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Forest foods and local livelihoods

AN EVALUATION OF THE SITUATION INBÉLI IN THE BOÉ REGION OF GUINEA-BISSAU



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Abstract

This paper reviews the use and potential of edible forest products (forest foods) in a community in the Boé hunting reserve in Guinea-Bissau, West-Africa. The Sustainable Livelihoods Framework (SLR) and focus groups were used to analyse the local situation in the context of the research, while both interviews and plots were used to come to a better understanding of forest food products currently in use. *Parkia biglobosa*, *Elaeis guineensis*, *Saba senegalensis* and wild honey were the species principally in use as well as traded by the local community. These products also provided a much welcomed source to additional income for community members besides their cultivated products. Other species discussed include bushmeat products, wild vegetables, a wide range of fruits and forest foods used by local inhabitants for making beverages. Some species seemed to be decreasing, according to the local community only having a low abundancy level in the area, as was the case for *Dioscorea spec.*. Other species, like the previously mentioned *P. biglobosa*, seemed abundant in number.

Forest foods are an important part of local livelihoods in Béli particularly because of the seasonal difficulties within the areas; during the peak of the rainy season the village becomes a very secluded place which is difficult to leave and get to; barely any extra food can be provided during this time and the area is known to have suffered small famines during these periods. Forest foods provide an alternative when the availability of rice and/or other products does not suffice. Research suggested, however, that these products can be implemented more efficiently during these times, for example through better storage techniques or even different methods of use. Another way in which livelihoods can be improved would be through the carefully monitored implementation of further commercialization of forest products. Suggestions are made with respect to the further development of commercialization, however, because of the difficulties the village faces with regard to transportation, infrastructure, properly monitored forest management and funds this for now seems a distant reality.

The rapid deforestation in the area causes both wildlife habitats and people's safety nets to rapidly decline through the burning of forest areas for the creation of grazing fields for cattle, the collection of honey and slash-and-burn cultivation. This means that in the future other land use systems need to be implemented that all less destructive for the forest environment and will allow access to the surrounding forest resources for generations to come. Both the government and local NGO's are already setting up strategies to create more awareness about these facts and the interviews showed that people understood the message - and although change is not evident just yet this might prove to be a good sign for generations to come, animal, plant and man.

I INTRODUCTION

I.1 STUDY BACKGROUND

Guinea-Bissau is a country situated on the west coast of Africa. It borders on Senegal in the North and Guinea in the South and the east, and is relatively small in size; its total area is only 36,125 km². Despite this small size the country still has a wide range of natural variety including over 1,000 plant species, 459 species of birds and 108 species of mammals. The country is divided in continental land and a set of islands. Around 60 per cent of the Bissau-Guinean territory appeared to be forested during a FAO inventory back in the year 2005 (including cultivated forests such as cashew plantations, regenerating forests and fallow areas)¹, but the forest cover has been gradually declining ever since due to the common practices of slash-and-burn agriculture, coal production, fires, the production of fuel wood and logging.

The forest eco-regions in which Guinea-Bissau is situated are the Guinean forest savannah mosaic and the Guinean mangroves. As can be seen in table 1.1, the types of ecosystems that can be found within these ecoregions include subhumid forests, semi-dry and dry forests, savannahs, mangroves and gallery forests.² Summarized, landscape of Guinea-Bissau is characterized by coastal plains and mangrove swamps in the west and (forest) savannah in the east. The region of Gabu, where the study area for this paper is located, consist mainly of the ecosystem types Dry and semi-dry forest, Savannah and Palm trees and gallery forests. For the latter, 74.000 ha out of the total of 80.000 ha within the country is situated within the region of Gabu³.

Type of ecosystem	Approximate size in Ha	Main regions
Subhumid forest	129.000	Quinara, Tombali
Subhumid degraded forest	25.000	Quinara, Tombali
Dry and semi-dry forest	959	Oio, Bafata, Gabu
Clearcut forests	1.076.000	Oio, Bafata
Savannah	160.000	Suzana, Varela, Cacheu, Orango, Uno, Campeana, Casbetché, Cassumba, Gabu (depressions of the Boé), Southern and Northern Oio and Tombali
Mangroves		Cacheu biombo, Quinara, Tombali, Oio
Salt flats	37.000	Cacheu
Palm trees and gallery forests	80.000	Gabu

Table 1: Types of ecosystems and their respective size and regions in Guinea-Bissau (Dias C., 2000)

The climate of Guinea-Bissau is a monsoon-like one with a distinct dry (December - May) and rainy (June - November) season. The rainfall generally varies between 2.750 mm (south) and 1.200 mm (north-east) annually. The average temperature revolves around 27 Degrees Celsius. The relatively favorable climate has opened the door to productive and successful agriculture for some of the country's inhabitants; whether people really profit from this, however, varies regionally. In the Boé area of Guinea-Bissau, for example, the growing of crops is more difficult because of the rocky soils. It is therefore confined to specific areas where agricultural practices are possible and crops can grow.

¹ Food and Agriculture Organisation of the United Nations (2005)

² Dias C. (2000)

³ Ibid

Guinea-Bissau is subdivided into eight administrative regions including the autonomous capital, Bissau. The other seven regions consist of Cacheu, Biombo, Quinara and Bolama in the western coastal parts of the country with Tombali in the Southwest, Oio and Bafata in the more central part and Gabu in the east.

The local administrative unit in Guinea-Bissau is a Tabanca, or village, followed by Sections, Sectors and finally the Regions. Society is largely rural based (70%). Population census estimated in 2012 stated that around 1,6 million people inhabit the country of Guinea-Bissau. A large share of these people (40%) are within an age of 0 – 14 years old. Only around 8% of the total population is estimated to be over 55 years old⁴, not surprising if one considers that the general life expectancy in Guinea-Bissau is 48 years⁵. Demographics further indicate population growth rates of 1.97% per year⁶.

Inhabitants main socio-economic activities include agriculture and livestock keeping, fisheries, forestry and mineral extraction. Agriculture is the most dominant economic sector, employing 80% of Guinea-Bissau's working population. This sector focuses primarily on rice, cashew and livestock. Cashew is the main export product of the country, with India as its main export destination. Food security in Guinea-Bissau is low, with an import of up to 30% of the country's main food crop, rice. Because of this and the country's dependency on only few export products the country has shown itself to be vulnerable to foreign price fluctuations.

Guinea-Bissau is a poor country, with approximately 66% of its inhabitants living below the poverty line of \$1.25 a day. The economic growth rate was -2 in 2012, a grave decline compared to the growth rate of +6 in 2011. This decline was mainly the cause of lower production and world pricing of cashew and the political instability due to the coup d'état that took place in April 2012 as well as to unfavourable climatic conditions in the country⁷. During the field work for this research in 2013 people addressed were still suffering from negative price fluctuations on cashew exportations.

Guinea-Bissau is one of the 39 countries listed on the Heavily Indebted Poor Countries (HIPC) list, a list of countries with high levels of poverty and debt, which can get special aid from the International Monetary Fund and the World Bank.

⁴ Central Intelligence Agency World Factbook (2013)

⁵ The World Bank (2011)

⁶ The World Bank (2012) http://www.indexmundi.com/guinea-bissau/population_growth_rate.html

⁷ Prices went down from \$1.350 (USD) per tonne in 2011 to \$1.081 (USD) per tonne in 2012

I.II PROBLEM STATEMENT AND RESEARCH OBJECTIVES

This research focuses on the use and benefits that edible forest products (the so-called forest foods) are providing and have the potential to provide to local livelihoods. In West-Africa, many wild edible plant species can be found that have great potential as food products for subsistence as well as for sale on local markets but lack of the availability of information can cause many of these products to be under-utilized rather than used to their full potential.⁸ They can contribute significantly to health and income generation of rural people. This thesis focuses on evaluation of the current situation as well as examining the current potentials and constraints of using forest foods as a means to achieving livelihood improvement in the secluded village of Béli in the Boé area of Guinea-Bissau, where rural poverty is widespread and income opportunities are scarce. Forest foods, therefore, were chosen as the main focus of this research.

Besides poverty, a lack of food security and sparse health and educational services, the Béli area has the additional problem of a combination of inadequate and underdeveloped infrastructure and remoteness. Agricultural activities are subject to insecurities as a consequence of the sometimes unpredictable weather patterns, leading to regular food shortages. These are all characteristic problems for the Guinea-Bissau countryside. The village of Béli was chosen for research to be conducted in because it is suitable as a sample area.

The main objective of this study was to make an inventory of available forest food products and describe their current contribution to community life as well as the potential contribution they could offer to local welfare in terms of health and income generation whilst keeping in mind the major constraints in further promoting them as suitable NTFP products to be integrated in community farming systems within the region.

I chose to continue my research in an academic centre with its close proximity to theoretical knowledge by means of which I found I was able to build on the practical research data I gathered during my stay in the region.

The main question concerned during this thesis is:

- Which forest food products are currently being used by the community and how are they used?

Supporting research questions for this paper are:

- Are there any additional food uses for found species that are not implemented by the community?
- How are livelihoods arranged and how do forest products fit into this scope?
- What are the constraints and potentials for using certain forest products for certain purposes?
- Which forest foods can be considered priority species regarding the further development of livelihoods for the community of Béli?

I.III INTRODUCTION

Poverty these days is a tremendous challenge that remains to be overcome. Still 80% of the world population lives in poverty. According to the available 2010 World Bank statistics, poverty

rates have been slowly declining over the last decades. Progress, however, has been uneven. In 2010 around three-quarters of the world population classified by the World Bank as “extremely poor” lived in South-Asia (507 million) and Sub-Saharan Africa (414 million).⁹ More and more we are starting to see that forest foods play an important role in the lives of especially this vulnerable group in terms of livelihood development. Only in West-Africa, Latin-America and South-east Asia there are already 60 million people that are considered to be “highly forest dependent”. Access to forests and their respective resources (and access to knowledge and materials) can help this group and other groups of people to diversify their livelihoods in a strategic way.¹⁰

Forest products can in these cases serve as risk reducing complementary incomes, for example when they are sold on local markets, or they can act as a buffer when alternative food supply is scarce. Forest foods form a source of income and food supply to people in rural areas all over the world. The Food and Agriculture Organisation (FAO) estimates that 80% of the people in developing countries make use of wild plants to nourish their nutritional and medicinal needs.¹¹ This means that billions of people make use of these kind of products for their daily subsistence, using thousands of plant and tree species which are usually consumed within a household rather than traded on the market. The wide variety of products collected from natural or disturbed forest areas are extracted by an equally wide variety of people on many different intensity scales.

In areas where employment opportunities are scarce people tend to look for additional income sources and may find this through the collection and small-scale marketing of edible or non-edible non-timber forest products from nearby forest areas. Although these products are often absent in recorded national statistics, small batches of collected products can be found at nearly every Western-African market in small quantities for everyday use.¹² On occasion, these products may also be domesticated through the planting of seeds near to homes or in community gardens.

As has been stated before, a significant share of the collected products are used as a direct source of food and are therefore tremendously important in providing food security. In the case of Guinea-Bissau, where this study is focused, this includes bush meat which provides essential protein-intake and for example lareh (Kriolo: foli; Scientific: *Saba senegalensis*), tugui (palmera; *Elaeis guineensis*) and nete (faroba; *Parkia biglobosa*) - all products with local Fula names that are used on a wide scale throughout the communities.

⁹ The World Bank (2012)

¹⁰ Warner K., McKall E., Garner S. (2008)

¹¹ Maas J. (2003)

¹² Adenike, A. A. and Adekunle S. S., (2007)

II METHODOLOGY

II.I STUDY SITE

In the Boé area where this study was executed, the growing of crops is more difficult than in the rest of the country because of the rocky soils. It is therefore confined to specific areas where agricultural practices are possible and crops can grow.

The study area chosen was Beli and the surrounding area. Béli is a village located in the heart of the Boé area, 40 km south east of the crossing of the Corubal river near Chéché. There are different village districts within the village, each with their own district leader (each district is named after the leader at that time, meaning that district names are prone to change). It is the home to on and about 900 people, and the children make up the most of this population. Most people in the village have a Fula ethnicity.

Only a select few within the village have access to proper electrification for everyday use. Mobile telecommunication is possible, but phone reception is not always reliable. The infrastructure within the entire region is inadequate; roads are in bad condition and cannot always be crossed, especially during the rainy season, and the ferry to Chéché is not always in service. This makes it very hard for the inhabitants of Béli to reach the main cities Gabu and Bissau. People rely for their livelihoods on agriculture, but agriculture in the region is susceptible to many risks. Furthermore the inhabitants of Beli live in one of the poorest and least developed countries in the world: on the United Nations Human Development Index, Guinea-Bissau ranks as the 176th of the 186 countries that were surveyed.

II.II FIELD OBSERVATIONS

A field study was undertaken around the village of Beli in Guinea-Bissau.

Plots were set out in different areas to determine the presence of edible forest products. A random sample was used using random GPS coordinates to ensure that a representative, non-biased sample of areas was included in the research. The random sample locations were created using the MS Excel RAND-function. Plot locations were then drawn into a map and selected at random.

Plots were always set out towards the east. If this was not possible they were set out towards the North instead. The plot locations were tracked by GPS and in each spot a plot of 20x20m was set out starting with the middle line at the GPS location and going towards the east. Species were noted down with the products that the local community used them for using local guides, one of which served as a translator. All mentioned uses were noted down, even if they did not entail food provision. Literature analysis was used to find out any additional uses of found species. Species were determined using local knowledge, determination books, the internet and pictures taken in the field. A waypoint was made of the plot locations so that they can always be traced back in the future.

II.III SEMI-STRUCTURED INTERVIEWS

Key informants (people that are directly or indirectly involved in the collection and use of forest products) were questioned using semi-structured face-to-face interviews. These interviews were used to find out which products were in use by the local population and what they were being used for. A total of 32 interviews were held. Aspects studied during these interviews included social status and occupation, land ownership and/or use, availability of land, experience with domestication of forest products, types of domesticated (forest) crops grown and preferred, and varieties used. Data on forest foods included species known, used and preferred, harvesting methods, seasonality and duration of collection, security of supply and income generation. This interview is attached in Annex 1 of this thesis under the working name of Interview A.

Keypersons were selected on their knowledgeability on the subject and their ability to understand some of the more abstract questions. They were selected and approached with the help of a local project officer and a local guide and translator.

Second, another investigation considering the marketing of said forest products was carried out through the use of a separate, shorter interview that focused mainly on available materials, funds, current marketing activities and marketing constraints for forest foods (Annex 2, Interview B).

Third, a separate, in-depth interview was designed to learn more about the social and cultural background of the population (Annex 3, interview C). The translator used for this interview, a native Portuguese speaker employed at Daridibó, was different from the rest of the interviews (where a local translator was used).

Finally, hunters were asked about their hunting practices through a third interview to get a good view of the subject of bushmeat and which animals were being used for food purposes in the village (Annex 4, interview D). A total of 7 hunters were questioned.

Before the start of any interview people were informed about the scope of the research, their anonymity and their right to not answer any questions asked. In contrast to plans made according to research guidelines, complications arising from gathering and communicating with interviewees through an interpreter and guide led to a total number of interviewees unevenly

divided along gender lines. Time and circumstance allowed no opportunity for more interviewees.

II.IV FOCUS GROUPS

Through the use of focus groups village members were involved in the creation of a livelihoods calendar (Annex 10). During these focus groups, a total of five participants were asked to indicate (with use of a calendar of months and a defined amount of beans which they could divide over the different months) which months they considered most relevant for different topics. There were separate focus groups for men and women to avoid gender related bias (i.e. women not feeling comfortable to speak freely in front of the men). Due to complications in the communication through the project officer only three out of five women in the end attended the meeting but this was considered enough to conduct the focus group. Subjects were put forward after which the village team had the opportunity to discuss the issue and place the beans. After placing the beans they were asked whether everyone agreed with the placements and there was room for further discussion and replacement of the beans. This system was chosen because during interview A it was proven very difficult to ask respondents for valuation ratings for different product categories and it proved to be a very successful way around the problem.

II.V SUSTAINABLE LIVELIHOODS FRAMEWORK

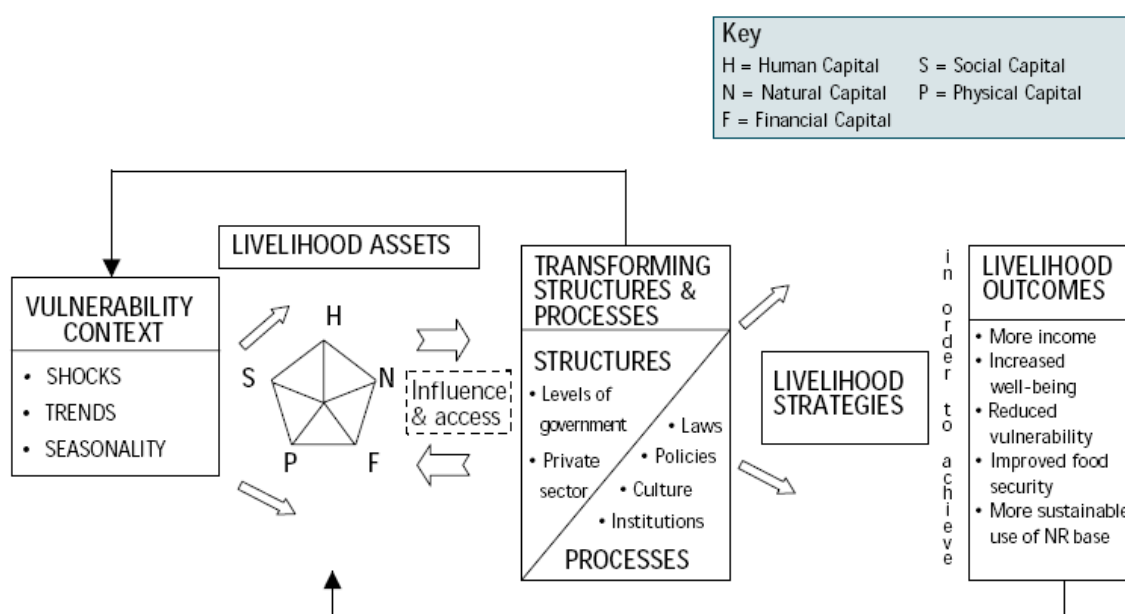


Figure 1: Sustainable livelihoods framework

In order to get an idea of the role of forest foods in the livelihoods of the local community it is important to understand other livelihood aspects besides the gathering of those forest products as well so the role can be defined in its full context. To enable this, the Sustainable Rural Livelihoods Framework (SRLF) is used during this research to obtain a rapid analysis of the most important livelihood aspects within the local situation. This is necessary because only a limited amount of information on the study area and its inhabitants is available so far.

The sustainable livelihoods framework is a tool which is used to increase the understanding of people's livelihoods, and particularly the livelihoods of the poor. It uses a so-called 'five capital approach', in which the *social, physical, human, natural* and *financial* context of the situation are analyzed within their *vulnerability context* (a term referring to trends and shocks that affect local

livelihoods, such as for example population growth, economics, resource availability, seasonality of work available and natural disasters). Accordingly 'transforming structures and processes' also need to be analyzed, which are made up by the institutions, organisations, policies and legislations that shape and influence livelihoods. Indicators for the five capital approach can be found in table 2 of this document.

Thus, the SRLF presents the most important factors that affect people's livelihoods, and the relationships that exist between these different factors. It provides a checklist of important issues and sketches out the way these link to each other, draws attention to core influences and processes and emphasises the multiple interactions between the various factors which affect livelihoods.¹³

As can be seen in *Figure 1*, this framework does not develop in a linear manner or present an exact model of reality. Rather, it helps to identify the most important factors that shape and affect livelihoods and shows how they interact and helps one view (in this case) the use of forest foods in this context.

