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Evaluation Of Smoked Fish Market Trends In The City Of Ngaoundere (Adamawa-Cameroon)

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Abstract – This study was conducted to evaluate the market trends of smoked fish in the city of Ngaoundere (Adamawa-Cameroon). A questionnaire survey was conducted among 37 smoked fish retailers in 2 subdivisions of Ngaoundere. The data collected were analysed and processed using Excel software 2016. The results showed that in the Ngaoundere I and II subdivisions, consumers of smoked fish experience scarcity during certain periods of the year and this is related to the biological cycle of the fish. Also, smoked fish is sold mainly by men (89.19%), young people aged between 20 and 40 years (83.79%). The ethnic group most represented in the sector is Mousgoum (72.97%). The main source of supply for retailers is Lagdo (54.05%). Only 10.81% of retailers obtain their supplies locally, so that 89.19% of fish sold in Ngaoundere town comes from elsewhere (Lagdo, Tibati, Lom pangar, Maga, etc.). Tilapia is the most popular species (51.35%) because of its organoleptic properties and accessibility. The average daily income of a trader is less than 15,000 FCFA (56.76%). Smoked fish is subject to attacks by pests, which are mainly insect pests (76%). The most common means of combating pests are heating with wood fires (48.65%) and the use of insecticides (24.32%). Retailers (100%) face several institutional, financial, economic and commercial constraints in carrying out their activity which if adequately addressed can help better organise the sector for the protection of stakeholders.

Keywords – Survey, retailers, smoked fish, Ngaoundere.

I. INTRODUCTION

According to the FAO, in 2015, world fisheries production (fish, molluscs and crustaceans) reached a volume of 170 million tonnes (94 Mt for fisheries and nearly 76 Mt for aquaculture, 70% of which is in fresh water and 30% in sea water and brackish water), to which must be added approximately 28 Mt of algae [1]. The World Food Organisation (FAO) estimates that in 2025, the share of aquaculture will reach 57% of fisheries production, i.e. an increase of 31 Mt (+ 1.8% per year in the next decade compared with + 3% per year in the previous one). Overall, aquaculture is the fastest growing animal production in the world ([2], [3]). In sub-Saharan Africa, fish covers on average 22% of animal protein intake. In Cameroon, as in other countries, this coverage would exceed 40%. Indeed, as in many developing countries, in Cameroon fish is the main source of protein, a real local resource

that meat cannot replace because of its unavailability or its high selling price. It is a source of protein and essential trace elements, very valuable for nutritional balance and health (rich in long-chain omega 3 and low in cholesterol) and represents up to 9.5% of the population's total needs ([4], [5]). The current consumption of fish products in Cameroon is between 12 to 18 kg / inhabitant / year [1]. The supply of fish comes from in land fishing (22%), marine fishing (21%), less than 1% from fish farming and the rest (57%) is covered by imports ([1], [6]). However, in Cameroon, national fisheries production is only 180,000 tonnes with less than 1,000 tonnes/year coming from aquaculture. This remains low for an annual demand estimated at 400,000 tonnes ([7], [8]). To make up for this deficit, 212,000 tonnes of fish products were imported in 2012, representing a value of about 120 billion CFA francs [9]. The country's dependence on imports is expected to increase in the coming years, due to the increase in demand and the decline in fisheries production linked to the decrease in fish catches in most fishing areas, and to population growth.

Due to conservation difficulties, insufficient marketing infrastructure and dietary habits or requirements, fish is mainly processed in smoked or dried form, which is more resistant to the vagaries of the weather and to long-distance transport to reach inland areas ([10], [11]). Indeed, smoking is one of the oldest food preservation techniques, along with salting or drying [12]. Low in calories but high in protein, smoked fish is appreciated for its nutritional value and dietary benefits [13].

The objective of this study is to evaluate the market trends of smoked fish in the city of Ngaoundere-Adamawa (Cameroon).

