering

There is still knowledge available on how to use bees. The reason that this is not done is mainly a transport problem. The second reason they gave me was also quite simple: “Why use bees if they can be found in the wild. I just have to go and get them if I feel like it”. Unfortunately the way of gathering honey is illegal according to Legislative Decision No. 01/GM/97 it is prohibited to gather honey by the cutting of trees. Beside from that it is very labour intensive and not very good for the environment. The beehive is severely damaged and only with luck the bee queen, when still alive, can lead her brood to a new place. There is an opportunity to develop bee keeping in the Boé region, but it will need education and understanding of the local people to see the long term benefits and infrastructure to succeed. In CheChe the people already understood the benefit of keeping bees and that village has 11 beekeepers with 5 to 10 hives each. CheChe can provide a pool of knowledge and a good example that could be shared with the other villages in Boé

4.2 Who are the stakeholders for hunting and the trade in wildlife products?

Most striking is that the hunting in the villages increases at the end of the hunting season in at the end May and beginning of June.

There are a lot of hunting practises in Boé that are used and are prohibited by the international and national law in Guinea-Bissau. The most frequently used methods are snares for trapping, this is more usual during the wet season when 'trap-lines' are created. Other methods seasonally used are fire. The burning of the savannah happens after the rain season and there are very few places that remain untouched usually the places that remain wet for longer. According to the interviewees, the hunters do this to clear the path which makes it easier to hunt (in high grass it is difficult to see the animals). Artificial light sources are used to hunt porcupine and any other animal they happen to come across.

Poison or poisoned or anaesthetic bait is said not to be used often. The results show that only two villages admitted using poisoned bait to protect their agricultural fields. Informal interviews with the women show that they are well aware on how to poison rats and other small animals or birds that threaten their rice fields.

Most hunters are aware of the national law, but the attitude towards the government is generally one of; "they don't care for us we, don't care for them". Although there are very few hunters that are aware of the prohibited animals but most are aware that they are not supposed to shoot pregnant animals or animals with young.

4.2.1 Local hunters

In the 21 interviewed villages are 54 hunters. Nearly all farmers own a gun. There are some villages without any hunters. On average there are 2.5 hunters in each village. With 71 villages all over the Boé region, that makes 182 hunters who hunt on a regular basis. I went to $21/71 = 0.296 * 100 = 29.6 \%$ of the villages in Boé and if 54 is 29% of all hunters in the Boé region there would be around 182 hunters. ($54/29.6=1.824 * 100=182$)

A personal observation was that the older generation had a clear preference for meat of Cephalopus spec. and bigger vertebrates.

4.2.2 Foreign hunters

The seasonal immigrants from Guinea Conakry are allowed to hunt in the region. The villagers closer to the boarder between Guinea Bissau and Guinea Conakry complained the seasonal migrants over utilize the natural resources. The soldiers stationed in the Boé also have the means available to them to poach and it is not unusual for them to have a monkey or a young chimpanzee as pet.

Of course there are some exceptions in the case of hunting tourists, who bring economic incentive and other benefits. Although the main bulk of the hunting tourists have not found the area yet (Lindsey et al. 2007), the few tourist that bare the inconveniences of the life in Boé are the few tourist that come for rare trophy hunting, and they are a threat to the slow breeding antelope species in the area.

According to the data the hunting pressure on pigs and monkeys is not that high. For the Flagship species of the area, the Chimpanzees, the low hunting pressure is positive. The biggest threats for the chimpanzees seems to be habitat loss due to increasing demand for agricultural land and the catching of the chimpanzees for pets or presents.

4.2.3 Bushmeat market

It is likely that the bushmeat is consumed immediately, because there were no signs for smoking and drying in any village in the research period (March-July). In August – November when access to the villages is not easy, the hunters smoke their meat first to preserve it for both their own use and to sell it to the more well to do families further away. While in the months that the roads are quite accessible the meat can be sold before it turns foul. This is in the months of the dry season February to the end of May.

4.3 What species hunted in the Boé region?

The interesting fact is that the wild animals seen most on the savannah and in the forest are reflecting the top three of what the local people eat most; Duikers (*Cephalophus ssp.*) and Gazella spec. Guinean fowl (*Numida meleagris*) and porcupines (*Histrix cristata* and *Atherurus africanus*).

Most of these species thrive better under a high hunting pressure (Nasi 2008). Unlike large bodied species like buffalo or bigger antelope species. It is possible to conclude that the high amount of ‘professional’ hunters in each village lead to a higher amount of the preferred species that are able to adapt to a high hunting pressure. The area is effectively managed for these fast reproducing sly species, by narrowing the habitat needed by other big antelope species. Although this management is not done with specific thought on the future management goals, it is successful in preventing any large scale poaching not organized from within the region.