ASSET	INDICATOR (for this thesis)
Social capital <i>The social resources available to the local community (networks, formalised groups, supporting institutions and relationships of trust, reciprocity and exchange that may provide the basis for informal safety nets)</i>	Ethnic group and religion Village organisation Existence of local groups or organisers Decision-making Rules, regulations and punishments
Physical capital <i>The basic infrastructure and producer goods needed to support livelihoods</i>	Available infrastructure (access to markets) Affordable transport Access to information
Human capital <i>The skills, knowledge, ability to labour and good health that together enable people to pursue different livelihood strategies and achieve their livelihood objectives</i>	Education Household composition Equity Local knowledge of uses

¹³ The Centre for Financial and Management Studies of the University of London (2013)

<p>Natural capital</p> <p><i>The natural resource stocks from which resource flows and services (e.g. nutrient cycling, erosion protection) useful for livelihoods are derived</i></p>	<p>What products are collected by which groups</p> <p>Land uses</p> <p>How is land access and land ownership arranged</p> <p>How is agriculture practiced (how long / fertility / variation in yields / etc)</p> <p>Rice shortages</p> <p>Role of forest foods in daily life</p> <p>How productive are different forest foods (issues of soil fertility, structure, salinisation, value of different species, etc.)? How has this been changing over time (e.g. variation in yields)?</p> <p>How productive are different agricultural crops (issues of soil fertility, structure, salinisation, value of different species, etc.)? How has this been changing over time (e.g. variation in yields)?</p>
<p>Financial capital</p> <p><i>The financial resources that people use to achieve their livelihood objectives</i></p>	<p>Available stocks or savings</p> <p>Main income</p> <p>Income sources</p> <p>Availability of credits</p> <p>Available inputs</p>

Table 2: Indicators for the “five capital approach”

II.VI LIMITATIONS

As with any other study, there were limitations to the study including available time, quality of translation, non-response and uncalculated illnesses. The findings and results of this research are based off a defined area and might therefore not apply to other areas. It seems highly likely, however, that insights gained through this study are applicable to situations with a similar context.

Questions for the interviews after some trials were formulated very precisely and with the help of one of the Daridibó employees and a local translator were translated into Creole in order to obtain the best possible understanding. There remains a possibility that respondents or the translator interpreted questions differently than the researcher did because of any language barriers. Consequently, some results may have been lost in translation. For research conducted on this small scale, however, it is very difficult to tackle language barriers without proper linguistic and professional support. Thus, dealing with language and translation the research was

conducted on the basis of taking interview results at face value unless results strongly deviated from precedents. The use of a questionnaire-structured interview for interview A may have limited the information given by locals but deemed necessary for a better understanding of the questions by local population and translator. Some tree species during the establishment of plots could not be brought to their fula, creole and/or scientific name due to the guides' limited knowledge and the limited time available. It was assumed, however, that plants that could neither be brought to their fula nor to their creole name had little to no value in daily life as forest foods.

Respondents may have been biased in their communication about forest (product) use because of researcher's attachment to the Daridibó project. The researcher because of this risk always fully explained the purpose of the study and the fact that it was completely anonymous and no names would be attached to their data in order to make the respondents feel comfortable enough to avoid this bias.

Plots were not set out as extensively as had been planned in the beginning because one of the field guides could not assist any further due to other occupations and a proper replacement could not be found. A trial plot was made using another field guide to see if his knowledge was adequate for the job but on account of this it was decided it was better to focus on the interviews instead to obtain as much knowledge as possible in the limited time available.

II.VII DATA ANALYSIS

After the collection of the data in the study area, the researcher returned to the Netherlands only a little bit earlier than expected on doctor's advice. All of the interviews had been completed. First, an analysis of local plant names and their respective scientific names was made using local plant names and other gathered fieldwork data, like pictures. After that a qualitative analysis of data regarding the sustainable livelihood framework was analysed (contributing to chapter one of this study). Further data analysis was done with the help of MsExcel. Interview data was entered into a workmap and analysed from there using statistics and calculations. These worksheets were also used to get a good overview of qualitative data.

III LIVELIHOODS OF BÉLI

In this chapter, the role of forest foods in relation to the local livelihoods in the village of Béli is described according to the different assets of the Sustainable Livelihood Framework.

The community is involved in various activities and occupations in order to obtain a certain degree of livelihood security. Most inhabitants are relatively poor and their livelihoods would already become at risk by a small change in assets, such as illness in the family. All of the inhabitants have access to land for cultivation and many (90% of interview respondents asked) own some livestock that additionally to providing meat and other benefits serve as a financial backup.

III.I SOCIAL CAPITAL

A society's social capital consists of the social structures and relationships that people draw upon when pursuing their livelihoods. In order to maintain and develop the social capital efficiently time, effort and other assets need to be invested, such as for example the membership of a community organisation. Through this information can be obtained, a feeling of kinship can be created and access to certain privileges (such as forest products) can be obtained. Social capital can also lead to constraints or restrictions in the access to certain forest products. Finally, the social capital can help develop new safety nets and influence authority positions.

Social background

The inhabitants of Béli are for the greater part Muslims and of Fula ethnicity. It is not uncommon for men to have multiple wives. During the interviews, the average family size was 8. Not all wives and children within a family are treated equally; those with a bloodline closest to the husband get more advantages than those who don't. For example, if a man with a Fula background has two wives, one of Fula origin and one of a Madinga background, that both have children, only the children with the Fula background will inherit the father's land. Land tenure, therefore, is based on heritage. This is considered important in the community because if it didn't happen ethnicity problems could be generated. It is therefore easier and more encouraged within the community to marry someone with the same descendency.

Tenure security

Tenure arrangements govern some of the most direct interactions between a society and its resources¹⁴. These systems provide the rules for the government of who is harvesting how much of what product for whose benefit. Tenure therefore includes ownership level and the rights that are associated with this. There are four different types of ownership that are widely agreed upon. These consist of a) state lands; b) private lands; c) communal lands; and d) open access lands. These four types of lands can in turn have one of four different types of right, namely a) use; b) transfer; c) exclusion; and d) enforcement. In Guinea-Bissau most forest grounds are officially state-owned by law. By the inhabitants of Béli, however, they are considered communal lands. Agricultural grounds are considered private grounds. Tenure security within the area is not very well defined, but even so everybody within the village knows which lands belong to what persons. Property rights are not regarded as insecure but said to be respected by everyone. As a consequence, there are barely ever any problems rooting from tenure security and if there is a problem the problem is usually easily solved by discussing the situation together with one of the elder men in the family and the persons involved.

People that originally come from Béli usually own some land through their ancestry because land rights within the area are transmitted from the fathers onto their sons. These people are not

¹⁴ Neumann R. P. and Hirsch E. (2000)

obliged to ask permission to plant on these grounds since they are considered their rightful property. Immigrants from outside the village do. After requesting permission to stay in Béli, the King of the village will appoint them a place where they can live. If they wish to plant agricultural products they can ask a landowner in the village to “borrow” some land and plant their produce there. Planting cashew on this land is strictly forbidden because these contracts are only for one year. In the past this was allowed, but it was usually regretted afterwards, so these days it is forbidden as a rule.

If anyone within the village wants to plant in another village’s territory this needs to be discussed first with the main authority of the other village. Forest products are always allowed to be taken out of any part of the forest that is not being used for agriculture in any amount but people take care not to dwell in isolated places where according to their beliefs *iran* live. The *iran* are believed to be invisible spirits with a human structure that live in the bush, usually in isolated places with a thick undergrowth that are hard to pass through. The *iran* can show themselves at will and are known to have long hair and a white skin. Sometimes they show themselves as a snake or strong wind. Some of the *iran* are good-natured, others bad. If one comes across a bad natured *iran*, bad things tend to happen, which is why the community as a whole prefers to avoid them.

National rules and regulations

The Constitution of the Republic of Guinea-Bissau defines as State property “a) A superfície emersa compreendida nos limites das fronteiras nacionais; b) O mar interior e o mar territorial definidos na lei, assim como os respectivos leitos e subsolos; c) O espaço aéreo supra jacente aos espaços geográficos referidos nas alíneas anteriores” (the surface within it’s national borders and the lands and marine areas and all its above and underground natural resources). The respect for customary land rights and the role of the local communities as principal managers of the territories are established in the land law of 1998. This land law guarantees land rights to local communities for economic use and has introduced permanent and temporary concession in the urban and rural areas of Guinea-Bissau. While all land according to the state law belongs to the state and all of the people that reside within it, inhabitants of Guinea-Bissau also have the right to private land use for individuals or communities. These rights can be granted through customary use as well as through concessions. A community has the authority to authorize private use of community land by individual community members.¹⁵

The forestry law of 1991 allowed attribution of forests to Guinea-Bissau *tabanca*’s (villages) so that they can be managed under supervision of the The Directorate General for Forests and Fauna. The DGFF is a governmental department operating under the Ministry of Agriculture and Rural Development (MADR) and is directly responsible for monitoring the use of forest resources. It has direct influence on forest policies and the management of forest resources through the coordination of projects and plans, and issues forest concession. The Department of Animal Services (DFS) is a government department created in 1988. This service falls under the DGFF of the Ministry of Rural Development , and is divided into three different departments: Protection of Wildlife, Hunting and Protected Areas. It enforces wildlife policies and issues game and hunting concessions.

The hunting law of 1980 has implemented hunting regulations. It among others summarizes endangered species, the animals that are allowed to be hunted (and when this is allowed), and allowed hunting methods. The hunting season takes place from 1 November to 30 April and one needs to have a permit in order to be allowed to hunt. In some designated areas you are not permitted to hunt at all; these areas are considered “Hunting Reserves”. The whole Boé sector is

¹⁵ Barry B., Creppy E.G.E., Gacitua-Mario E., Wodon Q. (2007)

of such nature.¹⁶

In 2004 the Institute of Biodiversity and Marine Protected areas (IBAP) was established. Their mission is to protect and manage Guinea-Bissau's biodiversity through a national system of protected areas (SNAP). The organisation has the authority to propose new policies and dictate norms. They carry out activities throughout Guinea-Bissau, focusing on the enhancement of effective management, a collaborative, integrated ecosystem-based perspective on biodiversity conservation and the support of sustainable development.

The organisation is institutionally attached to the to the Ministry of Agriculture and Rural Development (MADR) but it has administrative, financial and patrimonial autonomy and can therefore act quite independently¹⁷.

Decision-making and problem solving

Decisions within a family are usually made by the father. When the father passes away, the oldest son takes the place of the father in the decision making process. Problems are solved on a "brotherhood-level". A problem is first considered a problem of the two families in question. The people it considers talk among each other with family elders to try and solve the issues. If the problem is too big to solve among the families the problem will be discussed with the King of the village and becomes a village problem. The community of Béli doesn't seek advice from legal institutes, problems are always solved on a community level.

Village organisation

The village representative is the king of the village. He has the authority to assign communal land to newcomers and needs to be contacted in case of village level issues. The village of Béli is made up of 4 different districts. Each district has its own district leader, that can lead the district meetings and represent a certain district during meetings with the King of the village. A district has a number, but is generally referred to by the name of the district leader at that time.

Community groups

Béli has a couple of community groups. First and foremost there are the district groups, which have regular meetings and of which anyone belonging to an individual district automatically becomes a member. Many also consider themselves a member of the organised muslim community, attending the Qu'ran school and prayer sessions. Other important groups mentioned were Radio de Boé (the local radio-group, which was used by some of the community members to make announcements to a wider Boé audience). When asked about groups and organisations the old German agricultural project "PADIB/Bhantal Boé" was still fresh in the minds of many people. Many respondents mentioned either they themselves or their parents or other close relatives had worked with the project. Faba de Boé was a project that was implemented in the Boé region to improve agricultural techniques within the communities. A bee project by the river in Chéché was mentioned during the interviews. A couple of women from inside and outside Béli has teamed up to start a crafting group. Together they sometimes travel to Kindia in Guinea-Conakry to paint clothing along with other women. The Formacion de Mansoa was said to be a journalist group in which journalists could team up and discuss. Misubab is a project that was initiated by Daridibó as a response to planned bauxite mine development. The main goal of the project is to enable the sustainable development of said mine. The project will come to an end by the end of 2013.

Mentioned organisations	% respondents mentioning
Muslim community	50

¹⁶ Kormos R., Boesch C., Bakarr M.I., Butynski, T.M. (2003)

¹⁷ IBAP (2013) ; Government of Guinea Bissau (2012)

Marriage, baptism and funerals	46
District	34
Faba de Boé	12
Fonda Huuwa	8
Formacion de Mansoa	8
Government	8
Radio de Boe	8
Other social gatherings	8
Bee project	4
Educative Board of the Boé	4
Misubab	4
Painting group	4
Red Cross of the Boé	4
Schoolchildren's parents organisation	4

Table 3: Mentioned community organisations and groups

The Platform Horizontal held meetings attended by different stakeholders with the aim of promoting sustainable development in the area (initiated by the Misubab project). Further organisations mentioned were the Educative Board of the Boé, the Schoolchildren's parents organisation and the Red Cross of the Boé.

Marriage, baptism and funerals as well as town festivities were also mentioned by many respondents. They insisted they considered them part of organisational family structures, even if in other cultures these events would not be considered organisations by definition. Because they are an important part of social group structure, they were still added to the data list.

A community organisation that was not mentioned but is definitely present are the village vigilance committee (VVC), which are groups of people (there are 28 VVC's in different villages of the Boé in total) assigned by Daridibó that monitor chimpanzees and other relevant sightings using designated forms monthly.

As has been mentioned on the previous page, there is a project focusing on the sustainable production and collection of bee honey in Chéché. Only one person knew about the project when directly asked about this. The project involves the sustainable production and harvesting of bee honey through the placement of bee hives. Other than this project, there are no producer groups focusing on specific NTFPs. IBAP is currently active in Béli and surroundings with a project focused on the creation of a medicinal plants database but by the time of the research they were just starting. Attitudes of local people attending these meetings seemed positive and constructive about the project. There is a health centre in the village of Béli but access to its resources is unreliable because of varying opening times and the regular absence of the nurse.

Social capital in relation to forest foods

The network of social relationships within the community find a firm base in the local community. Rules and regulations are generally agreed on as a community and issues are resolved within the community. Generally the attitude towards the government (and government rules) was noticed to be one of indifference rather than hostility or cooperation. This has its influence in the collection for forest foods, for example, when people hunt outside the hunting season. The hunting season generally takes place after the community has started burning the fields for crop-growing in the months of June and July, outside the official hunting season that lasts from the 1st of November up to the 30th of April. Community rules and customs thus generally are respected over those of the government, partly because people have more

attachment to the community as a social structure than to their government. Since government enforcement measures in the area are considered to be low the resources in the forest are regarded as no man's goods: the forest areas are considered free to be used for the extraction of forest food by anyone, there are no community restrictions to these practices whatsoever – only when the area is in use for growing agricultural crops the harvesting within the area has restrictions since from that moment it is regarded someone's property. Not all lands can be used to create agricultural fields since (temporary) rights over the land need to be established with the king of the village first. Areas believed to be inhabited by *iran* are not used for forest food collection by the local inhabitants; they were generally described as dense areas close to rivers with many snakes.

Intra-communal ties are very important to the local population because they can be counted upon in times of need (assisting in work in the forest or fields, borrowing money, loaning).

There are no groups or organisations in the village that emphasise or influence the management and use of forest foods directly. Indirectly muslims are taught through the muslim community to not eat certain species (monkeys and hogs) and Daridibó employees were observed teaching local about the more sustainable harvesting of products such as wild honey in pursuit of a more sustainable and environmental friendly management strategy.

Forest products are sold throughout the community, but not in great quantities. They are mainly used for household consumption. Forest products such as foli, faroba and tugui are sold to traders from Gabu and Bissau that visit the area somewhat regularly. A company called “mel di Gabu” collects honey from the Boé to process it further. Faroba is sold to occasional traders who visit the area from Guinea-Konakry. Other products are generally sold in small quantities throughout the village by the children since it's difficult to conserve them for selling on a broader scale due to the problem of adequate transportation and infrastructure. Finally, on the account of social capital it can be concluded that there is a high level of trust within the local community and a willingness to cooperate in activities.

III.II HUMAN CAPITAL

Demographics

Around 900 people live in the village of Béli. Around three hundred of these were estimated to be adults during field work observation. This estimation highly corresponds with the household composition data of the interviews, where 72% of respondent households consisted of the children. During the interviews the adult sex ratio was 0,63 male per female or 61% of the total adults. World Bank demographics for Guinea-Bissau indicate 50.3% of the total population is female. The World Bank also states that in between 2010 and 2050 population size is likely to increase by 48%¹⁸.

Literacy and education

Most people in the village only speak Fula, some (mostly men) additionally speak some Guinea-Bissau Creole. A minor part of the inhabitants (again, mostly men) have a limited knowledge of Portuguese, French and/or English. Some people mentioned they spoke some Arabic, but upon further questioning this appeared to be mainly the summoning of sunna's from the Qu'ran they had obtained at the Qu'ran school. Knowledge of every day Arabic seemed limited only to those Arabic words that had been locally integrated into their fula language speak (generally phrases such as “alhamdulillah” and “assalam-o-aleikum”).

The literacy level in the village is very low and being able to speak a language does not necessarily mean a person is able to write the words down. There is a school in the village where children

¹⁸ The World Bank (2013)

can go to for education. To educate themselves further (after the sixth class), they need to go to other parts of the country but in many cases, especially for the women, they marry young. Girls marry younger than boys. Sometimes they are already married out around the age of 15, when they have their first period and get womanly shapes.

A minority of men mentioned they had gone to capital cities and even abroad to educate themselves further. For example, they would work under the tutorship of a carpenter and come back with their knowledge to be able to practice the job in their village. They would usually live with family or acquaintances during this time.

During the interviews it was mentioned that it is only of a recent nature that also women are going to school. In former times it was believed that this would get in the way of their marriage. Even so, the literacy among women is still significantly lower than the literacy among men and many did not have any education at all.

Knowledge about NTFPs and traditional medicine is something that is passed on from generation to generation. The knowledge about traditional medicine is not widely spread and people involved in the collection of these products were careful in sharing their knowledge because this knowledge being spread widely would lose them their jobs. Traditional medicines are still widely being used throughout the community - for solving small illnesses like stomach aches, but also for bigger issues such as fertility problems and AIDS.

Healthcare

Adequate healthcare is not always available in the town of Béli. There is a local health center, but it depends for a great part on volunteers and access to it is unpredictable because of the regular absence of the nurse in charge. This, in combination with the difficulty it takes to reach a doctor in one of the urban areas, leads to the local inhabitants depending heavily on traditional healthcare.

There are many NTFPs available that – according to local knowledge – can treat minor as well as major diseases. There are only a few traditional medicine men in the area that have specialized in obtaining adequate knowledge about this. This knowledge passes on from these select men to their sons to avoid the knowledge becoming widespread. The harvesting of medicinal plants is therefore usually done by these few men (except where it considers a few more general cures, like stomach aches, which seems to be more common knowledge), after which the medicine is processed and sold to village inhabitants.

Gender roles and division of tasks

Non-timber products in general, and therefore the use of forest foods, in rural areas is often gender-specific. That means that the use of certain products can be determined by gender. Some products maybe regarded by the community as “women’s products” whereas others are for the bigger share harvested and/or prepared by men. It was observed that there is a strong division of tasks within the community of the village of Béli. Many medicinal products were mainly harvested by men, for example, whereas women would only have knowledge of a few “basic” species used to cure headaches, stomach aches and other small ailments. Women generally tend to take care of the household, prepare rice and other products, cook and look after the children. They would harvest the products that by men were often described as being the more “easy” products to harvest. Men would take control over the harvesting of certain products but since cooking is largely considered a woman’s job the further preparation of the products was almost always done by women. Honey was considered a man’s product and was observed to be both harvested and prepared by men. Tugui mainly because of the difficulty of harvesting the product, was generally noticed to be harvested by men but the women of the household would take care of the further preparation of the product for meals. Honey was considered a man’s product as

well, the harvesting of said product being considered hard and dangerous work. It was observed that both harvesting and preparation (the cooking of the honey, not the addition to the meals, which was done by women) was done by men. Men also took care of the fabrication of working equipment for the fields and house construction. The gathering of wood for fuel, considered an easy task, is usually assigned to the children in a family.

Working on the *kau di labra* (the agricultural fields, literally the “place of working”) is shared among all family members, men and women like, except the smallest that are not able to work in the fields yet and the eldest that lack health and energy for doing the labour. They depend on their families to do the work. The collection of forest foods that did not require any substantial tree climbing or –cutting and was therefore considered relatively easy was usually assigned to a family’s children and sometimes the women. Men were also prone to collect, but generally on a more opportunistic basis when they were in the field serving other work already. The children were also the ones selling the collected products for their family locally. On markets, women were the main sellers of forest food products. Knowledge about NTFPs that are currently being used for food and general household purposes is widely spread among the men, women and children of Béli alike. Knowledge about the medicines that are in use was discovered to be more confined to a select predominantly male group.

