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Scorodophloeus zenkeri Harms : A Potential Non Timber Forest Product for enhancing local populations livelihoods in Lolodorf and Akom 2 subdivisions in Cameroon

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Abstract

Scorodophloeus zenkeri is a Non-Timber Forest Product belonging to the Fabaceae family. The specie is commonly exploited for its multipurpose uses, including medicinal and dietary properties. The specie's bark harvesting technic does not always obey sustainable management standards as local producers carry out systematic cutting down of standing trees before entirely debarking process. The marketing of these peels help producers improve their living household standards as well as numerous needs. The objective of this work is to highlight the market chain of this resource starting from the forest remove bark's techniques to the final marketable products. Our methodology used is based on household and markets surveys carry out in the Lolodorf and Akom 2 subdivisions in the Southern Cameroon. Results revealed a mean of 1500 kg of bark produce and distribute weekly per producer in local, regional and sub regional markets. These barks combined with other spices are processed into powder used in Cameroonians traditional dishes. Socio-economic studies carry out in Mokolo and Mfoundi (Central Region) and Ebolowa, Kye-Ossi, Eseka and Lolodorf markets (South region) revealed the existence of two models of commercialized barks (those of about 1m x 10 cm sale in raw statement and those processed into powder and sale inside plastics). According to the seasons, the monthly generated incomes varies between US$ 33.33 to 41.67, whether US$ 50 to 55 respectively between distributors and wholesalers; Retailers benefits are between US$ 0.66 to 1.17. Commercial activity caused by the bark exploitation of this tree will spatially cause a highly environmental impact regarding the anarchic poorly technics used by producers.

Keywords *:Scorodophloeus zenkeri, Non-timber Forest Product, overexploitation, harvesting technic, livelihoods*

Résumé

Scorodophloeus zenkeri est un Produit Forestier Non-Ligneux appartenant à la famille des Fabaceae. L'espèce est communément exploitée sous multiples formes pour ses propriétés médicinales et diététiques. Les techniques de récolte des écorces n'obéissent pas toujours aux normes de gestion durable, car les producteurs procèdent à l'abattage systématique des arbres afin de les écorcer entièrement. Le marché des écorces aident les producteurs à améliorer leurs conditions de vie dans les ménages. L'objectif de ce travail est de rehausser le circuit de commercialisation de cette ressource allant des techniques de prélèvement des organes en forêt au produit final commercialisé sur le marché. Ainsi, la méthodologie utilisée est basée sur les enquêtes de ménages et de marché conduites dans les arrondissements de Lolodorf et Akom 2 situés au Sud-Cameroun. Les résultats obtenus révèlent qu'en moyenne 1500 kg d'écorces sont prélevées par acteur et distribuées chaque semaine dans les marchés locaux, régionaux et sub-régionaux. Ces écorces combinées avec d'autres épices sont transformées en poudre pour être préparées dans les mets traditionnels camerounais. Les études socio-économiques conduites dans les marchés de Mokolo et du Mfoundi (Région du Centre) ainsi que ceux d'Ebolowa, Kye-ossi, Eséka et Lolodorf (Région du Sud) révèlent l'existence de 2 modes de commercialisation d'écorces (celles d'environ 1m x 10 cm de dimension vendues à l'état brut et d'autres écrasées et vendues en poudre dans des sachets plastiques transparents). Selon les saisons, les revenus générés mensuellement varient de 33,33 à 41,67 US$, ou de 50 à 55 US$ respectivement entre les distributeurs et les grossistes. Les bénéfices réalisés par les détaillants varient entre 0,66 et 1,17 US$. Le commerce accentué des écorces de cet arbre causera à terme un grand impact environnemental au regard des techniques archaïques de prélèvement utilisées par les producteurs.