5 Conclusions and recommendations

5.1 Conclusions

The fast increasing population in Boé results in habitat loss to agriculture, not least of all the increasing demand for protein. Unfortunately, none of these problems are quite new and a well known problem throughout most of the tropics (Nasi 2008).

Hunting is the most important income generating activity from forestry resources for the men in Boé. So any measures taken to protect the wildlife of Boé need to be thoroughly discussed with the local people. For the local people it will also be important to understand the value of their unique environment, to enhance participation in conservation efforts.

When a national park will be established in Boé the biggest threat will not come from hunters from outside the region but from the commercial hunters from the villages around the park in the area itself. The situation on the bushmeat market in Boé is different from the findings of Merode (2004) who found that over 90% of both bushmeat and fish production is sold at the local or regional market. In Boé 33 % meat from the whole animal is sold on the local market.

In the months of June and July (the breeding season) at the beginning of the rainy season it would be necessary to patrol the whole park intensively. The park guard should have the authority to fine poachers and confiscate all poaching material and caught animals. This could be done in cooperation with the Bauxite project, which has a concession in Boé for the next 20 years (newspapers Bissau 2008)

There is no environmental education for school children in Boé. Investing in teachers in Boé and paying the salaries on behalf of the population. Could be an opportunity to change that. The salary could be compensation for damage done to crops by chimpanzees. The children are now encouraged to practice their hunting skills on mainly small animals, because they are believed to be dangerous for the crops (even if some small animals are insect eating lizards and therefore beneficial).

There are some opportunities to sell the products derived from NTFPs on the central market Gabu, but this is mostly hampered by transportation costs.

Table 7 SWOT Analysis, Protection of Bushmeat in Boé.

SWOT Analysis, Protection of Bushmeat in Boé	Helpful	Harmful
Internal	<ul style="list-style-type: none">• Tradition of not eating chimpanzees• Rich Biodiversity• Interest in new project	<ul style="list-style-type: none">• Low Government trust• Lack of employment opportunities• Islamification (loss of

	<ul style="list-style-type: none"> • There still are rare species present in the area • There is respect for the chimpanzees • Islamification (less hunting on animals used for magic) • Population is still within the boundaries of sustainability • Population is divided on migration of outside 	<ul style="list-style-type: none"> • traditional values) • “Westernisation” (loss of traditional values) • Population growth • Migration • Cow farmers from Guinée Conacry • Rivality between social groups • Few lasting results from projects in the last 20 years.
External	<ul style="list-style-type: none"> • Bauxite project • Increasing government interest • New infrastructure project starting in 2009 	<ul style="list-style-type: none"> • Limited law enforcement • Low government interest (But it is increasing because of the Bauxite project) • Insecurities caused by the recent conflicts in the region

5.2 Recommendations

- Investigate the potential benefits in keeping Guinean Fowls, maybe they are more disease resistant.
- Maybe there are possibilities to create folia farms, and process the fruit in the Boé. There is a market for the fruits in Dakar. And maybe the processed fruit juice could be distilled into liquor to sell to tourists.
- Pay all the salary of the teachers in Boé so the villagers don't have to. This could be a compensation for crop damage done by chimpanzees. Of course this could be coordinated with the WFP (world food program).
- The Utilisation of Cane rats (*Thryonomys swinderianus*) could be a solution to the bushmeat problem. These animals are relatively easy to domesticate and breed well in captivity (Ryan 2006). The Cane rats were seen in Dandum as a big nuisance, because they damage crops. Only marketing them might be difficult as the people in Boé do not have a history of eating the Cane rats. This could be a pilot project.
- Agricultural assistance. The set up of a farmer corporation using the already formed structures build by the PADIB project, aimed at both women and men.

The farmer corporation with the aid of the park organization could organize research on what the causes are for the diseases in livestock of the surrounding villages. Preferably learning from previous experiences in the PADIB project. In the PADIB project they used antibiotics for the animals, but these were not available after the project finished, maybe there are other solutions to prevent animal disease.

For further research

- Research if a natural resource management plan for Boé would be beneficial and feasible.
- Research on how the local population can participate in a natural resource management plan
- Research on the behaviour and habitat the major mammal species in Boé, leading to an active management plan involving the local population.
- Investigating the possibilities of beekeeping, in an economical, environmentally sustainable way.
- Possibilities cultivating the wild fruit trees and lianas. Especially for folia there is a great opportunity. There is a market for Folia and the lianas can grow very old.
- Collect samples of medical plants and their uses, and create growing schemes for cultivating and conserving them.

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