Task	Division	%
Fuelwood collection	Children	45
	Women	7
	Men	3
	Women and children	26
	Men, women and children	16
	Men and children	3
Fruit collection	Children	47
	Men, women and children	22
	Men	16
	Men and women	6
	Women	3
	Women and children	3
Honey collection	Men and children	3
	Men	97
	Not collected	3
Collection of medicinal plants	Men	78
	Women	16
	Men and women	6
Hunting	Men	91
	Not practiced	6
	Men and women	3
Fishing	Children	31
	Men, women and children	28
	Men	16
	Men and children	13
	Not practiced	9
	Women and children	3
Work in the agricultural fields	Men, women and children	91
	Men and children	3
	Men and women	3
	Women and children	3

Table 4: Task division

Human capital in relation to forest foods

A rapid growth in population size will not make it easier for the community to lift itself out of poverty since there will be more mouths to feed, more pressure on community (forest) grounds and too many people competing for a still relatively small amount of job opportunities. In recent years there has been a shift in the amount of children that go to school, especially among women; two generations before there was no school for them to attend and the practice was frowned upon since it was believed to reduce a girl's chances of marriage.

Even though basic healthcare is available through the local Health Centre when it's open, there is a tradition in using plants and plant materials from the forest for medicinal purposes. Some of these products, such as dundu ke and honey, can be used for both health and medicinal ends. Observations and interview responses show that men hold most knowledge of medicinal plants, and that this knowledge is passed on to their sons. Certain forest food products or activities are by the locals considered man's goods or man's jobs (honey collection, tugui collection etc.) whereas others are referred to as a woman's terrain (preparing (tugui) sauces, forest juices etc.).

III.III FINANCIAL CAPITAL

Main sources of income

The people of Béli maintain themselves by the practice of subsistence agriculture. Crops grown in the surrounding of the village for this purpose are discussed in the section "natural capital". Sometimes crops are sold to obtain some additional income. The main cashcrops are cashew and groundnut. Fruits (grapefruit, orange) honey, cashew, and vegetables are grown or harvested specifically for this purpose. Money obtained from these practices was said to be mainly used to buy necessities like clothing and rice.

Livestock serve as a financial backup in times of need in the village. The most valuable animal is the cow, but they are only kept by migrating herdsman that visit the surrounding from time to time. The villagers themselves do not keep them. Their livestock is mainly composed of goats, chickens and/or sheep. Domesticated ducks were also seen in the village. A major part of the domesticated chickens dies each year as a consequence of illness outbreak.

An organisation carrying the name of MPC-Divutec provides loans to poor women and young persons within the country of Guinea-Bissau but apparently knowledge about this organisation is not widely spread within the community; according to interview respondents, organisations supplying loans or grants to individuals are non-existent so that people have to rely mainly on neighbours and/or family when they need help dealing with finances. Daridibó does offer financial compensation for the rice banks and Village Committees and people are aware of this.

Daridibo, with several projects including the Misubab project (until 2013), the government and the local school offer employment opportunities other than agriculture. Some other entrepreneurship practices included tailor, shoemaker and the selling of cashew wine on a small, local scale. However, these jobs are regarded as additional to agriculture rather than the other way around. Agriculture remains the most secure option in obtaining food security.

Financial capital and forest foods

Forest foods serve as a safety net in vulnerable times when money is scarce. They can help to provide income flows without directly requiring financial investments. The loss of access to forest foods would make the community even more vulnerable than they already are since the most vulnerable groups save it as their last resort for a safety net. Forest foods provide food without needing financial investments, making them an important strategy for survival for the

local population. People in this village do not generally have the opportunity or the education available to them to choose the most economic opportunities for their livelihoods; their lives are revolved around maintaining (food) security, health and shelter. More can possibly be gained from forest foods financially with the right investments by commercializing more, but without proper infrastructure, fundings and connections it will be difficult to achieve this.

III.IV PHYSICAL CAPITAL

Infrastructure

A big asset – and also a big problem for the village of Béli – in livelihood development is the access to towns in order to reach local markets, hospitals and other benefits. The nearest market mentioned was Gabu, the district capital, which can during the dry season normally be reached by car or truck. However, getting there was considered difficult and expensive by all. The condition of the road is currently not good and travelling gets especially difficult during the rainy season when the ferry tends to go out of order for periods of time due to have rainfall and other deficiencies. It was also mentioned that for heavy commercial trucks it was especially difficult to get to Béli as it contained some risks to advance on the journey and the truck might break down or get stuck. Some trucks were mentioned to even be too heavy for the ferry to cross, so there are also limitations to this. In conclusion not only getting to Gabu markets was considered a problem in the eyes of local inhabitants, also the markets being able to get to them, and the main obstacle for that is not the distance itself but a lack of infrastructure.

Furthermore, in terms of physical capital, besides being used for food purposes many NTFPs are also used to provide construction- and handicraft materials: fibres from certain tree species (boileh kundjeh, silah fitareh) are dried to use as ropes in for example house construction and grasses are used for roofs.

Machinery, tools and buildings

There is not a lot of machinery being utilized. None were mentioned during the interviews in relation to NTFP-harvesting and –commercialization. Tools and houses were all said to be self-constructed out of materials available. There is a separate shed in the village where the men forge knives and other tools.

Tools mentioned during the interviews in relation to possible NTFP commercialization were bidons (for safeguarding honey and palmoil), plastic bags (for safeguarding mainly faroba) and small storage houses that practically every family in the village owned. These storage houses are at the moment mainly being used for storing rice (sometimes also faroba and oilpalm were taken out of it but this was not common practice – these products in most families were stored directly in their houses) and it was mentioned there were problems with mice getting in and damaging the rice. The tools used by the various households are basic tools used for different household practices, including non-timber forest product extraction.

Equipment	Translation
Korbadur	Ax
Katana	Machete
Manchadu	Axe
Faka	Knife
Impara	Knife with long blade
Storage houses	
Plastic bags	
Kabalareh	

Kehri	Hoe
Konko	Very sharp hoe, mainly used for cultivating groundnut
Marte	Hammer
Noroto	Machete with round blade
Bicycle	
Bottles / Jerry cans	
Buckets	

Table 5: tools mentioned during the interviews

Physical capital and forest foods

The physical capital is greatly influenced by the lack of proper infrastructure. The road to Gabu, very important for villagers and external traders alike, is in a bad conditions and the nearest markets are hours away. The lack of (ownership of) cars and the lack of money (and thus fuel) furthermore make traveling to the markets both too difficult and expensive for many. On their way into the Boé commercial trucks can get stuck or damaged, making it a risk for them to go there as well. The ferry during the midst of the rainy season is not in operation, causing forest products during this period of time to be practically unmarketable on a bigger scale than the local level. Tools for further development of NTFP marketing are at this moment virtually non-existent. People have their working equipment and tend improvise with this, for example by attaching knives to big sticks in order to make harvesting in high trees easier and more sustainable – however it was also observed that in some instances big branches of the faroba trees would be cut down to quicken the process of harvesting, harming the trees.

III.V NATURAL CAPITAL

Forests and their importance in local livelihoods

Béli is located in the Boé area of Guinea-Bissau. The direct surrounding of the village comprises mainly of cultivated areas, regenerating forests and the Guinean savannah-forest mosaic. Nature is immensely important in local people's livelihoods; it provides them with medicine, craft- and building materials and last but not least a stock supply of food.

Agriculture

In most households the practice of slash and burn agriculture is combined with the exploitation of forest products, fishing and animal breeding. Livelihood activities within a household generally limit themselves to agricultural crop production, forest related activities (including harvesting of forest foods and medicine), animal husbandry, and off-farm activities (for example teaching or the creation and commercial selling of cashew wine).

In the area that was investigated for this study rice was the main staple crop. Only one respondent during the interviews mentioned she did not grow this. Her motivation was that she was too old to work far away from the village and relied on her son to supply her with rice. There are two kinds of rice farming systems in practice in the region: bolonha, which involves planting rice in wet areas close to the river, and mpampam. Bolonha farming according to community members is said to be more productive in terms of yield/ha. Fields can also be used on a more permanent basis than the mpampam fields that lead to a decrease in forest areas through the burning practice it requires. However, the construction of a bolonha rice field requires a lot of labour and respondents mentioned the proper machinery for it was not available to them. All of them therefore grew mpampam rice. In the case of mpampam bush areas are cleared through slash and burn activity. No fertilizers are applied and the soil requires less preparation than in the case of bolonha before seeds can be planted.

Maize is another dominant crop grown to obtain food security: 81% of the respondents grows it on their agricultural fields. The main cashcrops are groundnut and cashew (grown by respectively 79% and 93% of the respondents asked). The bigger share of the crops is grown for home production; on average 60% of the main crops grown on the agricultural fields (rice, maize and groundnut) are kept for household use. The remaining 40% of the total harvest of all the main crops together is sold to generate some additional income.

Crop	Average yield	Average stock	Average sell
Rice	766kg / household / harvest	707kg (92% of average yield)	59kg (8% of average yield)
Maize	263kg / household / harvest	177kg (67% of average yield)	85kg (33% of average yield)
Groundnut	689kg / household / harvest	174kg (25% of average yield)	548kg (76% of average yield)

Table 6: Crops grown (responses of interview A-1 and A-2 were not calculated since this in a later stage adjusted version of the interview does not contain the proper data to do all calculations justly for all the categories. It was then decided to leave it out altogether so that it does not influence the other data.)

Problems in agriculture

When land is cleared for agricultural use many potentially valuable trees can be lost due to the fire that accompanies the widespread slash-and-burn activities in the area. Farmers do not always use techniques intended to prevent the fire from spreading throughout the entire area, which leads to mass burnings killing and damaging many trees and plants. Additionally, these fires possibly contribute to the - direct or indirect - destroying of forest products, wildlife and their associated habitats.

The slash-and-burn activities particularly seem a double-edged sword for those farmers growing cashew. These farmers use the fire to clear and fertilize the land for their agricultural activities. But when the fires start to spread outside their intended terrain they can become a hazard to local inhabitants' cashew plantation sites and damage or even completely burn many of the trees.

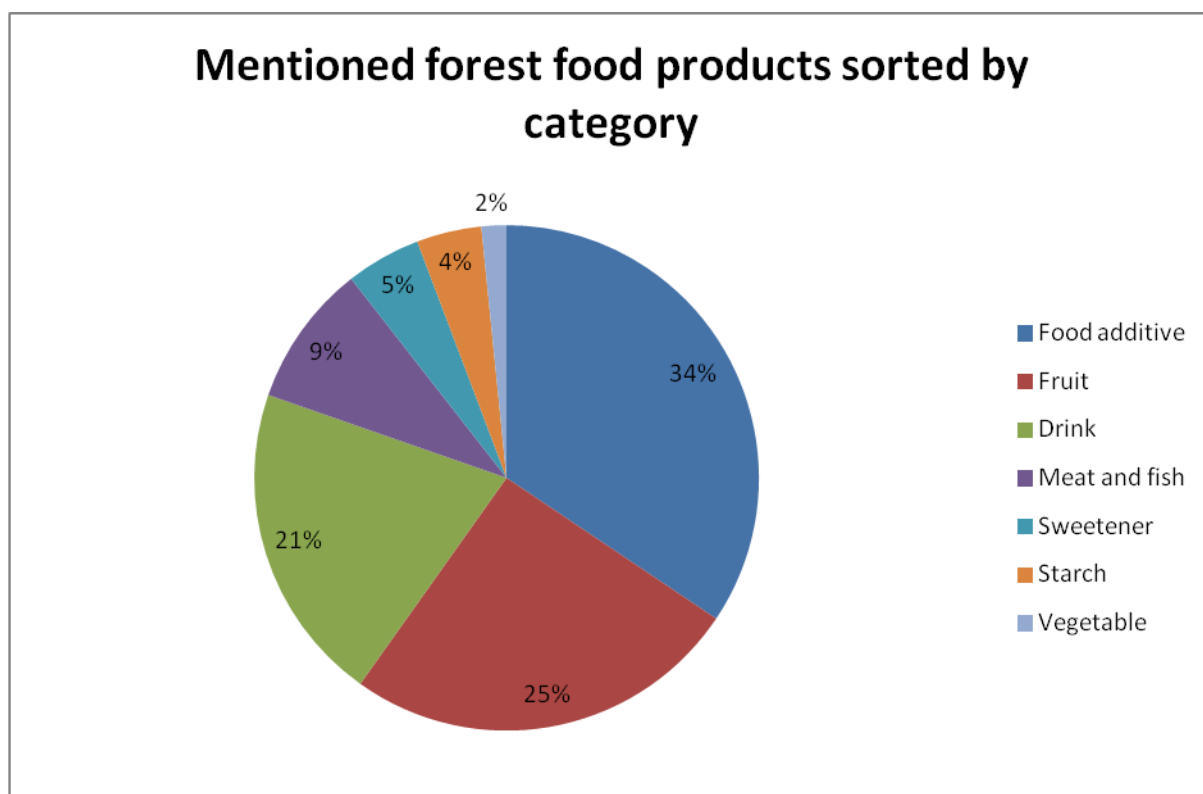


Figure 2: Forest foods mentioned during Interview A and Interview B combined in divided into categories (in %)

The data obtained from the interview A indicate that “food additives” are the most widely collected forest food category. This category includes some of the most commonly used forest fruits such as *Saba senegalensis* and *Parkia biglobosa* as well as the palm *Elaeis Guineensis*. Annex 7 contains a list of the different products that were discovered to be in use for food purposes by the community during the fieldwork of this research and their respective categories.

It was observed that the majority of the people depend on agricultural activities for their livelihoods. However, the majority of this group (78%) mentioned having had to deal with a shortage of rice at least once in the past three years. During these periods of time availability of and access to forest foods become crucial for these vulnerable groups.

Food security and livelihood strategies

When rice shortages are strong, mainly as a result from crop failures and the harvest itself being insufficient, the community will first try to buy rice in the city or at the local shop with any money they have left. If this is not possible, or after acquiring the rice here they are still left with a shortage, people need to resort to other means to cope with this. Because it is often impossible for the individuals to engage in wage labour (jobs are scarce and shortages affect many during the same period of time when money is already getting scarce), the first resort is usually to sell any livestock they have. Some people try to find jobs in other villages or in one of the big cities so they can buy rice with the wages and send it back to their families. When people are out of money and have no job prospect or livestock people fully depend on forest foods and other people’s generosity in securing their daily nutritional needs. It is a situation which is difficult to improve because by this time they have already outrun their resources.

In table 7 the main coping strategies of the households can be reviewed. They were calculated through the specification of a list for possible coping strategies and asking respondents which coping strategy they tended to follow in times of rice shortage. The respondents could name up

to three strategies and were allowed to add their own. If the first coping strategy was the selling of livestock, the second one they chose would be the one they would follow should they run out of livestock. Coping strategies mentioned in the first shortlist were awarded 9 points, in the second 6 points and in the third 3 points.

Coping strategies (rice shortage)	Total number of points awarded
Sell livestock in order to obtain money to buy rice	129
Work off-farm (alternative employment)	123
Collect food from the forest	69
Borrow money	33

Table 7: Coping strategies

As can be seen from the final shortlist, the main coping strategy remains the selling of livestock; livestock is very valuable to the people as a source of meat and a financial back-up. Some people said they were most likely to go work someplace else, either in the village, on another man's land or in another village altogether. The collection of forest foods to either sell or eat was only mentioned by 20% of the respondents as a first coping strategy. Borrowing money and depending on forest foods seem to be regarded the last resort. People tend to resort to other strategies to obtain their main source of food (rice) through money first. Even during the hungry season people preferred to keep collected products for selling purposes (again to obtain money to buy rice) rather than use them on a standalone basis as an alternative to their normal diet. Depending on forest products solely therefore can be regarded as a last resort.

III.VI SEASONAL CALENDAR



Figure 3: Seasonal calendar

There is a clearly defined dry season in the area, that generally lasts for about 6 months from mid November up to midMay. Medicinal plants can be collected for storage only from February until the end of April, when the rains come. The barks and roots are outside these months considered to be unsuitable for medicinal use (due to degradation of product ingredients because of the rain as well as harvesting dangers). Livestock diseases also take place mainly during the dry season, and the main reason for this are said to be the drought and high temperatures. The excessive consumption of bush potato was also said to be a common cause of disease in livestock. Animals are sold when money is most needed. Usually this is in times of festivities (for example, marriages or baptisms) or hunger. The peak-times in which they are sold were mentioned to be September, October and November, during the rainy season when rice is scarce and thus money is needed most. In October there is also a big festivity celebrated by the whole village which requires money to buy food for the families. Vegetables are grown and available throughout the year, but not in big numbers. Honey is also sold throughout the year, but the supply is largest when the rainy season arrives at its peak and rice is scarce. During the rainy season also diseases are at its peak, one of the reasons being the more common presence of malaria musquitos (the rainy season enables them to find breeding sides, enlarging the numbers present). In September a clear link seems to appear between the shortage of rice, a rise in the monetary expenses of families (mainly to buy rice) and a lack of money among community members. From this chart it can be concluded that the middle of the rainy season is the most problematic time for the community of Béli, because a lot of problems appear at once and some of them seem to be interrelated. On the other hand it is also a time in which forest foods are more abundant than during the dry season and livestock (also a big asset in maintaining food security) is less vulnerable to diseases.

IV USE AND MANAGEMENT OF FOREST FOOD SPECIES

IV.I DIVERSITY AND MANAGEMENT OF FOREST FOODS

A total of 58 species were found out to be in use as a source of food during the complete fieldwork, which consisted of both interviews and the identification of tree species at randomly generated plot locations. These species could be classified into different categories of use, including fruit (which here means that a species is eaten raw as a fruit), drink, food additive (for example sauces and soups), vegetables and meat and fish. A full list of all the mentioned NTFP species mentioned during the three interview set-ups is shown in Annex 7.

During the interviews it became clear that forest foods were especially important during the rainy seasons; the forest products serve as one of the community's coping strategies during times of rice shortage. Households of all wealth levels cope with occasional shortages, partly because of the isolation of Béli. Outside the "hungry season", as it is referred to, they are also used but not on such a wide scale.

The lands where the forest products are collected are considered community lands where everyone can go; only in the case of cultivation (cashew plantations, staple crops) one is consigned to grow and collect products within a designated area that is either the persons ownership or that one is contracted for to use. Forest foods are collected in the areas surrounding the village irrespective of whom owns it. Only in the case of the "kings of the bush" (locally referred to as the *iran*), spiritual beings that can bring about bad luck, areas are avoided or traditional rituals had to take place before one is allowed to cross into them. It was mentioned multiple times by local inhabitants during discussions in the field that the hunting of mammals is officially considered an illegal practice. Since there is very low law enforcement, however, and meat is considered an important part of the diet and livestock is valuable, hunters in the area do this openly. Forest products are not actively managed. They are generally collected on opportunistic grounds rather than set strategies.

Plant- and treespecies uptake in all the interviews in %

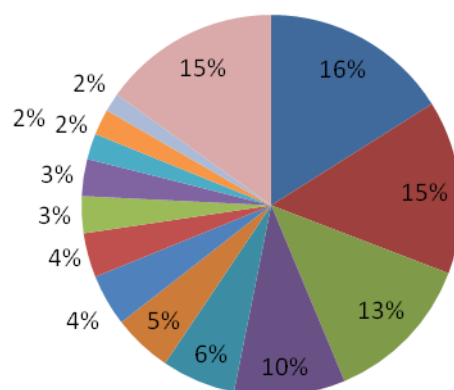
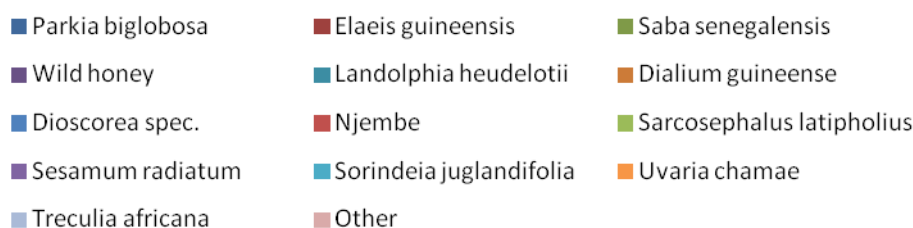


Figure 4: Plant- and treespecies uptake in Interview A and Interview B combined in %

As can be seen in Figure 4, the three most mentioned species of use during the interviews were *Parkia biglobosa*, *Elaeis guineensis*, *Saba senegalensis* and wild honey. *Dialium guineense* and *Landolphia heudelotii* are also considered very important and useful food products from the forest. Compared to those, species like *Uvaria chamae* seemed to only be of minimal importance in obtaining food security.