Mots clés *: Scorodophloeus zenkeri, Produit Forestier Non Ligneux, Surexploitation, Technique de récolte, Condition de vie*

1. Introduction

Scorodophloeus zenkeri, commonly known as 'garlic tree', is one of the major Fabaceae family, Non Timber Forest Products (NTFPs) highly exploited in Cameroon. The tree is found in tropical Africa, from Nigeria to the Democratic Republic of Congo. In Cameroon, this evergreen forest tree is found around the Dja Atlantic forest (Eyog et al., 2006). This specie can also be found in garlic forest where it grows well on light soils and less on soils clogging water, even temporarily (Opsit). Then, this useful tree is used for several purposes. It's a good timber, sometimes used as food stuff or spice. In medicine, bark extraction is used to treat amoebic dysentery, toothache, snake bite, leprosy, syphilis, elephantiasis and gonorrhea (Abdou bouba, 2009). The powder of the bark acts as a laxative and a diuretic (Arbonnier, 2000). The bark, as well as its fruit is also widely used as spice. Therefore, Agbor et al., (2005) shown that the bark and fruit of this plant harvested in Cameroon has antioxidant potential. On chemical aspect, Tchiegang and Mbougueng (2005) analyzed the chemical composition of fruits and barks of *Scorodophloeus zenkeri* in Cameroon and identified nutritional potential value hidden. On nutritional aspect, barks and seeds stripped of their envelopes are commonly used as a spice and barks are regularly flame or dried before being rasped and consumed (Eyog et al., 2006). In West Cameroon, those organs are used to give a flavor to traditional dishes such as Nkui (gluey sauce), Nap poh (yellow sauce) and Condret; in the Centre region, the bark is better used in traditional dishes called « Sangha », « Nkouem », « nut's sauce »; while in the Littoral region, the same bark is rasped as spice for black sauce called « Bongo ». The marketing of this bark in Cameroon's markets involves many stakeholders such as producers, wholesalers, distributors, retailers and consumers. It's observed that these actors exploit large quantities of this bark nowadays. This activity helps farmers and indigenous populations to improve their living conditions. Therefore, regardless the quantities transported daily by car from local areas toward metropolitan markets, it became therefore urgent to conduct a socio-economic assessment on this marketable resource with the aim of more understanding the livelihood impact of this Non-Timber Forest product.

2. Material and Methods

2.1. Study area

The study was conducted in the Akom 2 and Lolodorf sub-division, division of Mvila and Ntem, Southern region of Cameroon (figure 1). Vegetation transition change gradually and can be described between "the littoral type" characterized by Ceasalpiniaceae Atlantic forest and "the Biafra Atlantic type characterized by "evergreen degraded forest" (Letouzey, 1985). Annual rainfall varies between 2000 and 2500 mm per year with average annual temperature of 25°C. Three main reasons justify the choice of this site: firstly, the region is belonging to the forest area. Secondly, it is classified among the highest productivity area where large quantities of this bark are provided. Thirdly, on the socio-economic aspect, *Scorodophloeus zenkeri* is a specie widely exploited in the chosen areas and its overexploitation helps producers to improve their incomes in the household.

2.2. Socio-economic surveys

In order to carry out this study, Accelerated Method of Research and Participatory Planning (AMRPP) were used. Surveys were conducted in five villages, two in Akom 2 subdivision (Fenda and Bifa) and three others in Lolodorf subdivision (Lolodorf, Ngoyang and Nkouemp Boer). In a total sample of 45 households, 31 have been interviewed bearing respectively 8 producers and 23 consumers. In each village, a guide was recruited so as to help easily identify actors involved in the bark's exploitation of *Scorodophloeus zenkeri*. Assessment conducted with these actors help to record some data such as : amounts incomes generated, used harvesting techniques, the costs of marketing, and collecting sites. Socio-economic