Forest food species mentioned could mostly be assigned to the “food additive” and “fruit” categories. These were the category-foods most commonly mentioned, suggesting that the bigger percentage of the forest foods harvested will be used in these ways. Food additives mentioned included species like *Parkia biglobosa*, *Elaeis guineensis* and *Saba senegalensis*, and usually meant that these products were integrated to make a sauce. During the plots it was discovered that also the calyx of *Bombax constatum* is used to prepare a condiment. Food categories for the different products (both from the plots and the interviews) can be viewed in annex 7.

All members of Béli households contribute to forest food collection in some way but there is a certain degree of task division where men are assigned jobs that are considered difficult and dangerous (like hunting and collecting honey) and women and children did the work that was considered more easy to pick, for example the collection of some of the fruits and vegetables (foli, foli sinhu, lalo). *Elaeis guineensis* was generally collected by men because the task was considered dangerous and enduring, requiring climbing the palm.

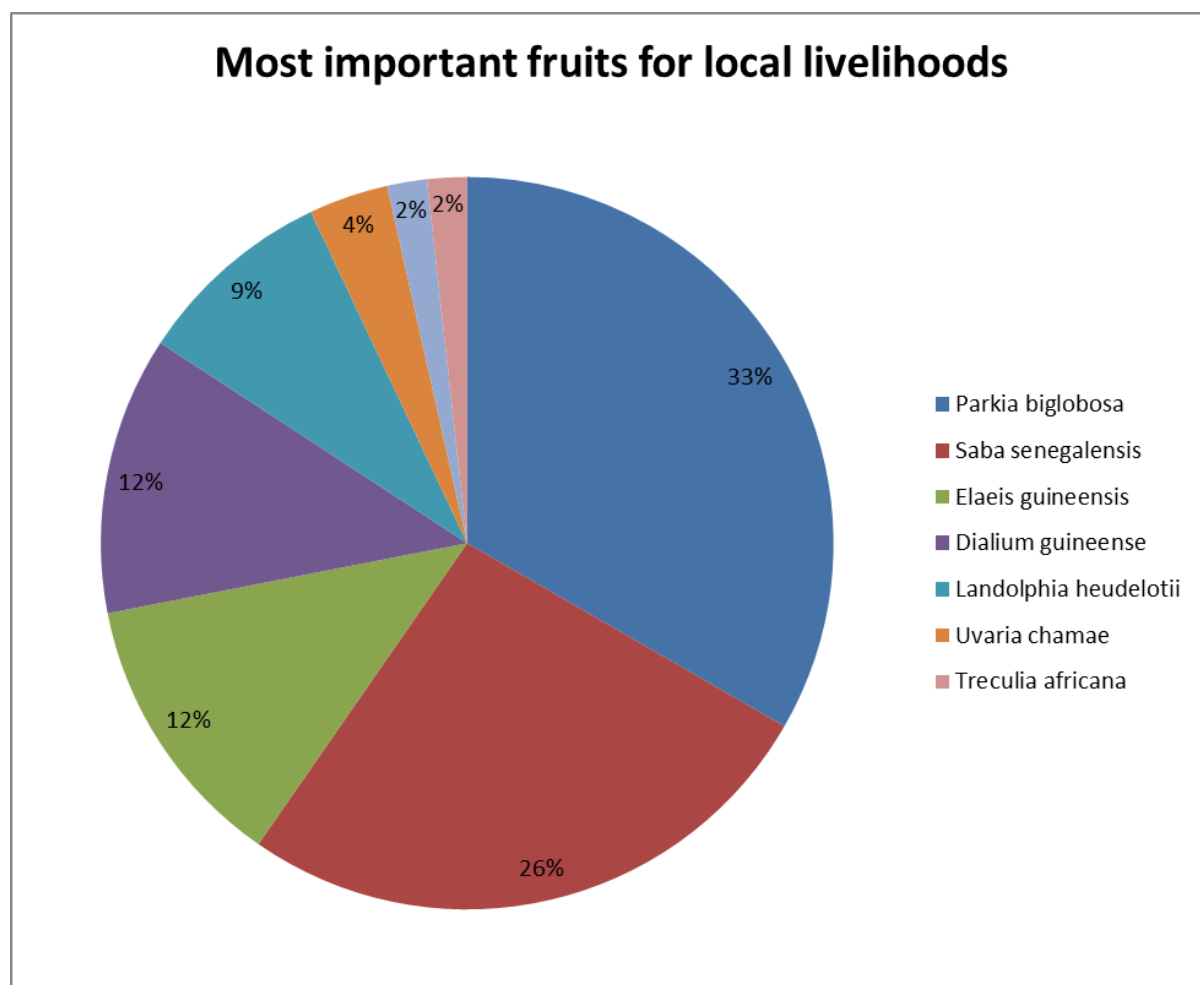


Figure 5: most important fruits for local livelihoods

The most important fruits collected for the local inhabitants livelihoods mentioned throughout the interviews included *Parkia biglobosa*, *Saba senegalensis*, *Elaeis guineensis* and *Dialium guineense* (figure 5). The fruits of *Dialium guineense* can be harvested during the month of May. The fruits of both *Parkia biglobosa* and *Saba senegalensis* can be harvested during the months May and June, after which the fruit of *Landolphia heudelotii* can be collected in July. *Elaeis guineensis* were harvested all year round. Fruits that were mentioned additionally (but not in this specific context) included *Treculia africana* (Gilinti; the African breadfruit), *Sarcocephalus latifolius* (Dundu ke, Dundu ke tjango; a tree from the Rubiceae family which holds a kind of peach more commonly known as the Guinea peach) and *Sorindeia juglandifolia* (Sanguebombo, which provides berrylike edible fruits). All of these products were said to be eaten raw. A total list of mentioned and observed fruit products is provided in the table below:

Fula name	Creole name	Scientific name
Unknown	Baobab	<i>Adansonia digitata</i>
Boileh	Banana sanchu	<i>Uvaria chamae</i>
Boileh kundjeh	Unknown	Unknown (possibly <i>Hexalobus</i>)

		monopetalus)
Bumeh	Unknown	Vitex spec.
Bumelbab	Unknown	Unknown
Unknown	Cadju	Anacardium occidentale
Djambo	Unknown	Amaranthus spinosus
Dukumeh	Unknown	Annona senegalensis
Dundu ke (tjango)	Unknown	Sarcocephalus latifolius
Nete	Faroba	Parkia biglobosa
Lareh	Foli	Saba senegalensis
Poreh padjah	Foli sinhu	Landolphia heudelotii
Unknown	Gilinti	Treculia africana
Unknown	Po di bichu	Antiaris toxicaria
Unknown	Poreh pududu	Unknown
Unknown	Poreh kududu	Salacia senegalensis
Unknown	Sangue bombo	Sorindeia juglandifolia
Taba	Kola di matu	Cola cordifolia
Tchuku	Unknown	Lannea spec.
Tugui	Palmera	Elaeis guineensis
Una d'odi	Unknown	Unknown
Meko	Veludu	Dialium guineense

Table 8 - Fruits mentioned and observed to be in use during field work

The additional data obtained from the plots provided different data than the data from the interviews did, indicating that there are fruits and other food products derived from the forest that were not mentioned during the interviews but common in number in the forest. All these products, with the exception of *Icacina oliviformis*, were said to be in use by the population. Possibly these products were not mentioned because these products are less commonly used or collected on a much smaller scale (see annex 10 for a full list). *Icacina oliviformis* was not used by the local populations even though people were aware of the edibility of it. Even after repeated questioning, reasons for this remained unclear. Tchuku was the only fruit-bearing species found in the plot that had a diameter larger than 20cm. Fruits most often found regenerating in the floor layer (<1m) of the plots were *Sorindeia juglandifolia* and Boileh kundjeh (scientific name unknown). *Annona senegalensis* was the most abundant species in the understorey, accounting for 16% of all species found in this layer. Other highly abundant species present were *Combretum micranthum*, *Landolphia heudelotii* and Boileh kundjeh (scientific name unknown). *Salacia senegalensis*, *Uvaria chamae*, *Saba senegalensis* and Una d'odi (scientific name unknown) were also relatively abundant. Layer 3 mainly consisted of medicinal species with the exception of an opportunistic individual of *Landolphia heudelotii*. Although it was relatively rare to find a tree that could be considered a canopy tree, individuals of *Lannea spec.*, *Uvaria chamae*, *Parkia biglobosa* and Boileh kundjeh were observed here; their stems were all relatively thin however. This is also due to the fact that most randomly generated forest areas consisted of fallow lands

and/or regenerating forest.

- *Wild vegetables and starches*

The rather low number of vegetables mentioned during the interviews indicates a category which is either not very important or not commonly found. The interviews I had with the local inhabitants suggest a combination of both, since many respondents did mention the most important part of a person's meal is a combination of rice, meat and (palm)oil or a sauce. This, the respondents would often indicate, is what makes one strong and keeps one alive. Vegetables in this seem to be of a secondary importance and are for the bigger part cultivated home-grown vegetables in gardens (cucumber, bitter tomato, onion, cassava leaves) in the village that are cultivated by the women. The most important leafy vegetable harvested in the forest was *Sesamum radiatum*. It is used as a leafy vegetable and can be eaten fresh or cooked to use as a sauce. Only 12% of the total number of products mentioned during interview A could identified as being in use as a vegetable. 56% of those responses consisted of *Dioscorea spec.* (yam, technically a starch) and 30% of *Sesamum radiatum* (lalo). The remaining 14% included mampatas (unknown; a starch), *Amaranthus spinosus* (Djambo, a leafy vegetable, the leaves of which can be eaten raw or cooked) and *Cola cordifolia*, of which the leaves are also used as a vegetable.

The available number of *Dioscorea spec.* was mentioned to be declining both during interviews (mentioned by 22% of respondents as a vegetable that is decreasing in number and on average classified as having an average availability rate of "few"). *Sesamum radiatum* was also mentioned to be in decline a few times. The other vegetables were also mentioned on this account, but only once.

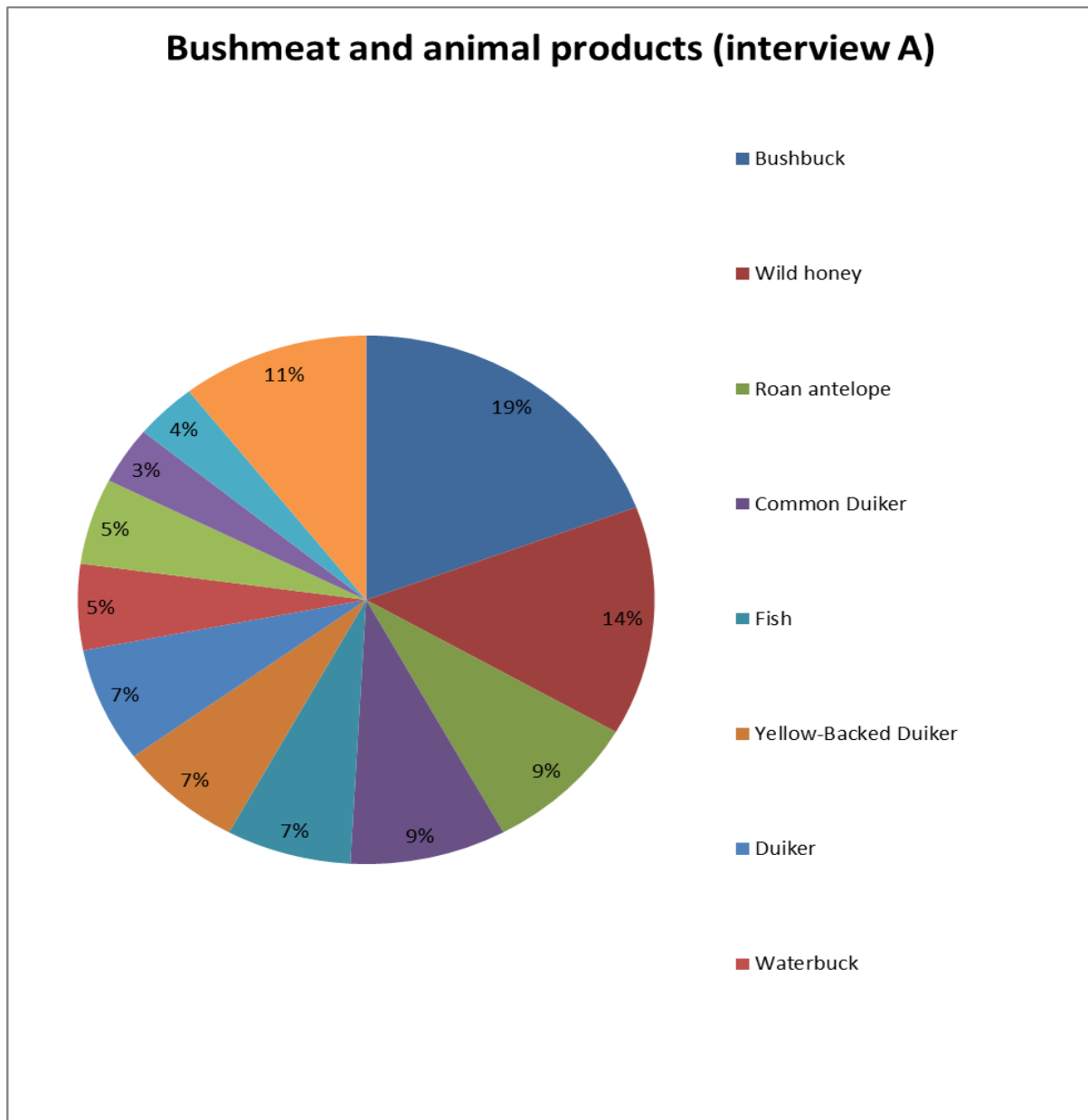


Figure 6: *bushmeat and animal products (interview A)*

All the hunters during their interviews stated that the bushbuck was the most desired species by the village inhabitants. It was also one of the most hunted animals (14%), along with the roan antelope (16%) and the common duiker (16%). When asked which bushmeat they bought in the village, indeed most people appeared to buy bushbuck (followed up by yellow-backed duiker). The bushbuck was also listed the most often spotted animal in forest areas, along with the common duiker and the red-flanked duiker. The common duiker and the red-flanked duiker, however, were also mentioned by several hunters when asked which species they see the least. Hunters were asked to give an availability rating of the edible species they were mentioning during the interviews. They were thus asked whether there were either “very few”, “few”, “enough”, “many” or “very many” of a species left in the forest. During Interview A people were also asked to rate the abundance of wildlife species they used themselves for cooking.

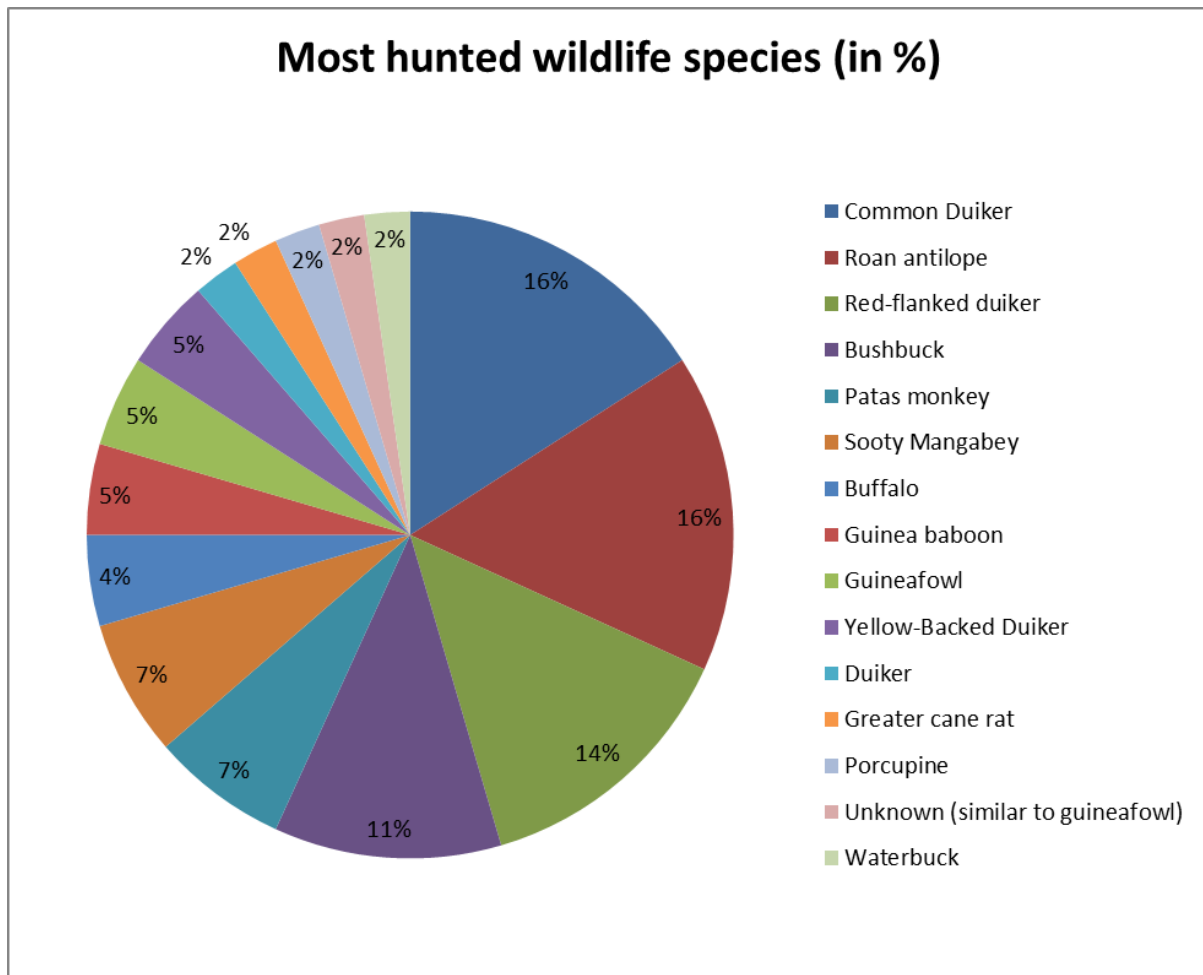


Figure 7: Most hunted wildlife species (in %)

Wildlife assigned a rating of “very few” would be awarded 3 points, “few” 6 points, “enough” 9 points, “many” 12 points and “very many” would give a valuation of 15 points. The total number of points given to the species was then divided by the total number of respondents valuating them. Through this system, the following table was made:

Species	Final valuation
Baboon	Enough
Roan antelope	Enough
Common duiker	Many
Bushbuck	Enough
Fish	Few
Yellow-backed duiker	Many
Roan antelope	Enough
Red-flanked duiker	Enough
Sooty mangabey	Many
Patas monkey	Many
Wild honey	Enough

Table 9: Species availability rating according to local respondents

The table does not necessarily indicate how many of a species are left in a forest or which species are more sustainable to use since the visibility of species might have a big influence in the availability-rating people attach to it. A species that is not commonly seen may for example be more wary of humans and thus more prone to hide itself. What can be indicated by this table is

which of these animals are more often spotted and therefore more likely to be hunted regularly. Ratings based on two respondents or less were not included in this table, the full table is shown in annex 8.