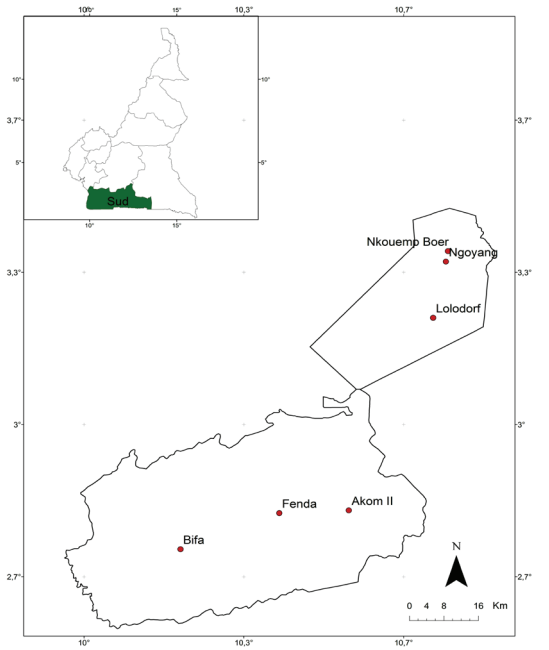


Figure 1: Study site in the surrounding region

surveys were conducted in five markets namely Mokolo, Mfoundi, Eseka, Kye-ossi and Ebolowa. In a group of 80 producers, 44 people respectively 9 distributors, 21 wholesalers and 14 retailers have been answered so far. A part from collecting data, it has been observed that a producer collects 3 bundles of about 55 kg of barks per week and per household. It globally represents a mean of 165 kg of barks/week/producer. The trading prize of a bundle fluctuate within abundant and scarcity period. This study helps us to elaborate bring out a confined distribution and commercialization chain of this specie's barks in Lolodorf and Akom 2 subdivisions of the country. It appears therefore important to evaluate the commercialization chain of the species barks in all distribution areas by the way to have a global estimation of biomass exploited, incomes generated and the real fluctuation mechanism of benefit while developing the value chain including all stakeholders in the country. It requires enough time to achieve these results.

2.3. Statistical analysis

Here, SPSS software was used for ANOVA while Microsoft Excel helps to draw out graphics to illustrate quantities of bark exploited and variation of benefit within actors according to the season.

3. Results

3.1. Harvesting technic

Designed chart (figure 2) have been developed from activities scheduled in the Lolodorf subdivision, particularly in "Mbeng forest" belonging to Nkouempboer village. An escort in forest lead to the development of step by step designed harvesting and processing chain of tree garlic barks. The first step stage consists of identifying a tree of 25 cm and above DBH (Diameter at Breast Height) (step 1); cut down or fell trees using axe or a saw and start with debarking stage (step 2 and 3). Sometime the tree can also be pilling. After harvesting the barks, they are drying or flamed (step 5). Then, bundles with a maximum of 40 barks pieces (1m x 10 cm) representing approximately 55 kg/each are build up and exposed along the national road or sending directly to concerned distributor. Sometimes, local resident distributors or wholesalers coming from different town are the main traders (step 6). At this stage, the bark is ready for consumption market, but it can be also snipped out before being transformed into powder to be used for medicinal purpose or for food (step 7 and 8).

3.2. Socio-economic aspect

Assessments have been carried out in two regions of Cameroon. In the Southern region, direct interviews have been done in Ebolowa, Eseka and Kye-ossi markets and, Mfoundi and Mokolo markets in the Centre region. In these localities, a sample of 44 stakeholders were considered and interviewed. They were dispatched into distributors, wholesalers and retailers.

It has been observed that a mean of 3 bundles of 55 kg each of *Scorodophloeus zenkeri* bark is harvested