66% out of 32 respondents during interview A mentioned they saw a decrease in the availability of some wildlife species. A further 16% mentioned they saw an increase with some species. 31% saw decreases nor declines. The following animals were mentioned in relation to wildlife decrease and –increase during the interview:

Decrease Creole / Fula	English	Increase Creole / Fula	English
Kon	Baboon	Passaru	Birds (general)
Gazela	Bushbok	Gazela	Bushbok
Edda	Buffalo	Porku preto	Warthog
Muntun	Yellow-Backed Duiker	Kon	Baboon
Sancho preto	Sooty Mangabey	Dari	Chimpanzee
Porku preto	Warthog		
Boka baranko	Roan Antelope		
Lion	Lion		
Bolereh	Common Duiker		
Sancho	Monkeys (general)		
Sin-sin	Waterbuck		
Cabra di matu	Duikers (general)		
Farfana	Cane rat		
Choka	Unknown mammal ("small chicken of the bush"; possibly a small type of guineafowl)		
	Fish		
Girafa	Giraffe		
	Bees		
Jabereh	Kob		
Jawlal	Guineafowl		
Kemba	Bahor Reedbuck		
Koseh	Aardvark		
Lopereh	Unknown mammal (gazelle or duiker- like animal)		
Lubu	Hyena		
Porco espino	Porcupine		
Sanchu burmeja	Patas Monkey		

Sanchu moneh	Vervet Monkey
Savanu	African wild dog
Timba	Unknown mammal
Togereh	Red-Flanked Duiker

Table 10: Species increasing and decreasing in number according to local inhabitants

A total of 59 individual species names were given for decreasing species, whereas the amount of increasing species mentioned only added up to a total of 6 species (with the baboon as the most mentioned species, having been mentioned twice). Most mentioned species in decrease also included the baboon (mentioned during 25% of the 32 interviews) and bushbok (also mentioned during 25% of the interviews). The Bahor Reedbuck and Loperreh, a type of duiker or gazelle which unfortunately could not be traced back to its scientific name, were even regarded as having gone fully extinct in the area by one of the respondents. The most important causes of declines in wildlife mentioned included excessive burning and an increasing population density in combination with increased hunting practices. The giraffe was mentioned once as a declining species in the area but in reality it seems acceptable that even the existence of the giraffes in this area can be ruled out.¹⁹

Hunters mentioned that some of the animals would only be shot when they were harming the crops and foraging on agricultural fields; animals mentioned in this context were the baboon, the patas monkey and the sooty mangabey. It was also mentioned by the hunters that some groups within the muslim community did not eat wild hogs and monkeys on religious grounds.

- Other

Honey

People are generally positive towards the collection of honey because it has value as both food and a traditional medicine for small ailments. It is used as a sweetener in drinks and as a food additive in dishes. Honey also provides good way to earn some additional income because the product is easily stored and is not likely to go bad.

Honey is collected on an opportunistic base through the use of fire, creating a potential fire hazard every time it is harvested. Trees are burned and cut to collect the hive. Another reason why the current practice of harvesting is unsustainable, is because it happens during the night because the bees are said to be more docile then. Bee communication and navigation, however, use the sun as their reference point. Because during night time this is not possible, bees will lose their ability to navigate and start to scatter, leading to another potential loss of bees on top of the ones dying from the fire. Another problem with the burning of the beehives is that bees do not resettle in the same locations, making it impossible for the community to profit from the same hive more than once.

Forest products used for drinks

Different drinks derived from forest products were identified during the stay in the Boé; they included juices such as foli (juice made using the saba senegalensis and/or Landolphia heudelotii fruit), veludu (juice made using the fruit of Dialium guineense), faroba (juice made using the fruit of Parkia biglobosa) or a combination of these. The juice from the fruits would generally be combined with water, sugar and/or honey. Another drink derived from the forest was made using a plant locally known as kankaliba (Combretum micranthum), of which the leaves are cooked in water and drunk as a kind of tea. The same happens on a lesser scale with the naruma plant (both scientific and creole name unknown).

¹⁹ IUCN (2013)

IV.II FOREST FOODS AS A SOURCE OF FOOD SECURITY

Food security is an important concern for families residing within the study area; households are generally poor and vulnerable to change. Concerning food security, it was observed that there were a lot of problems involving rice yields (crop loss, crop failures, animal damage). Using the results from the interviews and the Pearson's correlation test (which gave a result of 0,17) it was observed that there was no obvious correlation between the amount of rice yielded and the number of rice shortages experienced during the last three years. Before doing the correlation statistics, yield harvests were brought down to rice yields in kilos per head of the household. The correlation calculation indicates that there is a high likeliness that there is not a relation between the size of the harvest per household member available and the appearance of rice shortages in the household in the past three years. This indicates that both families that own a larger amount of land to grow their crops or have more fertile lands to plant on (and thus in both scenarios can obtain higher yields) and families with small or infertile lands (mostly the poorest families) are subject to regular rice shortages, making the problem seem structural for everyone.

Cause of crop failure	Number of respondents	%
Animal damage	17	63%
Erratic rainfall	17	63%
Pests and diseases	5	19%
Poor soils	3	11%
Limited land availability	1	<1%
Fires	1	<1%

Table 11: Main causes of crop failures

In the table above the causes of crop failure as mentioned by the respondents are described. 63% of respondents mentioned animal damage and erratic rainfall as one of the main causes of their crop failure respectively. Temperature and climate thus proved to be critical factors in the success of crop yields. If drought or excessive rainfall occurs leading to crop failure and there are no carry-over stocks available and/or there is no food available through other channels such as the local shops, it can lead to food shortages within households. In worst case scenario's (for example during the rainy season when the ferry is out of service and it gets especially difficult to reach the markets) it may even lead to famine. Small-scale famines were said to have occurred in this region in the past in the midst of the rainy season.

Forest foods are an important and cheap part of people's daily diets. A big variety of foods is consumed by the inhabitants of Béli, with some of the main collected products being *Elaeis guineensis* and *Parkia biglobosa*. The amount of forest foods collected and used by families varied. Table 12 shows which forest products were specifically important for local people for cooking purposes.

Scientific name	Kriolo name	Current use	Mentioned %
<i>Dioscorea spec.</i>	Njembe	Vegetable/Starch	41
<i>Sesamum radiatum</i>	Lalo	Vegetable, Food additive	30
<i>Elaeis guineensis</i>	Tugui	Food additive, General household use	22
<i>Parkia biglobosa</i>	Faroba	Fruit, Drink, Food additive	19
- (Fish)	Peska	Fish	11
<i>Amaranthus spinosus</i>	Djambo	Vegetable	11

- (Wild honey)	Mel	Food additive, sweetener	7
Treculia Africana	Gilinti	Fruit	7
Tragelaphus spec.	Gazela	Meat	7
Adansonia spec.	Baoba	Fruit	4
Landolphia heudelotii	Foli sinhu	Fruit, Drink, Food additive	4
Cola spec.	Kola di matu	Fruit, Vegetable	4
Papio spec.	Con	Meat	4
Cephalophus sylvicultor	Muntun	Meat	4

Table 12 - Most important species for daily cooking activities according to interview respondents

As can be seen in the table, Dioscorea spec. was the most mentioned product. However, many families admitted that the product was getting relatively scarce; people would have to search longer to find it, and would take only a small amount if they did. It is one of the favourite food products for this category but because of this not likely the one that is used most often. The product was not observed at all during the fieldwork for the plots.

Forest foods are collected all year round, but mostly before and during the start of the rainy season, when the availability of rice declines and products are stored for later use. It is one of their main assets in combating the local seasonality problem. It was observed that for these months food is rationed and stored within the household as a coping strategy. Other coping strategies mentioned included borrowing money from friends or family, selling livestock in order to obtain some money or searching for additional income through off-farm labour (see table 7).

V COMMERCIALISATION OF FOREST FOODS

V.I COMMERCIALISATION

Commercialisation includes all the activities of a company associated with the adding of a product to the market chain so that they can be bought by consumers and other collectors. It is important for any company, local entrepreneur or smallholder working on any scale to have a good view of the market chain of the situation because it offers insights that can help develop and distribute products.

Commercialisation opportunities in this case do not only rely on availability and social factors. One of the most important factors in commercialising products in a community like Béli is the environmental one; it must always be ensured that a product has a healthy, non-destructive relationship with the natural environment surrounding it, ensuring a relatively low-input, low-maintenance source of income while maintaining the natural ecosystems on which people depend at the same time.

Factors to consider include when deciding whether a crop could have value in potential marketing strategies include:

- Does the crop grow easily within the area (without additional input)?
- Is the crop likely to be abundant (and can it be harvested on a regular basis) in the area now and in the close future?
- Are people familiar with the species and its products?

For most of the inhabitants of Béli the commercial trading of food products obtained from forest areas seems a distant reality. Forest foods are used as a supplement to agriculture in the first place. The markets are hours away and transport is unreliable and difficult to arrange. The Béli people rely on subsistence agriculture for their livelihoods, and when this does not suffice the most often mentioned alternatives are the selling of livestock (animal husbandry) as an alternative additional source of income and - if there is no other option - seasonal migration to work elsewhere. It was observed that there was a distinction in the selling of fruits: foli, faroba and lalo were usually sold locally by children of both sexes, while most other products were sold by women.

It was mentioned that forest products being traded locally were only traded locally on a very small scale – there simply is no big market because most people will collect their own products and people are relatively poor. Families with many children will normally ask the children to harvest the fruits rather than buy the fruits themselves. Smaller families are more dependent on the buying of such products, but as has already been mentioned, only in small quantities.

The forest food collectors in Béli are for the bigger share dependent on local traders for the selling of their collected products. Three types of traders were identified that visit Béli on a somewhat regular basis:

- Traders from Gabu and Bissau, which are by far the most important ones. They buy crops like groundnut as well as honey and palm oil to take to the markets in Gabu, Bissau and Senegal. One specific company that comes around is called Mel di Gabu (“honey from Gabu”). They collect the honey in the Boé and process it further in Gabu. These traders come most often just before the start of the rainy season during August/September
- Traders from Guinea-Konakry that occasionally come by and buy bags of Faroba (in modest amounts of only few 50kg bags per visit)

- Traders from South-Africa, that come at rather unspecified times every few years to buy the domesticated fruits. Although South-Africa was specifically mentioned multiple times by the translator as being the country of origin, it seems more reasonable that in this case the respondents were referring to a more Southern African country than to South-Africa as such.

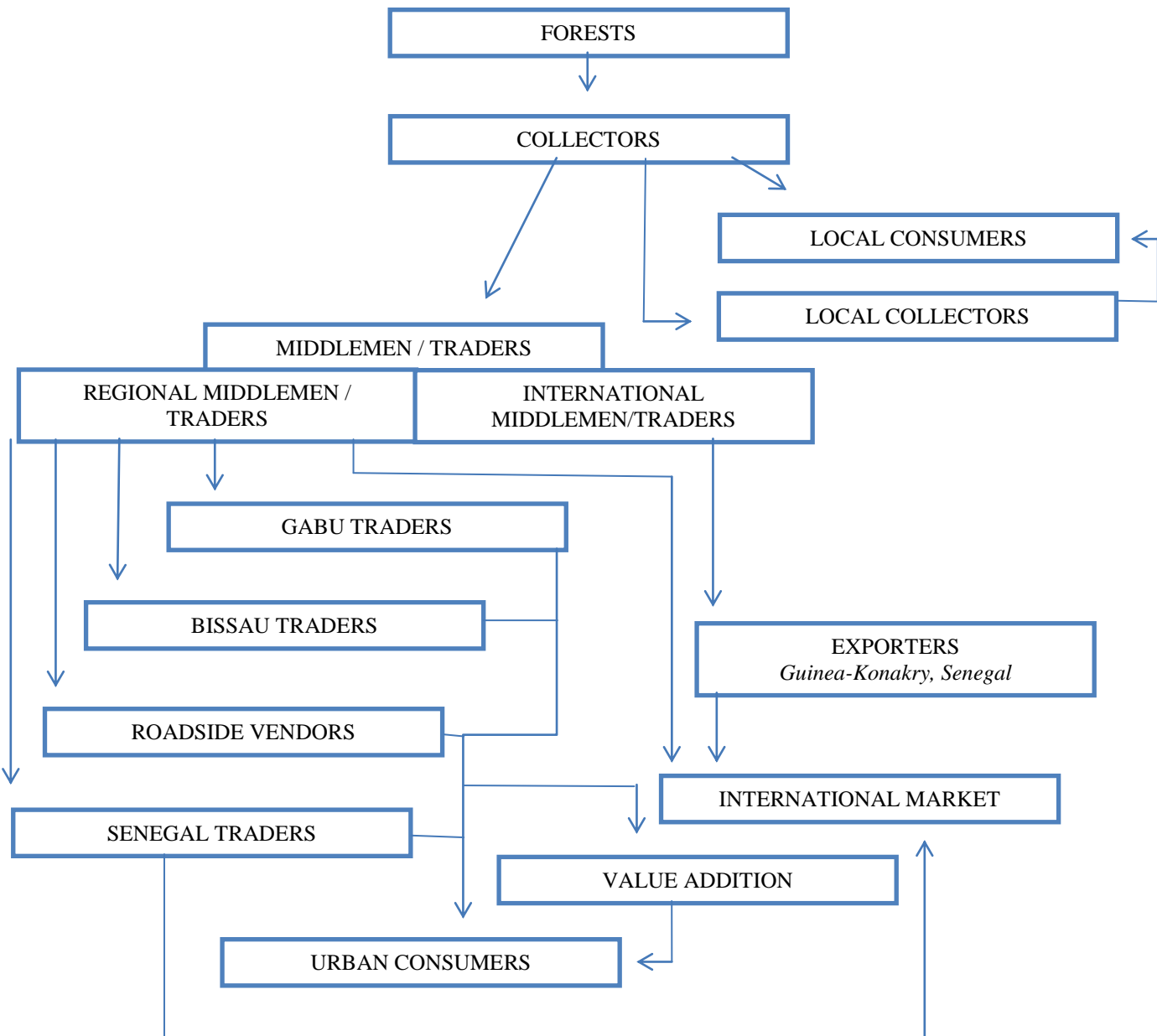


Figure 8: The market chain of local forest products

The traders were said to not generally sell all the products on the market themselves, making them most often middle men in the market chain towards the consumer.

The collectors depend for the bigger part on the regional/national traders from Gabu and Bissau. They visit the most often (but often unannounced, which leaves little space for the villagers to prepare) and buy the most valuable products. During both interviews and informal conversations it was addressed, however, that collectors felt they were not getting fair prices for their products. One of the respondents gave an indication of 50% of the amount he would

receive should he sell his products on the market himself. Although it should be noted transportation risk and costs are paid by the trader, these sentiments should not go unnoticed.

In the bigger villages and cities forest foods were observed to be sold in open-air markets and along roads, where they were either being sold from stalls and booths or street vendors would approach people on their own account. In most cases women were selling the forest food product, processed (for example fruits made into juices) and unprocessed. It was also noticed that in supermarkets regional products were sold, like locally produced and processed honey. No products from the Boé were spotted. One interview respondent mentioned that one difficulty that applies to the commercialization

NTFPs that can be traded commercially on small or big scale within Guinea-Bissau mentioned during the interviews are listed in the table below.

Creole name	Scientific name	Av. Availability	Use
Lalo	<i>Sesamum radiatum</i>	Enough (9)	Vegetable
Foli	<i>Saba senegalensis</i>	Enough (19)	Fruit, Drink
Foli sinhu	<i>Landolphia heudelotii</i>	Enough (9)	Fruit, Drink
Bumelbap	<i>Vitex spec.</i>	Few (1)	Fruit
Faroba	<i>Parkia biglobosa</i>	Many (23)	Fruit, Drink, Food additive, Animal feed
Tugui	<i>Elaeis guineensis</i>	Enough (16)	Food additive, General household
Kura	<i>Parinari excelsa</i>	-	Fruit
Dunde ke tjango	<i>Sarcosephalus latipholius</i>	Many (12)	Medicine
Pau di sangue	<i>Pterocarpus erinaceus</i>	Enough (4)	Medicine, Furniture, Construction
Veludu	<i>Dialium guineense</i>	Enough (11)	Fruit, Drink
Njembe	<i>Dioscorea spec.</i>	Few (15)	Food
Banana sanchu	<i>Uvaria chamae</i>	Many (6)	Fruit
Fish	-	Few (4)	Food
Bushmeat	-	See Annex 8	Food
Wild honey	-	Enough (8)	Food, Food additive, Drink

Table 13 - NTFP species with marketing potential

Many people do not have the opportunity to visit the city markets regularly because it is far away and transportation is expensive and difficult to arrange. If they do go there, people will generally take a jerrycan of palmoil or another valuable product (like honey) to sell in the city in order to obtain some money during the stay.

Traders come to the village of Béli once every few weeks during dry season to buy the products. During the rainy season they come less because it is more difficult (sometimes impossible) to get there, so there is less of a market to sell the forest foods to during this season. One woman said during an interview she sometimes collected lalo and would take it to the market herself. Most other respondents mentioned other products than faroba, tugui and wild honey would be difficult to trade because of previously mentioned reasons (many products are hard to conserve and trader visits are often unannounced, leaving villagers unprepared for their arrival). During one interview a man made a comment that he felt the traders were abusing their position when they would come, giving the villagers only a very small share of products' worth on local markets.

V.II MARKETING POTENTIAL

The access to marketable forest foods has for the bigger part remained the same according to local population. *Parkia biglobosa* was the only species they considered marketable for the bigger markets that was mentioned in relation to decline. On the other hand the same species' availability rating was considered an average of "many" using the rating system in annex 8. It was mentioned the fires (which are used to create agricultural fields, grazing lands and for extracting honey) are a big cause of forest damage and destruction, which will lead to a decline in available products if not properly addressed in the near future.

The three types of food that according to the respondents had the highest marketing potential out of all marketable forest foods were considered tugui, wild honey and faroba (see table 14). The most important criteria for a forest food being marketable were a) the ability to conserve the product for a longer amount of time; b) the consumer attitude towards the product (some products are more popular than others among consumers – the market demand); and c) economic value.

Criteria that were not addressed by respondents but that do play a role in establishing successful commercialisation for local forest products are a) harvesting techniques; b) cultivation potential; and c) conservation status. The cultivation potential of certain species and the processing requirements for certain products can also play an important role. For the latter in the case of Béli funding would be required which, according to the respondents, is not available.

High marketing potential food product	% respondents mentioning
<i>Elaeis guineensis</i> (Tugui)	86
Wild honey	69
<i>Parkia biglobosa</i> (Faroba)	55
<i>Saba senegalensis</i> (Foli)	48
<i>Landolphia heudelotii</i> (Foli sinhu)	21
<i>Dioscorea spec.</i> (Njembe)	7
Fish	3

Table 14: High marketing potential forest foods

Elaeis guineensis (tugui)

The oil palm (*Elaeis guineensis*) is a tree endemic to the forests of West-Africa. In the study area the tree was used for multiple purposes, namely as a source of food (the fruit) and as a cosmetic (the seed is used for the fabrication of soap). The traditional methods of oil palm extraction are still being used (extraction by hand, see annex 9). *Elaeis guineensis* is collected by men, but the further processing of the product is usually done by the women of a household. It was noticed to be stored in both regular houses and special storage houses (created and used mainly for rice). Although the oil palm is a very valuable economic crop, the intensification of the growing of this product has in other scenarios often led to controversial issues regarding social inequality and environmental degradation. The product was said to be collected year-round and after processing it is usually stored in jerrycans or bottles for later use or selling.

Average availability rating for this product: **Enough** (16)

Wild honey (mel)

Honey is collected by men and has value as both a food additive and traditional medicine for small ailments. It is collected opportunistically throughout forest areas. Many hives are said to be located in close proximity to the rivers. The advantages of honey considering marketing potential are a) the relatively high prices that can be obtained; b) it can easily be stored for a longer period

of time; c) there appears to be a high market demand for good quality honey. Market value was at the time of visiting between 500 and 1000 CFA per liter of honey or US\$1028,76 per tonne and US\$2057.51 per tonne (Gabu market). According to FAO the producer price for honey in Guinea-Bissau in the year 2006 was US\$1042,30 per tonne. Constraints of using honey as a marketable product are a) that the collection of honey is relatively demanding and can be dangerous and b) that current harvesting methods contribute to the degradation of the forest ecosystem.

Honey is collected year-round, but the main period of selling for the product is the month of September. Honey is sold locally and to traders that come from Gabu and Bissau. These traders were said to sell the product in Gabu, Bissau and Senegal.

There are some problems and opportunities that can be addressed in relation to honey collection and its potential marketing:

- The current method of extraction is highly unsustainable, in worst-case scenarios leading to extensive forest fires. Bees are unnecessarily killed in the process. The surviving bees cannot orientate properly because of the lack of sunlight. If both queen and queen eggs and larvae are lost in the process a population is likely to eventually vanish. The destroyed hive has not been used to its full potential by the time the harvest is over.
- The quality and taste of the honey is affected by the boiling process which according to locals is necessary to ensure the honey can be stored and does not go bad.
- The growing population leads to a growing demand for honey. This, in combination with the unsustainable harvesting practices, will have great impact on the future honey supply within the area in a negative way.
- A decline in forest area will lead to a decline in honey supply.
- No commercial apiculture practices are currently developed in Béli.