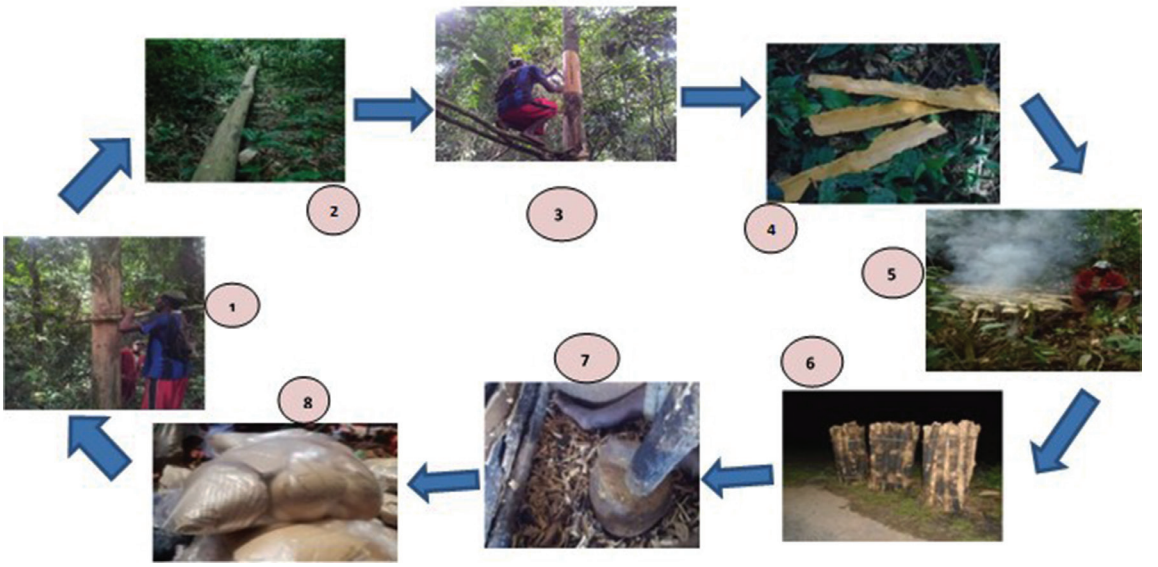


Figure 2: Harvesting technic of tree garlic and processing chain of bark into powder

weekly by a producer. Among actors involved in the exploitation of barks, distributors are the most compared to wholesalers and retailers (figure 3). Each distributor can harvest average of 1320 to 1540 kg of bark are harvested per month (table 1). The price of one bundle of 55 kg of bark varies between 8.85 US$ in scarcity period and 8.125 US$ in abundance depending on difficulties faced by each producer and the distance of harvesting. After harvesting and drying, barks are directly transported to Mokolo and Mfoundi market where they are selling to wholesalers approximately at 21.15 US$ in scarcity and 18.33 US$ in abundance period. According to the thickness of the bark, wholesalers retail the bark between 0.96 and 0.63 US$ a piece to retailers in the different surrounding markets (figure 4). Then, the retailers split the bark and sell a slice.

During the survey, it has been observed that interviewed traders in the market are mostly women (73%) and men (27%). This demonstrates the place of gender in the exploitation of *Scorodophloeus zenkeri* and the role that women can play in the livelihood improvement through the exploitation of NTFPs.

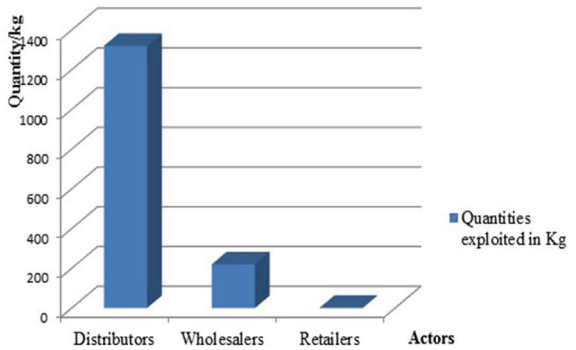


Figure 3: Quantity of bark exploited by actor per month

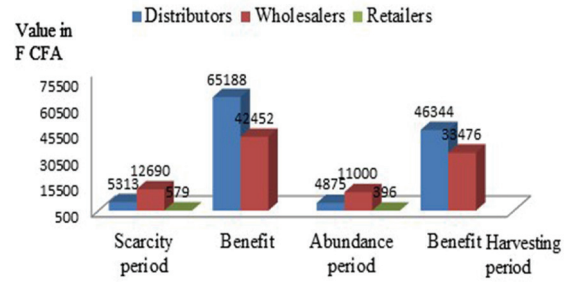


Figure 4: Fluctuation of seeling prices and benefits according to actors and harvesting period

As distributors are the major involvers in this activity, their profit gathered is less than those of wholesalers due to difficulties encountered during the bark delivery. Generated benefit varies according to the mean purchase price at all and the availability of the product. However, there is no profit during scarcity and abundance period. In scarcity period, distributors coming from Lolodorf village can generate up to 108.65 and 77.25 US$ in abundance period according to the characteristics of the bundle's barks after two weeks. In Yaounde market, when wholesalers sold the bark to the retailers, they generate most benefit that varies between 70.76 and 55.8 US$/month, depending of scarcity or abundance period (table 2). But if bundles of bark are sold between wholesalers, the benefit is less significant. For example, a bundle of bark bought at 200 US$ can be resold at 230.33 or 250 US$. Retailers also generate small benefit at its one level, unfortunately difficult to evaluate or explain exactly. While evaluating the annual benefit of actors during the scarcity or abundance period that is 6 months full activities, it is remark that generated profit by each actor is not significantly different due to the fact that barks are always sold in the local market and exported towards Gabon and Equatorial Guinea markets.

This market survey permits us to distinguish three main market distributing actors of this tree barks. The long chain is constituted of producers, distributors, wholesalers, retailers and consumers. The short chain is constituted of producers wholesalers, retailers and consumers. But, we can also have an intermediary or mid circuit between producers and consumers (figure 5). This mid circuit is frequently observed at Bifa and Fenda village in the Akom 2 subdivision where the tree's bark is less commercialized. Whereas, the two others circuits are more developed in Lolodorf subdivision considered to be the highest production area.

4. Discussion

Lolodorf subdivision was chosen among the best site to have major data on harvesting technic of tree

Table 1: Mean quantities of bark exploited per month according to actors

Actors	quantity in kg
Distributors	1320-1540 kg
Wholesalers	220-230 kg
Retailers	-1 kg

garlic. *Garcinia Lucida, Annichia clorantha* and *Scorodophloeus zenkeri* are among Non-Timber Forest Products (NTFPs) those more exploited for commercial issue. The bark is used in medicinal aspect to threat many diseases such as amoebic dysentery, toothache, snake bite, leprosy, syphilis, elephantiasis and gonorrhea (Abdou bouba, 2009). *Scorodophloeus zenkeri* is also used in traditional meals and two harvesting techniques of its bark are identified. The first consists to feeling the tree while other consists to strip the bark or debarking the tree such as *Alstonia boonei, Annickia clorantha, Prunus africana, Garcinia lucida* and *Scorodophloeus zenkeri* (Guedje et al., 2010). This harvesting technic very rudimentary is usually practiced by local populations due to their ignorance about natural resource, sustainable management and climate change knowledge. On a sample of 31 interviewed, 68% has a primary level and 32% a secondary level. This shows their limits and perception about legal harvesting technics and a sustainable management of the specie. Their only concern is to cut down the tree, remove the bark and make money to spend their life. According to Guedje (2001), debarking practices which consist to move all the bark lead a strong mortality of plants in order of 70%, whereas a partial sampling on one or 2/3 of the total circumference of the tree leads a low mortality of 10%. The debarking, the uprooting and the feeling of trees for the bark, fruits, flowers and roots harvesting of multiple timbers species, are some examples which illustrated this type of exploitation, applied by producers who practice regularly or periodically the commercialization of those resources (Guedje et al., 2010). Some results of research indicate that the exploitation pressure exerted by human populations is the principal cause of the scarcity or the disappearance of many vegetal and animal species (Siebert et Belsky, 1985 in Peters, 1996; Peters, 1997). The impact of this exploitation is a strong pressure exert on the resource (Guedje et al., 2010).

Approximately 1320 kg of barks are exploited each month by a producer/distributor involving in the commercialization chain. Lolodorf subdivision appears to be the main productive site of *S. zenkeri* barks, from where they are exported toward metropolitan and sub-regional markets. Less than 6% of women harvest barks in small quantities, , just for self-consumption or for selling around small local markets.