Average availability rating for this product: **Enough** (8)

Parkia biglobosa (faroba)

The tree *Parkia Biglobosa* is known to have a wide variety of uses but it is served primarily as a food additive in sauces and soups. In Béli it is also used like this or eaten raw altogether. The tree is also of use as a medicine through its flowers, bark, roots, leaves and fruits throughout Africa. Of these medicinal uses, the bark was the only one mentioned by the local community in Béli. They appeared however, more reserved in sharing information about traditional medicine than about their use of forest foods. Their arguing for this was that medicinal uses shared could become widely known through the community and cost people their occupation. *P. biglobosa* can additionally be used as a fodder during the dry season. The seeds can be used for feeding the livestock supply as well, but they need to be prepared first. During the interviews only domesticated tree species were mentioned to be used for soil improvement purposes; *Parkia biglobosa* would be a good addition because its leaves have a good reputation in use as a manure. The fibres of the pods are collected and used for making sponges. *Parkia biglobosa* is sold locally and regionally. It is also sold to international traders from Guinea-Konakry that were said to buy them in relatively small amounts of only up to a few bags each. The fruits of *Parkia biglobosa* are collected in the months of may and june but they are often stored for later use or selling.

Average availability rating for this product: **Many** (23)

NB:

Saba senegalensis and Landolphia heudelottii (foli and foli sinbu)

Both *Saba senegalensis* and *Landolphia heudelottii* are species native to the savannah areas of western Africa. The fruits are commonly eaten by local communities throughout Guinea-Bissau and combined with water and sugar to create a juice. Because of the ascorbic acid inside the fruits, the fruits are also commonly used as food additives. *Saba senegalensis* is collected in may and june while the main harvesting period for the fruits of *Landolphia heudelottii* was mentioned to be july. The fruits are mainly sold on a relatively small scale on within the village community.

Average availability rating for Saba s.: **Enough** (19)

Average availability rating for Landolphia h.: **Enough** (9)

Dioscorea spec. (njembe)

Dioscorea spec., more commonly known as the yam, is considered an important tuber crop in the community of Béli. Yams were not said to be stored, although in the right conditions some types of yam can be stored up to six months. Villagers mentioned that when collecting yam they would only collect few since only few were available at the time of research in comparison to other years. They mentioned there used to be more yams available in the past, but due to increasing population pressure the amount has gone down and it has grown more difficult to find the crop. Most of the interview respondents said they collect this product year-round, while one respondent mentioned the main collection period entailed the month of september.

Average availability rating for this product: **Few** (15)

Fish

Fish caught is usually dried straight after because it has to be caught in places hours away, near the river Féfene for example. Thus, to make the fish last, it needs to be processed to be conserved. To achieve this, fish is dried in the sun or smoke-dried using fire. Fish is definitely a highly regarded food product within the community, but most families took care of their own supply. Some of the interview respondents mentioned they saw a decline in the availability of fish; they concluded this from the fact that it was more difficult to catch them now than it had been in the past. The results on fish should only be considered in respect to Béli and not surrounding villages since it is relatively difficult for many people to travel there regularly.

Average availability rating for this product: **Few** (4)

V.III SWOT ANALYSIS

Strengths	Opportunities
Diversity of native species with good market potential available	Creation of a more stable market price
Well-established social structure	Possibility of receiving environmental benefits through long term sustainable harvesting and management practices
Improvement of livelihoods	Opportunities for soil improvement
Increase of income	Platform for education and information on sustainable forest management and -use
Increasing environmental awareness	Government / NGO / foreign funding or investments
New income opportunities	Safeguarding and protection of local biodiversity
	Willingness to commercialise

Weaknesses	Threats
Little funds or finances available to carry out substantial projects or activities (strong dependency on “outside” resources)	High expectations; you can only do so much
Boé products are not respected products	Low enforcement of law and regulations
Relatively small amount of regional / international market traders that come by (strong dependency)	“No man’s land” harvest rights can be an obstacle in tree planting and -management
Unsustainable practices (honey burning, slash-and-burn activities) that harm the natural	Fires have (uncontrolled) effect on the availability and regeneration of forest products

environmental and potential products	
Low availability of materials and information about sustainable forest management practices	Lack of financial resources
Low information access	Monopoly status of existing traders
No yield monitoring	Possible overharvesting of products (especially relevant for <i>Dioscorea spec.</i>)
Inefficient fire control	Natural disasters
Inadequate infrastructure / Isolation	No properly developed network linking different stakeholders in marketing chain

Table 15: SWOT-analyses for the commercialisation of forest foods in Béli

V.IV RECOMMENDATIONS

- Further exploration of the different possibilities of forest foods during times of scarceness is recommended. Because residents are focused mainly on rice for their diets there is reason to believe they are not using other products from the forest to their full potentials. *Icacina oliviformis* (false yam), for example, was mentioned to be used in the past by the inhabitants ancestors but not anymore. An evident reason for this change in diet could not be mentioned when asked. It was mentioned only the fruits were eaten in the past (in the neighbouring village of Capebondi the fruits were observed to still be actively eaten as a snack). Fruits can be eaten raw or sundried. Seeds of the fruits can also be eaten, and when dried stored easily without a lot of loss, even in the presence of rodents, because they turn rockhard. They can then be used by soaking them in water for several days and then boiling (in a new share of water), drying, deshushing and grounding them. The final (floury) product has a nutty flavour and contains a lot of protein and carbohydrates. Moreover, it can be stored for later use. Besides the fruits and the seeds, however, the product has another important potential, namely the tuberous roots it offers, which is also where the product gets its english name. It can grow up to very large sizes (sometimes weighing over 60kg, penetrating far below the surface) and the usable part consists for the greater part of starch. To use, the tubers can be soaked in clean water for several days which softens the matter of the product and makes it less bitter. Then they can be dried, pulverized and sieved into a flour. If the damp final product is dried using fire, a vast product of almost pure starch comes out that can benefit greatly during times of hunger. The flour can obtain up to 10% of protein²⁰ (five times as much as cassava flour and twice as much as potato). This flour can evidently also be stored relatively easily.

Faroba (*Parkia biglobosa*) is a product that people definitely have explored but the main focus during the interviews seemed to be on the on selling the product. Even so, the fruits were said to be used regularly to create a kind of sauce called konka as well as added to drinks. The seeds can also be fermented to create a condiment high in protein and fats that is sometimes because of this described as a meat or cheese substitute because of this. Faroba was said by the interview respondents to be kept in plastic bags for the most parts, allowing them to store it for 3-6 months. Dried and fermented seeds, however, can be kept for over a year when kept in earthenware pots. When roasted, seeds can also be used for making a tea-like drink referred to as “Soudan coffee”.²¹

Sesamum radiatum, besides being used as a leafy vegetable, can be grown for its seeds as well. Seeds can be eaten whole, toasted or grinded in the form of a kind of pasty

²⁰ Development, Security, and Cooperation (DSC); Policy and Global Affairs (PGA); National Research Council; National Research Council (2008)

²¹ World agroforestry centre (2013)

substance. The seeds can additionally contain over 30% of an oil comparable to sesame oil, which can be extracted.

It is important to explore these and other uses of products thoroughly because in times of scarcity they may be able to contribute to creating a more complete diet.

- Commercialisation of desired products yam and fish is not recommended due to apparent low availability. It should be taken into account with any commercialization attempts that possible counter-effects may occur that are harmful to the environment. This should always be avoided where possible. It should also be noted that some species that may seem plenty in availability are used on such a wide scale that they may still be vulnerable to overharvesting (*P. biglobosa*, for example, which serves many purposes besides being used as a source of food).
- The set-up of a program that encourages sustainable production and management methods for (wild) honey is recommended because a) it is already one of the main moneymaking products derived from the forest and b) current practices are highly unsustainable because they impact forest areas, individual trees, animals and the bee populations in a negative way. Only after completing the fieldwork, back in the Netherlands, it became known that in the past apiculture used to be practiced within the village (contradictory to what I had learned during the interviews); for such a project to be successful, therefore, one needs to find out first what the constraints were that led to the dismissal of this practice.
- The support and encouragement of the documentation and exchange of local knowledge of flora and fauna is recommended to increase knowledge about local forest products, the current state of the forest ecosystem and future trends and shocks.
- Further spread knowledge about sustainable forest management and awareness of the possible consequences of unsustainable practices is recommended (especially in relation to fire hazards and their effects on the environment)
- Improvement of current infrastructure needs to be established to enable substantial increase in the marketing of local forest products
- Improved monitoring of forest products is recommended in case of commercialisation in order to effectively control and manage forest products without the risk of overexploitation
- Where possible communication links between local innovators/entrepreneurs and the private sector need to be encouraged
- Transport and transport costs are a major constraint in the commercialisation of forest foods for isolated villages like Béli. People do not have proper transport and the costs of getting to the cities are generally high while the amount of products they can take on this trip generally are not. It is advised for future commercial forest foods projects to focus on village groups (to have a stronger hand in negotiating prices), value addition (to add value to the products before selling them to traders), or products that are not rarely found growing nearer to local markets but do have a fairly big market potential. Otherwise, without proper funding, the (financial) trouble it will take local people to get to the markets might in many cases not be worth the effort if compared to what can be gained through the process (unless big quantities can be sold).

- Identify interested farmers
- On a group level, form policies and note them down
- Negotiate
- If well-established and market responds: set up a nursery for priority species
- If well-established and market responds: set up a system to process certain products before selling, to increase value

VI CONCLUSION

This study showed that forest foods are of significant importance in the livelihoods of people inhabiting the village of Béli. The people of Béli live in one of the poorest areas of Guinea-Bissau and forest foods are an essential part of the livelihood strategies of its people since they have the potential to provide them with a safety net in times of need, for example when money and/or food is scarce. The community is very fragile when it comes to natural disasters like unpredictable rainfall and animal damage in the crops; these events have been known to directly or indirectly lead to substantial rice shortages or even famines, and it is precisely during these times that forest foods become of critical importance as a livelihood strategy.

During this research it was discovered that the most important forest foods in maintaining livelihoods include *Parkia biglobosa*, *Saba senegalensis* and *Elaeis guineensis*. These are also the most important species moneywise, being potential cash crops, with seemingly the biggest marketing potential. If not consumed locally these products can end up at markets in Gabu (all), Bissau (all) and Guinea-Konakry (*P. biglobosa*). Bushmeat is also important to local livelihoods; it brings in protein and provides families with a source of money when it is sold. Meat (including fish) is along with rice and oilpalm widely considered the most important nutritional intake. Not all plants in the area appeared to be used to their fullest potential; especially faroba (*Parkia biglobosa*) and silah (*Ipomoea oliviformis*) could be used more efficiently as a strategy during the difficult rainy season.

There was enough enthusiasm among the community to bring about commercialization of forest products, however resources are scarce and one needs to take into account the risks that come with commercialization (for instance overexploitation, especially where there is no proper monitoring system). Marketing potential of different products in the Béli region is constrained by access limitations due to inadequate infrastructure and a lack of resources and financial funds. People also currently have limited power to negotiate prices due to limited knowledge of arrival dates and for some products (like the yam) commercialization is not recommended because the current wild population seems vulnerable to overharvesting. People in Béli generally have no time-indication in which to collect good quality products (because they do not know in advance, or only very shortly in advance, when traders will arrive) and products are sold using an individualistic approach. Teaming up, for example in a forest food collection group, might open the door to more successful negotiations with regional traders.

The amount of unsustainable practices in the forest is still relatively high. Most problems are caused by slash-and-burn activities for the creation of agricultural areas, the clearing of land for cattle grazing and the burning of beehives. No proper measures are taken to prevent the fires from spreading causing damage to natural areas, agricultural areas and animals alike. The government has since a year been having a campaign about this issue on the radio that everyone seems very aware of. A big part of the people admitted they already saw the forest cover changing for the better because of this campaign but in reality it is too early to assign any changes to it yet. It is something that gives hope for the future, however, since apparently inhabitants are very aware of it.

ANNEXES

Annex 1 – Interview A

INTERVIEW

GENERAL

Mentioned

- anonymous
- free respond any given answer they wish, or not respond

Recorder: Jitske

NO.

Date:

Location:

F/M

Age:

Married: Y/N

Household:

Adults (w, m)

Children

w

m

Language(s):

F K P E Fr A O

Level of education [years]

Kantu anos di skola bu tene?

.... YR

Are you originally from Béli?

You where born in Béli? = Nunde ki bu paridu?

Yyyy

Yes / No

If no, Place of Birth:

.....

If no, for how long have you lived here?

If no, how many years do you live in Béli?

Si negativo, kantu anos bu ta mora na Béli?

.... YR

If no, why did you move here?

Si negativo, ke ki manda bu munda ba na Béli?

[A] Work

- Munda ba li pa trabaju

[B] Marriage

[C] Other

Are you a member of any village organisations?

Bu sta na ativo / participa na organisasions di tabanka di Béli

Yes / No

If yes, which organisation(s) are you a member of?

Bu sta atifu na kal organisasions? Kal nomi kil organisason o organisasions tene?

.....
.....
.....
.....
.....

What is your main source of income?
rendimentu/dinheiru?

Kal ki bu principal funti di

[A] Agriculture

Agrikultura

[B] Other

Where does this activity mainly take place?

Nunde ki bu ta fasi es?

[A] In forested areas

Na matu

[B] In savannah lands

[C] In the village

[D] In formerly cultivated areas

Na tabanka di Béli o utru tabanka

Do you have an agricultural plot?

Abu propietario / dono di kau di labra?

Yes / No

How is the ownership of your agricultural land arranged? Kin ki propriatariu di bu kaus di labra?

[A] It is my own; private ownership i di mi

[B] It is owned by someone else, they allow me to practice agriculture there without payment i kau di utru pekadur; n'pudi paranta la sin pagal

[C] It is owned by someone else, they allow me to practice agriculture there against payment i kau di utru pekadur; n'pudi paranta la ma n'ten ki pagal pa usa si kau

[D] It is community land that anyone can use i kau di comunidade; todos gentis di tabanka pudi labra ni kau

[E] Other.....

Do you have ownership over more than one agricultural plot in different locations? Abu ten mas di ki-un kau di labra?

Yes/No

If yes, how many? Kantus kau di labra ki bu tene?

[A] 2

[B] 3

[C] More than 3

Which of the following means of transport do you have? Kal posibilidades di transporte ke bu tene?

[A] Bicycle

[B] Motorbike

[C] Car

[D] None of the above Nada ka tene

If you have the ownership over an agricultural plot, what crops are grown there? Kal produtos bu ta kirsi na bu kaus di labra?

[A] Mpam-mpam rice / dry ground rice

[B] Bolonha rice

[C] Maize 1 Midju

[D] Maize 2

[E] Maize 3

[F] Peanuts

[G] Caju

[H] Cassava

[I] Other

.....

.....

.....

.....

How many harvest do you obtain IN TOTAL during an average yield (specified in bags of 20 and 50kg and/or hands of rice)?

Kuantos sakus di arus ki bu otcha na total na kebur normal?

Misti sibi pa kada produsut ki bu ta kirsi.

[A] Mpam-mpam rice / dry ground rice

[B] Bolonha rice

[C] Maize 1 Midju

[D] Maize 2

- [E] Maize 3
- [F] Peanuts
- [G] Caju
- [H] Cassava
- [I] Other

.....

Of the products you grow, can you give an indication of the amount of rice you stock for your family and the amount you use to sell?

Di produsutus ki bu ta kirsu, bu pudi fala kuantu saku du 20 o 50 kg ki bu ta rakada pa bu familia i kuandu saku bu bindi?

-
- [A] Mpam-mpam rice / dry ground rice
 - [B] Bolonha rice
 - [C] Maize 1 Midju
 - [D] Maize 2
 - [E] Maize 3
 - [F] Peanuts
 - [G] Caju
 - [H] Cassava
 - [I] Other

.....

[K=Keep, S=Sell]

During the last three years, did you have to cope with a shortage of rice? Na ultimu 3 anos bu tchiga [happen] di otcha falta di arus?

Yes = Y

No = N

If Yes, how often? Si positivo, quantu bias?

..... Times

What are the main reasons for crop failures? Kal ki résons mas importantes di problemas di agrikultura?

-
- | | |
|-------------------------------|---|
| [A] erratic rainfall | tchuba ka tchubi diritu |
| [B] droughts | tchuba ka tchubi nada |
| [C] pests and diseases | planta duente o planta tene bitchu |
| [D] animal damage | dunus di limarias |
| [E] poor soils | tchon i ka bon |
| [F] limited land availability | Ka ten kau di labra suficiente pa tudu gentis |

[G] Other.....

Do animals sometimes damage your crops?

Yes/No

Which animals?

Crops damaged?

.....

.....

Can you use any land in the forests to make your agricultural plot or does this have to be arranged or communicated first to an authority?

Abu pudi paranta tudu tchon pa fasi kau di labra o abu dibi di diskuti primairu ku autoridade traditional o estado?

[A] We can use all land freely No pudi usa tudu tchon ki no misti pa fasi kau di labra

[B] We can only use dry lands freely, others have to be discussed first with an authority No pudi usa som algun tchon, utru no dibi di diskuti primairu ku autoridade o estado.

[C] We can only use wet lands freely, others have to be discussed first with an authority No pudi usa som algun tchon, utru no dibi di diskuti primairu ku autoridade o estado.

[D] We can only use lands of a certain vegetation type freely, others have to be discussed with an authority No pudi som usa tchon du um typo di qualidade, utru no dibi di diskuti primairu ku autoridade o estado.

.....

[E] We can not use the lands freely, it needs to be discussed first with an authority

No ka pudi usa tchon sin punta primairo. No dibi di diskuti primairu ku autoridade o estado.

[F] People that were not born here need to ask; other people can use the land freely.

For how long will you use the agricultural plot that you are using now?

[A] 1 YEAR 1 anu

[B] 2 YEARS 2 anos

[C] 3 YEARS 3 anos

[D] MORE THAN 3 YEARS mas di 3 anos

For how long at maximum can an agricultural plot be used? Durante kantu tempu bu pudi usa kau di fasi agrikultura normalmente

[A] 1 YEAR 1 anu

[B] 2 YEARS 2 anos

[C] 3 YEARS 3 anos

[D] MORE THAN 3 YEARS mas di 3 anos

Do you use fertilizer?

Yes/No

Do you know how to make fertilizer yourself?

Yes/No

Do you use anything to keep insects/bitchus away from your crops?

Yes/No

Do you use any trees or plants on your agricultural field that will keep the ground good so the field can be used longer?

Yes/No

Does your household provide enough labour to work on the agricultural fields and get everything done in time?

Bu pensa kuma gentis ki bu tene na casa i justa ku tarbaju di bu lugar

[A] There is a surplus of labour available Gentis pa fasi tarbaju manga del

[B] There is sufficient labour available Gentis djusta ku tarbaju

[C] There is insufficient labour available but we do not hire external labour from outside the Household

No ka tene gentis sufficiënte pa tarbaju ma no ka ta paga utru

[D] There is insufficient labour available and we hire external labour from outside the Household No ka tene gentis sufficiënte pa tarbaju, no paga utru

Do you own goats? Bu tene cabras?

Yes/No

.....

Do you own sheep?

Yes/No

.....

Do you own cows?

Yes/No

.....

Do you own chickens?

Yes/No

.....

Do you own ducks?

Yes/No

.....

Do you use the milk of the goat?

Yes/No

Do you use the milk of the sheep?

Yes/No

Do you use the egg of the chicken?

Yes/No

Do you use the egg of the duck?

Yes/No

Do you use the milk of the cow?

Yes/No

Do you make use of livestock input? Bu ta gasta dinheiru na bu limarias?

[A] Vet / Medicine Veterinariu

[B] Hired labour Bu paga gentis pa kujda di bu limarias

[C] Fodder Bu ta kompre [G]Rasson o bu ta labra [G]Rasson

[D] Other [specify] Utru....

.....

Where do your animals graze? Nunde bu limarias ta kume?

Dry season: forest/village/savannah

Rainy season: forest/village/savannah

(Na kal epuke di anu bu limarias ta bai kume na matu?)

Do you grow trees or plants yourself apart from the agricultural crops? Bu kirsi paus / arvoris o plantas ki ka kusas di agrikultura

Yes/no

If yes, which trees or plants do you grow? Kal arvoris o plantas bu ta kirsi?

.....

.....

.....

.....

.....

Can you name the people within your household that are engaged in the following activities? Bu pudi fala kal gentis na bu casa ki ta pudi fasi kal actividades?

pau di kema	Collecting fuelwood	m	f	k	bai busca
matu	Collecting fruits from the forest	m	f	k	bai busca frutas na
matu	Collecting wild honey	m	f	k	bai busca mel na
mensinhu na matu	Collecting forest products for medicinal purposes	m	f	k	bai busca
kusas na matu pa fasi grigri	Collecting forest products for spiritual or cultural purposes	m	f	k	Bai busca
matu pa fasi di musika		m	f	k	Bai busca kusas na instrumentu
	Hunting	m	f	k	Montia
	Fishing	m	f	k	Piska
	Agricuture	m	f	k	Fasi agrikultura

Are you allowed to take as many products out of the forest as you want? Bu pudi toma tudu di matu ki bu misti?

Y = Yes
N = No

Is everybody allowed to go into the forest and take products? Todos gentis pudi bai na matu i toma ki kusas ki misti?

Y = Yes
N = No

Are there specific places in the forest where you are not allowed to take products? I tene kaus na matu nunde ki bu ka pudi toma kusas ki bu misti?

Y = Yes
N = No

Eleborate:

.....
.....
.....
.....

Do you use fruits from the forest?

Yes/No

Do you buy or sell any forest fruits in the village?

Yes/No

.....
.....
.....
.....

Do you use medicine from the forest?
Yes/No

Do you buy or sell any forest medicine in the village?
Yes/No

.....
.....
.....
.....

Do you use meat from the forest?
Yes/No

Do you buy or sell any forest meat in the village?
Yes/No

.....
.....
.....
.....

Do you use legumes from the forest?
Yes/No

Do you buy or sell any forest legumes in the village?
Yes/No

.....
.....
.....
.....

Do you use honey from the forest?
Yes/No

Do you buy or sell any honey in the village?
Yes/No

.....
.....
.....
.....

Do you feel that the way in which products are taken out of the forest can harm the forest ecosystem? Bu
pensa forma gentis ta toma produsut di matu ta dana matu?

Yes = Y
No = N

If yes, can you give one or more example(s) of this?

Si positivu, bu pudi fala esemplu

Are food products from the forest important for your daily subsistence? Produtus di matu pa kume i importante pa bu subsistensia diario?

Yes = Y

No = N

Did you over the last 10 years see a change in the availability of one or more forest fruits? Na 10 anos pasudus bu odja kuma i tene algum frutus di matu ki ta [g]rapati o aumenta na matu?

Yes = Y

No = N

Can you name any fruit(s) that over the last 10 years have decreased in availability and that now can not be found as much anymore as in the past?

Na 10 anos pasudus bu odja kuma i tene frutus di matu ki ta [g]rapati na matu?

Did you over the last 10 years see a change in the availability of one or more forest vegetables?

Na 10 anos pasudus bu odja kuma i tene legumus di matu ki ta [g]rapati na matu?

Yes = Y

No = N

Can you name any vegetables that over the last 10 years have changed in availability Bu pudi fala esemplu

Did you over the last 10 years see a change in the availability of one or more forest animals?

Na 10 anos pasudus bu odja kuma i tene limarias di matu ki ta [g]rapati na matu?

Yes = Y

No = N

Can you name any animal(s) that over the last 10 years have changed in availability Bu pudi fala esemplu

Did you ever take seeds out of the forest or out of forest fruits that you later planted elsewhere? Bu
 tchiga di toma sementaira di matu ku fruta di matu pa bu planta na utru kau

Yes = Y

No = N

Would you like to domesticatie forest products? Si bu misti planta di matu na bu casa o na bu kau di
 labra?

Yes = Y

No = N

If yes, which one do you want to domesticate most? Si positivu, kal plantas ki bu ma misti planta na bu
 casa o na bu kau di labra?

Tree for fruit =1 , Bee keeping =2, Tree for fodder =3, Medicinal plants =4 Other =5

Arvori di fruta Bu misti tene casa di baghera Arvori o planta ki limarias ta kume Plantas di
 mesinhu Utru

What are for you the most important fruits you take out of the forest or other natural areas?

Kal ki frutu di matu ki bu ma misti

What are for you the most important products you take out of the forest or other natural areas to cook
 with?

Kal kusa di matu ki ta kusingadu pa kume ku bu ma misti

What are for you the most important food products you take out of the forest or other natural areas?

Kal kusa di kume di matu ku bu ma misti?

What are for you the most important medicines you take out of the forest or other natural areas?
Kal mesinhu di matu ku bu ma misti?

Are there any forest products of which you would like to see the availability increased?
Kal kusa di matu ku bu misti pa i ma tchew?

65

Do you sometimes go to nearby markets to sell forest products?
Bu tchiga di bai bindi kusa di matu na feira?

Y = Yes

N = No

If yes, products: Kal kusas di matu?

Markets: Kal feiras?

Do you sometimes go to nearby markets to buy forest products?

Bu tchiga di bai compre kusa di matu na feira?

Y = Yes

N = No

If yes, products: Kal produsut

Markets: Kal feiras?

Can you mention which of the following constraints you experience during NTFPs extraction, production and marketing activities?

Bu pudi fala kal di problemas siginta bu ma odja ora ki bu tarbaja ku kusas di matu

[A] Access to NTFPs

Problemas di bai toma kusas di matu

[B] Availability of NTFPs

Problemas di quandidades di kusas di matu

[C] Distance of Markets

Distansa di feira

[D] Costs of transportkation

Preixo di transporte

[E] Infrastructure

Problemas di istrada ku kau di stokka kusas di

matu

[F] Labour

Gentis pa fasi tarbaju

[G] Market prices

Preixos di kusas na mercadu

[H] Technical knowledge of NTFP management

Bu ka sibi ki bu ta tarbaja ku ki kusas di matu

[I] Available money

Bu ka tene dinheru di investi

[J] Available materials

Bu ka tene materiaish di investe

[k]

[k] frequency of transportation

[l] products from the Boé are not respected products

[m] Other

Utru

Are there NTFPs which can no longer be found in the forest but that you could find in the past?

Which products does your household use for food purposes?

Ami misti sibi utrus kusas sobre kusas di matu ki bu ta usa

Botanical name.....

Local name (and language)..... nomi

Parts gathered (in case of plant).....fruits bark roots leaves seed flowers other (specify)

Parts used.....
 Used for.....
 Estimated quantity: Many / Enough / Few / Very Few Quantidade: Manga del, Baistante, um bokadu, pekiniu
 Availability: Jan / Feb / Mar / Apr / May / Jun / Jul / Aug / Sep / Oct / Nov / Dec / all year around / dry season / rainy season Kal mis
 Home use / Selling / Buy from other who collecte it (if sell or buy, market price?)
 Amount collected at a time Kada bias ki bu bai na matu kuantu e ki bu ta odja
 Times collected per day / week / month / season Quantus dias ki bu bai na matu pa buskal .. Na um anu, na um semana, na um mis...

Botanical name.....

Local name (and language)..... nomi
 Parts gathered (in case of plant).....fruits bark roots leaves seed flowers other (specify)
 Parts used.....
 Used for.....
 Estimated quantity: Many / Enough / Few / Very Few Quantidade: Manga del, Baistante, um bokadu, pekiniu
 Availability: Jan / Feb / Mar / Apr / May / Jun / Jul / Aug / Sep / Oct / Nov / Dec / all year around / dry season / rainy season Kal mis
 Home use / Selling / Buy from other who collecte it (if sell or buy, market price?)
 Amount collected at a time Kada bias ki bu bai na matu kuantu e ki bu ta odja
 Times collected per day / week / month / season Quantus dias ki bu bai na matu pa buskal .. Na um anu, na um semana, na um mis...

Botanical name.....

Local name (and language)..... nomi
 Parts gathered (in case of plant).....fruits bark roots leaves seed flowers other (specify)
 Parts used.....
 Used for.....
 Estimated quantity: Many / Enough / Few / Very Few Quantidade: Manga del, Baistante, um bokadu, pekiniu
 Availability: Jan / Feb / Mar / Apr / May / Jun / Jul / Aug / Sep / Oct / Nov / Dec / all year around / dry season / rainy season Kal mis
 Home use / Selling / Buy from other who collecte it (if sell or buy, market price?)
 Amount collected at a time Kada bias ki bu bai na matu kuantu e ki bu ta odja
 Times collected per day / week / month / season Quantus dias ki bu bai na matu pa buskal .. Na um anu, na um semana, na um mis...

Botanical name.....

Local name (and language)..... nomi
 Parts gathered (in case of plant).....fruits bark roots leaves seed flowers other (specify)
 Parts used.....
 Used for.....
 Estimated quantity: Many / Enough / Few / Very Few Quantidade: Manga del, Baistante, um bokadu, pekiniu
 Availability: Jan / Feb / Mar / Apr / May / Jun / Jul / Aug / Sep / Oct / Nov / Dec / all year around / dry season / rainy season Kal mis
 Home use / Selling / Buy from other who collecte it (if sell or buy, market price?)
 Amount collected at a time Kada bias ki bu bai na matu kuantu e ki bu ta odja
 Times collected per day / week / month / season Quantus dias ki bu bai na matu pa buskal .. Na um anu, na um semana, na um mis...

Annex 2 – Interview B

Code:

Recorder: Jitske

Age:

Family: w m cw cm

NTFP questions

1. What inputs are used for extracting ntfps?

Kal materiaus ke bu ten pa bai busca kusas di matu?

2. Are NTFPs sometimes preserved for later use?

Bu preserva kusas di matu pa pudi sedo usado depois?

Yes? Which products? How are they preserved

Si positivo, kal produsut? Kuma ke bu preserva e produsut?

No	Product	How?
1		
2		
3		
4		
5		
6		
7		
8		
9		

3. What are things that are taken into account when products are taken out of the forest?

Kal kusas ke bu pensa ke importante sibi kuandu toma produsut di matu?

No	Product	Example	Technique used
1	Leaves	Reducing damage to reproductive structures, growing points, branches, bark and trunk	
2	Bark	How to avoid damaging the cambium too much; the minimum and maximum height on the tree to cut; the depth of the cut; the equipment used; the treatment of the wound after the cut	
3	Roots	Which part of the root, rhizome, culm or bulb to remove (ie lateral rather than taproot), and how to remove it	
4	Fruits	How to reduce damage to reproductive structures, growing	

		points, branches, bark and trunk; How to minimize the harvesting of unripe fruit	
5	Honey	How to avoid harvesting immature honey, killing the larvae or flaming the hives	
6			
7			
8			
9			

4. In the past ten years, what are changes you have observed in forest areas?
Na 10 anos pasudus bu odja kuma i tene mudansa na matu?

5. Whom are the collected forest products sold to?
Kin ki ta kompre kusas di matu?

6. Are there any companies that sometimes come over to buy forest products in this village?
I ten nogos ki na bin li pa kompre kusas di matu?

7. Do you know of this happening in other villages?
Bu sibi si i ten nogos ki na bin na utru tabankas na boé pa kompre kusas di matu?

8. Which materials are available for the possible marketing of forest products from Béli?
Kal materiaus sta li na tabanka pa permiti preserva i bindi kusas di matu?

9. Which funds are available for the possible marketing of forest products from Béli?
I ten organisations ki na parti dinheiro pa projetus pa preserva i bindi kusas di matu?

10. Which forest products do you think have good marketing potential?
Kal ki produtus di matu ki ma bon pa bindi?

11. What are the main issues related to the collection of forest foods?
Kal ki problemas principal pa bai busca kusas di matu?

12. What might help people to benefit more from forest foods?
Ke ki pudi djuda pessoas beneficia mas di cumidas di matu?

13. How do you think the forest food industry compares to other land management uses or economic opportunities, like cow herding or agriculture?
Kuma ke bu compara bindi cumidas di matu ku otrus manera di ganha dinheiro, suma bacas o horta?

14. What do you think are the main benefits of forest foods?
Kal ki beneficios ma importante di kusas di matu?

15. How far away do you go to collect forest products?
Kantu kilometrus o oras ke bu ta yanda pa bai busca cosas di matu?

16. How difficult is the extraction of different forest products?
Misti sibi pa kal kusas ma kansadu pa bai busca kusas di matu
Misti sibi pa kal kusas ma fasil pa bai busca kusas di matu
- which forest products are most difficult to extract?
- which forest products are most easy to extract?

No	Product	Effort

17. What do you consider good nutrition?

Ke ki bu pensa ki sedo bon alimentacao?

18. Do you think that your access to forest products will change in the future?

Bu pensa na anos ki na bin bu na bin pudi bai mesmo kaus na matu i toma mesmo kusas di matu?

19. Do you perceive change in the forest cover during the last 10 years?

Na 10 anos pasudus bu odja kuma i tene ma o menus o mesmo arvoris na matu?

20. What are reasons for this change?

Kal ki résons mas importantes ke ku i tene arvoris ma / menus / mesmo

21. How do you usually cope with food shortage?

Ke ki bu ta fasi kuandu bu ka ten arus?

> collect food from the forest

bai busca comida na matu

> sell livestock

bindi nha cabras, carnelos, galinhas, bakas o patos

> work off-farm

tarbaja na tabanka pa ganha dinheiro

> borrow money from family or friends

Pista dinheiro di familia o di amigus

> get food from family or friends

Kume ku familia o ku amigus

> other

Utru

22. What are things you think should happen to improve the lives of the people here?

Kal kosas ke ten ke akontesi pa mindjora vida de gentis di Béli?

23. Which ones do you sell, which ones do you collect for your family?

Misti sibi kal kusas di matu bu bindi I kal kusas di matu bu rakada pa familia

I ten tamben kusas di matu ki bu rakada i di bindi?

No Type of NTFP collect? Purpose of collection

household income both

1 Faroba

2 Tugui

3 Honey

4 Lalo

5 Foli

6 Foli sinhu

7 Veludu

8 Njembe

24. How many of the family involved in collecting ntfp?

Kuantu gentis na bu familia ki ta bai busca kusas na matu?

....Men /women

...Girls / ...boys

Annex 3 – Interview C

1. How is the tenure of land arranged?

It is really traditional; no legislation behind the land tenure, it's based on heritage; his father had it, now he and his wife have it and it will be passed on to their sons and grandsons.

2. Is tenure security well-defined?

It is not written down but everybody knows. Very rarely there are problems; generally happens if someone wants to abuse and use the land for own use, and then its generally quickly solved by an older person. In beli extremely rare and easily solved; in gabu much more complicated and people can even go as far as shoot each other when there are problems over land.

How is tenure passed on to the children?

There is a problem about ethnicity. Because they have this polygami, they can be married with 2 ethnicities. If he would share equally between the wives there would be problems in the future. Only the kids of the wife of the same ethnicity would then use the land.

If he has 2 wives of different ethnicities; the closest's children will get the land.

If he did not do this he would generate ethnicity problems in the things that he owns, in his heritage. It is easiest to marry someone of the same ethnicity.

The older son takes the place of the father in the decisions; he is the older, more experienced and more able to divide the land properly. He has not more rights to the land than other people but can decide who goes to plant where.

3. Where are the boundaries of the communities territory located?

The rivers mark the boundaries of the territory.

Tchulagi, aicum, bonoruhum, petunkiku, kinjeke, vudu, kebube, balandugu, bunlun'juri (a lot of honey neat the bunlun'juri) > these rivers define the frontiers.

If you want to plant behind those borders, you ask the owner of the other land on the other side; you can then stay there for a year to harvest. You can not plant cashew or other crops that take longer.

Both sides of the river could be of Beli, people know.

Both sides of the river are generally of a village, then another village has another river totally. Only if the river marks a border with another country you would divide the river.

4. Do other people than the people from the village also use the forest surrounding beli? Which people?

Yes. Construction of houses and other practical things are taken out by people from G-Konakry.

5. What happens when people from outside beli come to live here?

Traditional system; they need to have the authorisation of the king of the village. He will then appoint a place where they can live. There are no bureaucratic or legal things behind this. If they want to work in agricultural field they can ask someone in the village to use the land. This is for one year. They can not plant cashew etc. In the last years they would lend the land and allow to plant cashew; now it doesn't happen anymore because people regretted it and could then not use the land, especially the land near the river.

6. What do people do when there are conflicts?

Solved on brotherhood level; problem of the families. If it is bigger it goes to the king of the village and becomes a village problem. They do not go to legal institutes. They talk to solve the problems. You sit together with the family elders and the people that fight and talk about the problems and solve it.

7. Are there rules in beli? What kind of rules? What happens if you break a rule?

There are no special rules; nothing written down. Everybody problem is solved on the family level or with the king of the village.

8. What are the most important conflicts between people and nature?

People put pressure on the forest; there are many people and population is growing. Before the independence 7000 people in the boé, now almost the double in 20 years. Also migrants come, cattle herders, people from bauxite angola.

- They burn the forest to make agricultural fields; the fire spreads a lot.

- Hunters hunt a lot and also burn the forest for hunting. If the hunter kills an animal he will think; there will be more hiding here. They burn the field so animals can see and will flee. When there is fire you can see many animals fleeing.

- Cattle herders burn the forest to make grasslands for grazing and the fires spread.

9. Are there rules for ntfp harvesting?

No rules. You go any place you want and take what you want.

10. Do ntfs currently play a role for local people in obtaining economic wealth?

Yes. But commercialization is difficult. There is a problem with selling; the first bottle neck is the road, the access to the village and to Gabu. You have to cross the cheche ferry which is very expensive, so sometimes people don't come here because it's not worth it; it is a lot of trouble to get here and you have to pay a lot. He has a lot of mangos that get rotten because he can not export them. Even if the cars don't come often they do depend on this for their money.

In gabu there is a company called "mel di gabu" which comes here to buy the honey. They buy the honey raw and process it in gabu. Cashews are right now not sold and prices are very low; they are now buying rice with cashew. The main problem is the access.

When they buy they do not give a lot of money. People can not allow themselves to choose the prices; you have to accept the price because you don't know whether another car will come. People in cars know this and take advantage of this fact and keep the prices really low.

11. Do any companies sometimes go to the forest to collect products there?

No. They collect in the village.

12. What are changes in the bush that you have seen?

If there is a change, it is for worse. So there are less trees and products in the bush. For him it's too early to evaluate any consequence in the bush from the government campaign because it started one year ago.

13. Is ntfp abundance monitored in any way so that changes can be communicated?

No. They know where everything is but not the quantity.

14. Are ntfps generally harvested annually? Is there a pattern?

Annually. When the products are there they take it.

15. Is there anything the people of beli do to increase the amount of products in the forest?

No. Jokingly: only the monkeys do this. People go to collect a lot with the machette. Monkeys just take fruits, eat and leave the rest for the other days.

16. In what type of lands are agricultural fields usually made?

Close to the river is most preferred; 10 years ago only close to the rivers but now there are many people. The fields from him and his wife, 10 years ago, they would let people plant next to the river but now not anymore.

17. What is the size of an average family in beli?

500 people in beli; he doesn't have a clear clue how to divide this. Men can have 4 wives according to the religion. Most have 2 or more women; the young men have less. Around 15 kids if you have multiple wives. Many children die at young age because there is a lack of care; they get a lot of kids and there is no food, or place to rest, or the mother might not be that healthy and give birth to a kid that is also not healthy, so it is difficult to say how big families are.

18. Are there any legends or stories about forest products?

Food that people plant lasts until june; july-next harvest (october) people have to depend on the forest products to fill their stomach; Faroba, nyammi, foli, mel.

Rainy season lasts till november and there will be no cars here 15aug-15sept because the ferry does not work. No legends.

19. How is honey generally harvested?

Very bad; the traditional system. They burn the tree to kill the bees; they cut the whole tree to take the hive.

20. Who usually goes to harvest in the family and why?

Faroba is not collected by kids because father generally don't want kids to collect this because the tree is so high. Foli is collected by the children because they really like to do this; it is like a sport to them. Any fruit they see they can take. They like to explore. Last year there was an accident with a girl climbing a faroba tree and she was in the hospital for 2 months so parents do generally not like it when they climb high.

21. Can you tell me something about the government campaign to not damage the bush?

This program is very big, too big. They do it, but with long intervals. They should do this more often. There is an annual meeting but this is not enough. They do not announce anything on the radio. Ministers do one or two travels a year. There is a forest office in beli which was supposed to inspect but they do not even have a bike so they can not do anything.

Only about the fire.

Maybe with ibap and future change of the state there will be more things. Ibap hasn't been in beli for very long, less than one year. Practical work, like recruiting park guards, starts in june for ibap.

22. Can you explain me about the iran?

The iran are devils, invisible spirits in the bush. They can be good and they can be bad. Sometimes people can see them – if they are good, nothing will happen. If they are bad, bad things can happen. The iran have a white skin and long hairs.

They like isolated places where people do not come often.