Information from Cameroon Tropenbos Programme in Kribi and Ebolowa market indicate that a bit bark of *Scorodophloeus zenkeri*, in 1997 was sold at 0.125 US$. According to Walter (2001), four years ago, a small bit of bark cost between 0.16 and 0.42 US$ in the forest area market. After 17 years, it's observed that the price of a bundle of 55 kg of bark has significantly increased and therefore cost between 9.06 to 10.87 US$ at the producer level. Then, we remark that the supply isn't going to satisfy the demand with the fixation of market price. However, by the fact that barks are overexploited by distributors, benefits generated are less considerable than those of wholesalers, due to many difficulties encountered by distributors. Among those difficulties, we can list

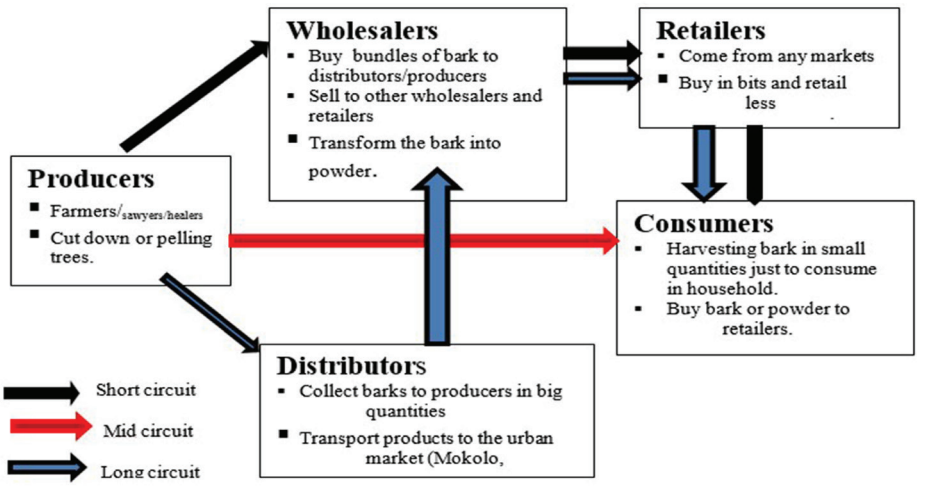


Figure 5: Value chain of Scorodophloeus zenkeri in Lolodorf

Ministry of Forest and wildlife control, increasing of transport price, harassment of policeman.

Market surveys helped us draw the marketing/ distribution chain of *Scorodophloeus zenkeri*. Up to now, statistics on the national trading of this specie were still unknown (Eyog Matip, 2006). Among the three well known commercialized chains, the longest chain is the better one as it involves many actors. Distributors from concerned villages sometimes sold their products and recover money one month later in the Mokolo and Mfoundi markets. It has also been revealed that wholesalers leaving to Lolodorf borrow many quantities of bundles of barks from distributors obliging such local actors to meet in the town and regularly this money remains unpaid.

5. Conclusion

This study has been conducted to evaluate the socio-economic potential of *Scorodophloeus zenkeri* as a mean for improving livelihood of local populations from the Southern region of Cameroon. The interest of this study is to bewail the harvesting technique of bark which is very rudimentary and widely used in this area. Study reveals than the tree's bark is higher exploited and commercialized to generate incomes. The mechanism of debarking has been assess as well as household and market survey that reveals quantities of barks produced monthly in Lolodorf and actors involved. The generated incomes fluctuated according to the period of exploitation, during scarcity period commonly located during agricultural season (rainy season), producers lower the debarking activities and are focused on agriculture because of the impact of rain on drying process that require supplementary efforts. Despite this behavior, the socioeconomic study reveals the potentiality of the specie to be used to improve household in rural area. The profitability of the tree is acceptable but the activity must be conducted using sustainable management and following the country regulating law.

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