There is a relation between snakes and iran. The iran has a human structure but is invisible. It can sometimes show himself as a snake or a sudden strong wind or a wervelwindje.

Annex 4 – Interview D

1. What animals do you hunt?
2. How many of mentioned species do you estimated there still are (very few, few, enough, many, very many)?
3. Which animals from the bush are most preferred for buying in the village?
4. Which animals are shot most often?
5. Which animals are seen most often in and around forest areas?
6. Which animals are seen least in and around forest areas?
7. Do you know of any stories that involve local wildlife?

Annex 5 – Agricultural activities

Month	Planting (preparation)	Harvesting
Jan.		
Feb.		
Mar.		
Apr.		Cashew is harvested
May	Fields are slash-and-burned	Grapefruit is harvested Cashew is harvested Cashew is sold
Jun.	Mankara suffers damage in the field Fields are prepared for rice planting Cassava is planted Groundnut is planted Rice is planted	Mango is harvested
Jul.	Rice is planted	Mango is harvested
Aug.	Potato is planted Rice stocks start to run out	
Sep.	Cucumber is planted Rice stocks start to run out	Cucumber is harvested Pumpkin is harvested Beans are harvested Groundnut is harvested
Oct.		Cucumber is harvested Pumpkin is harvested Beans are harvested Groundnut is harvested Rice is harvested
Nov.	Rice gets damage from insects	Maize is harvested Rice is harvested Beans are harvested Crops are harvested and sold
Dec.		Fruits are harvested and sold

Annex 6 – Availability commonly collected forest foods

Month	Local name	Scientific name
Jan.	Mel Tugui Njembe	
Feb.	Mel Tugui Njembe	
Mar.	Mel Tugui Njembe	
Apr.	Mel Tugui Njembe	
May	Mel Tugui Foli Veludu Faroba Gilinti Njembe	
Jun.	Mel Tugui Foli Faroba Njembe	
Jul.	Mel Tugui Banana sanchu Foli sinhu Njembe	Uvaria chamae
Aug.	Mel Tugui Njembe	
Sep.	Mel Tugui Njembe	
Oct.	Mel Tugui Njembe	
Nov.	Mel Tugui Njembe	
Dec.	Mel Tugui Njembe	

Annex 7 – Mentioned and observed forest foods in use

Creole name	Fula name	Scientific name		Category
Badi	Unknown	Unknown	Unknown	Food additive
Unknown	Baobab	<i>Adansonia digitata</i>	Baobab	Fruit
Boileh	Banana sanchu	<i>Uvaria chamae</i>	Finger root	Fruit
Bolereh	Unknown	<i>Sylvicapra grimmia coronata</i>	Common Duiker	Meat and fish
Edda	Buffalu	<i>Syncerus caffer brachycerus</i>	Buffalo	Meat and fish
Boileh kundjeh	Unknown	Unknown	Unknown (possibly <i>Hexalobus monopetalus</i>)	Fruit
Bolereh	Unknown	<i>Sylvicapra grimmia coronata</i>	Common Duiker	Meat and fish
Bumeh	Unknown	Unknown	Unknown	Fruit
Bumel	Unknown	Unknown	Unknown	Fruit
Bumelbab	Unknown	Unknown	Unknown	Fruit
Unknown	Caju	<i>Anacardium occidentale</i>	Cashew	Fruit, Drink
Choka	Unknown	Unknown	Unknown (small guineafowl-like animal)	Meat and fish
Djambo	Unknown	<i>Amaranthus spinosus</i>	Spiny amaranth	Vegetable (leaves)
Dukumeh	Unknown	<i>Annona senegalensis</i>	African custard-apple	Fruit (fruit)
Dundu ke (tjango)	Unknown	<i>Sarcocephalus latifolius</i>	Guinea peach	Fruit (fruit)
Unknown	Farfana	<i>Thryonomys swinderianus</i>	Greater Cane Rat	Meat and fish (meat)
Neteh	Faroba	<i>Parkia biglobosa</i>	<i>Parkia biglobosa</i>	Fruit (fruit), Drink (fruit pulp), Food additive (fruit pulp)
Unknown	Peska	-	Fish	Meat and fish (fish)
Lareh	Foli	<i>Saba senegalensis</i>	<i>Saba senegalensis</i>	Fruit (fruit), Drink (juice, fruit pulp), Food additive (juice)
Poreh padja	Foli sinhu	<i>Landolphia heudelotii</i>	<i>Landolphia heudelotii</i>	Fruit (fruit), Drink (juice,

				fruit pulp), Food additive (juice)
Gandereh	Unknown	Unknown	Unknown	Meat and fish (meat)
Unknown	Gazela	Tragelaphus scriptus scriptus	Bushbuck	Meat and fish (meat)
Unknown	Gilinti	Treculia africana	African breadfruit	Fruit (fruit)
Kahi	Unknown	Unknown	Unknown	Fruit (fruit)
Unknown	Jabereh	Gazella rufifrons	Red fronted gazelle	Meat and fish (meat)
Galinha du matu	Jawlal	Numida spec.	Guineafowl	Meat and fish (meat)
Unknown	Kankaliba	Combretum micranthum	Combretum micranthum	Drink (leaves)
Koba	Boka baranko	Hippotragus equinus	Roan Antelope	Meat and fish (meat)
Unknown	Kon	Papio papio	Guinea Baboon	Meat and fish (meat)
Koseh	Unknown	Orycteropus afer senegalensis	Aardvark	Meat and fish (meat)
Lalo	Unknown	Sesamum radiatum	Vegetable sesame	Vegetable (leaves), Food additive (leaves)
Lukum	Unknown	Bombax constatum	Bombax constatum	Food additive (calyx)
Mampatas	Unknown	Unknown	Unknown	Starch (tubers)
Unknown	Mel	-	Wild honey	Food additive (honey), Sweetener (honey)
Muntun	Unknown	Cephalophus sylvicultor	Yellow-Backed Duiker	Meat and fish (meat)
Nora	Krokodilu	Crocodylinae	Unknown; Possibly Nile crocodile / West-African dwarf crocodile	Meat and fish
Kankaliba	Unknown	Combretum micranthum	Combretum micranthum	Drink
Kapeh	Njembe	Dioscorea spec.	Yam	Starch
Unknown	Piskaval	Hippopotamidae	Hippopotamus	Meat and fish
Unknown	Po di bichu	Antiaris toxicaria	Antiaris toxicaria	Fruit
Unknown	Porco espino	Atherurus africanus	Porcupine	Meat and fish
Unknown	Porku pretu	Phacochoerus africanus africanus	Warthog	Meat and fish

Unknown	Sanchu burmediu	Erythrocebus patas	Patas monkey	Meat and fish
Unknown	Sanchu moni	Cercopithecus aethiops sabaecus	Vervet monkey	Meat and fish
Poreh pududu	Unknown	Unknown	Unknown	Fruit
Unknown	Sangue bombo	Sorindeia juglandifolia	Sorindeia juglandifolia	Fruit
Sin-sin	Unknown	Kobus ellipsiprymnus defassa	Waterbuck	Meat and fish
Sororo	Unknown	Unknown	Unknown	Food additive
Taba	Kola di matu	Cola cordifolia	Cola cordifolia	Fruit
Tchuku	Unknown	Lannea spec.	Lannea	Fruit
Togereh	Unknown	Cephalophus rufilatus	Red-Flanked Duiker	Meat and fish
Tugui	Palmera	Elaeis guineensis		Food additive
Una d'odi	Unknown	Unknown	Unknown	Fruit
Meko	Veludu	Dialium guineense		Fruit, Drink, Food additive

Annex 8 – Bushmeat in use and their respective average availability ratings according to the local community

Species		Average	Rating
Baboon	51	5	10 Enough
Boka baranku	60	8	8 Enough
Bolereh	84	8	11 Many
Farfana	24	2	12 Many
Bushbuck	138	14	10 Enough
Jabereh	12	1	12 Many
Jawlal	24	2	12 Many
Fish	27	4	7 Few
Muntun	36	3	12 Many
Choka	24	2	12 Many
Gandereh	18	2	9 Enough
Koseh	12	1	12 Many
Koba	33	4	8 Enough
Sanchu moneh	6	1	6 Few
Sinsin	18	2	9 Enough
Togereh	78	8	10 Enough
Krokodilu	12	1	12 Many
Hippo	12	1	12 Many
Sanchu Burmedja	36	3	12 Many
Sanchu pretu	36	3	12 Many
Buffalo	24	2	12 Many
Mel	60	7	9 Enough

These numbers were awarded using the following technique:

Wildlife products assigned a rating of “very few” would be awarded 3 points, “few” 6 points, enough” 9 points, “many” 12 points and “very many” would give a valuation of 15 points. The total number of points given to the species was then divided by the total number of respondents valuating them.

Then using the following scalebar a final rating was given using the average (total number of points awarded / number of respondents).

3	4	5	6	7	8	9	10	11	12	13	14	15
Very few	Very few	Few	Few	Few	Enough	Enough	Enough	Many	Many	Many	Very many	Very many

Annex 9 – General description of most commonly used products

Oil palm

Tugui, or *Elaeis guineensis*, is a palm tree native to West-Africa. The trees bear fruits that have an oily fleshy outer layer and a single seed, which in turn is also rich in oil.

Oil palm is collected by men and processed and sold on markets and in the village by the women. After harvesting, fruits are sundried (with leaves on top) in open savannah lands where they are collected one or more days later to take home. At home, the women start separating the kernels and the pulp and boiled and cold water are added to the pulp to facilitate the extraction of the oil. The women squeeze the pulp to get the oil out and the oil will start to float in the water. It is then separated from the water and collected.

Palm oil is an edible oil and is used as such by the inhabitants of Béli. This oil with its distinctive flavour is very important for the population for economic and subsistence reasons and is combined with fish, meat vegetables or rice as part of the sauce. The kernel oil is used to make soap.

Foli

Foli, or *Saba senegalensis* is a liana that can grow up to 40 meters long and often takes a shrublike form. It usually grows in more riverine areas and open woodlands. If the tough brown shell is broken open the yellowish edible sweet-sour fruitpulp will be found. This part, covering the seeds of the product, is eaten by the local community of Béli like that or it is combined with water and sugar (and sometimes other fruits, like faroba or veludu) to create a lemonade-like drink.

Besides being used within the households, these drinks are widely sold at local markets. Foli also produces a white latex and in many cultures the tree has a strong medicinal value as well, with many parts of the plant providing an equal amount of different ailments. The shrub can be used in erosion control measures and in Senegal its leaves are sometimes used as an appetizer with a salty taste. It furthermore produces an inferior quality rubber that can be used in adulterating genuine rubber.

Foli sinhu

Foli sinhu (literally “small foli”), or *Landolphia heudelotii* bears a fruit that in looks is similar to *S. senegalensis*, but it is smaller in size. It is a climbing shrub that can grow up to 15 meters in size. In Béli, this plant is used and valued for its fruit that is eaten raw or like *S. senegalensis* used in drinks. It is also used as a food additive, to add to dishes.

Banana sanchu

Banana sanchu, or *Uvaria chamae*, is another large climbing shrub native to West-Africa. It can grow on both wet and dry forest lands. The fruit is edible and grows in small bunches. In Béli it is said to be eaten raw, whereas in other parts of the world it is used in candies and as a spice in meals.

Veludu

Veludu, or *Dialium guineense*, is a native West-African tree that can grow up to 30 meters high. This species can be found in among others dense savannah forests and gallery forests. It prefers moist soils. The tree bears very distinctive black (almost velvet-like) berries. Fruitpulp is red and can be eaten: it has a sweet-sour flavour that is very similar to baobab, but sweeter. Veludu is often used in drinks. It is often combined with other juices like baobab juice. It is also eaten raw in Béli. With an average score of 8,4 using the calculation in annex 8, people considered the availability of veludu on average to be “enough”.

In other places, leaves of *Dialium guineense* are sometimes used in cooking, but this use was not mentioned for the case study area. Furthermore this tree has good firewood and charcoal

qualities and it is known to be used as medicine in many countries.

Faroba

Faroba, or *Parkia biglobosa*, is a large tree that can grow up to 20 meters in height.

The pods' yellowish fruit pulp, which is rich in carbohydrates, is used as staple food. The faroba fruits can easily be stored in households for a few months time and are in Béli very important during the so-called "hungry season" when food is scarce. The fruit is eaten raw, in sauces and soups and can be used to make juice. *P. biglobosa* has no value of interest on a global scale but is very important in the local economies of Guinea-Bissau.

Seeds were not mentioned to be used as foods specifically in Béli, but they can be used for this purpose after processing them. They can then be used to season sauces and soups. Bark, leaves and husks are valued for their medicinal properties in many places in West-Africa. Leaves are also known to be used as vegetables in other areas. Pulp can also be used for feeding poultry.

Parkia biglobosa can be used as a soil improver: the leaves can be used as green manure. It is also a good source of nectar and suitable for the placement of beehives.

Lalo

Lalo, or *Sesamum radiatum*, is a leafy vegetable that grows in savannah lands and is widely consumed in Béli. Leaves can be eaten raw or cooked, in which case a kind of slimy sauce is created. Seeds and shoots of this plant can also be eaten but were not mentioned by local inhabitants to be in use.

Gilinti

Treculia africana, or in Creole Gilinti, is an evergreen tree that usually grows 10-30 meters in height. Its fruit in Béli is used for food purposes. The fruits are hard, vibrous and very big: they have been known to weigh up to 8,5kg, and can be over 20 centimeters in diameter. Fresh seeds of this fruit can be eaten but were not mentioned during the interviews. The breadfruit is soft with a yellow flesh inside, which is sweet with a distinctive smell. It is grown in many parts of the world because of its unique texture and the nutritional value it offers.

Djambo

Djambo, or *Amaranthus spinosus*, is a strong branched, upright plant that can grow up to 1 meter in height. It is a relatively large weed that in Béli is used as a vegetable. Leaves for this purpose are eaten raw or cooked. Seeds of the plant can also be eaten when dried, but were not mentioned during the interviews.

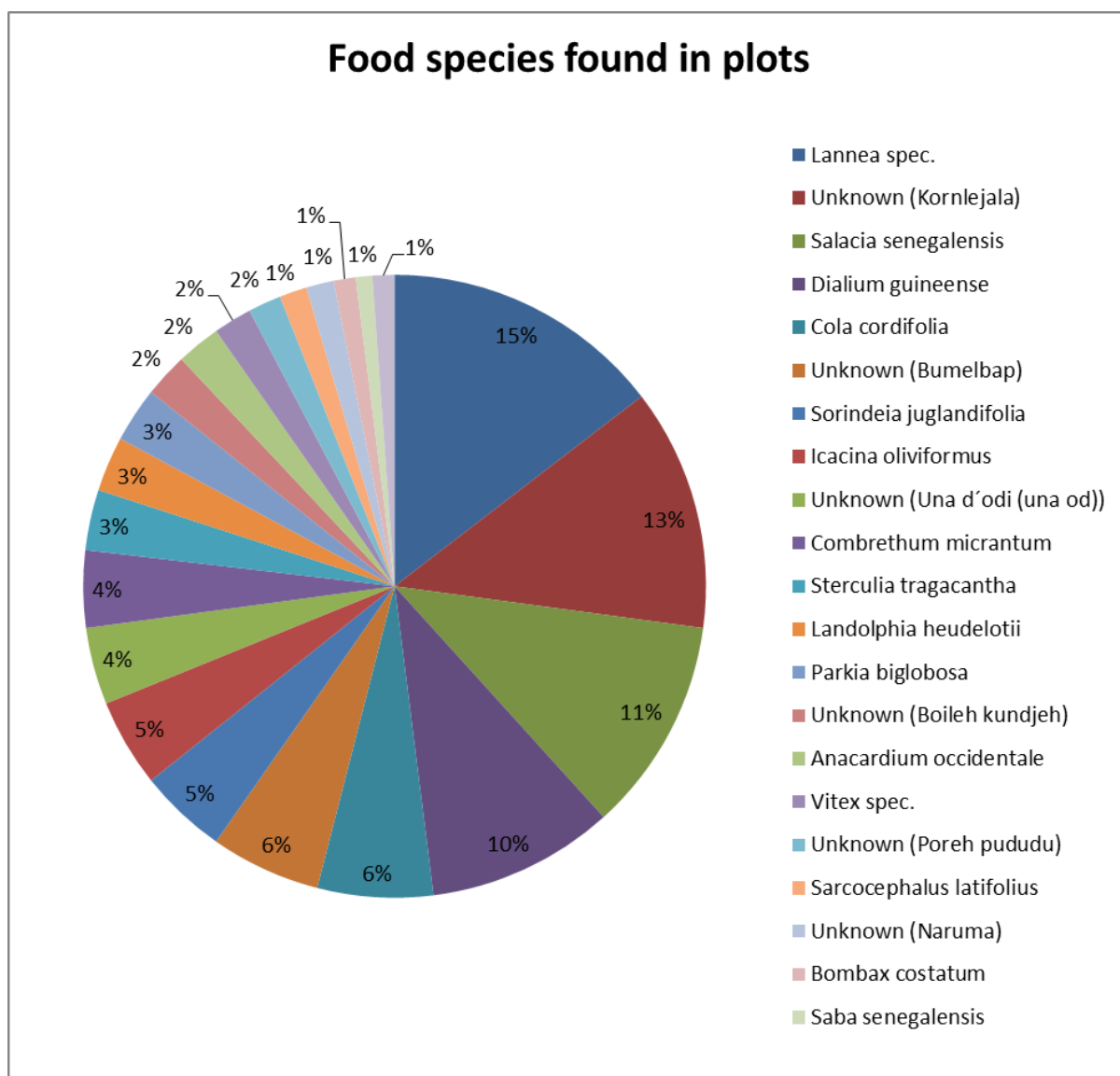
Annex 10 – focus group questions

In accordance with two groups of key informants (1 group male, 1 group female), a seasonal calendar will be made. During the group-sessions for making this calendar, people will be asked to give a valuation to each month of the year for a certain condition or activity using small pebbles; they obtain 120 pebbles each and need to divide these (per subject) according to relevance for each month. For example, if during the seasonal calendar workshop the first question would be "Indicate how much rainfall there is during each month using the pebble stones", most of the stones are likely to be divided among the months of the rainy season. Other topics discussed during the workshop include:

- Prevalence of droughts
- Pests and diseases on crops
- Planting times
- Harvesting times
- Rice shortages
- Diseases in livestock
- Selling of livestock
- Human diseases
- Monetary expenses
- Monetary income
- Lack of money
- Availability of bush meat
- Sale of bush meat
- Availability of medicine and medicinal plants
- Sale of medicinal plants
- Availability of home-grown fruits in the village
- Sale of home-grown fruits in the village
- Availability of forest fruits
- Sale of forest fruits
- Availability of home-grown vegetables
- Sale of home-grown vegetables
- Availability of forest vegetables
- Sale of forest vegetables
- Availability of wild honey
- Sale of wild honey
- Availability of edible mushrooms
- Sale of edible mushrooms
- Availability of edible herbs
- Sale of edible herbs

With the answers given, an analysis can be made of vulnerability during the different months of the year and a vulnerability chart can be set up. Problems that come into view during the research surveys will also be integrated in the focus groups.

Annex 11 – food species found in plots



Annex 11 – food species found in plots (continued)

Count	Local name	Scientific name
10	silah	Icacina oliviformus
5	bumeh	Vitex spec.
11	bumelbap	Unknown (Bumelbap)
8	cadju	Anacardium occidentale
44	dukumeh	Annona senegalensis
39	kankaliba	Combretum micrantum
14	lareh	Saba senegalensis
5	lukum	Bombax costatum
6	mehko	Dialium guineense
10	naruma	Unknown (Naruma)
4	neteh	Parkia biglobosa
16	Poreh kududu	Salacia senegalensis
34	Poreh padjah	Landolphia heudelotii
3	Poreh pududu	Unknown (Poreh pududu)
14	Sangue bombo	Sorindeia juglandifolia
1	Taba	Cola cordifolia
7	Tchuku	Lannea spec.
1	Tjalleh	Spondias mombin
1	Tjapelegeh	Sterculia tragacantha
16	Una d'odi (una od)	Unknown (Una d'odi (una od))
20	Banana santcho	Uvaria chamae
1	Dundu ke tjango	Sarcocephalus latifolius
21	Kornlejala	Unknown (Kornlejala)
8	Po di bichu	Antiaris toxicaria
51	Boileh kundjeh	Unknown (Boileh kundjeh)
350		

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