II. Materials And Methods

2.1. Study framework

Study was carried out in two subdivisions of Ngaoundere, Adamawa region (Cameroon) in the High Guinean savannah zone.

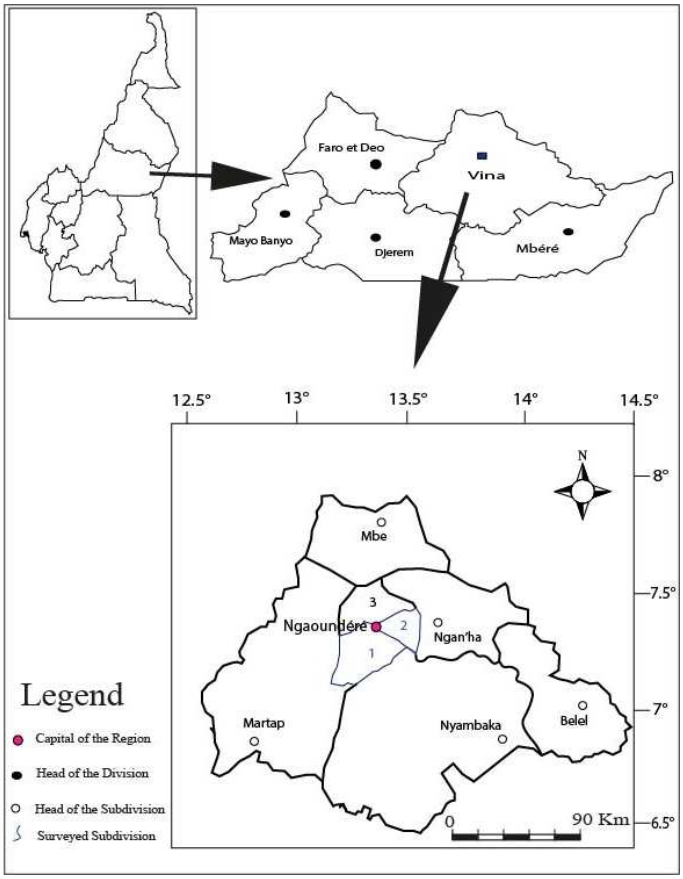

Figure 1: Map of Study area

Source: Cameroon administrative map

2.2. Data collection

The survey was conducted among 37 smoked fish traders during the period ranging from 5 April to 5 June 2021. Data was collected at seven sites, in the two main markets of the city of Ngaoundere (Bantai market and small market) and three sales points. The sites were selected randomly. The questionnaire was administered randomly to major fish retailers in these markets and answers collected by an investigator. The choice of the town of Ngaoundere is justified in that it is the main marketing centre for fishery products, especially smoked fish.

2.3. Data processing and analysis

Data collected were entered and processed in the Excel spreadsheet 2016. The statistical analysis method is descriptive and focus on estimating the frequencies and averages of socio-demographic variables.

III. RESULTS

3.1 Socio-demographic characteristics of respondents

Table 1: Socio-demographic characteristics of respondents

Modalities	Variables	Frequencies (%)
Gender	Man	89,19
	Woman	10,81
Age	20-30	35,14
	31-40	48,65
	41-50	8,11
	51-60	5,41
	Upper 60	2,70
Ethnic group	Bamoun	5,41
	Dii	2,70
	Guidar	2,70
	Laka	2,70
	Mambila	2,70
	Moundang	2,70
	Mousgoum	72,97
	Peuhl	5,41
	Toupouri	2,70
Education level	Primary shool	18,92
	Secondary school	45,95
	Higher education	8,11
	No formal Education	27,03
Profession	Private Sector	5,41
	Informal	94,59

Religion	Christian	24,32
	Muslim	75,68
Household size	1 to 5	62,16
	Upper 5	37,84
Activity	Principal	89,19
	Secondary	10,81

3.2. Retailers' sources of fish supply

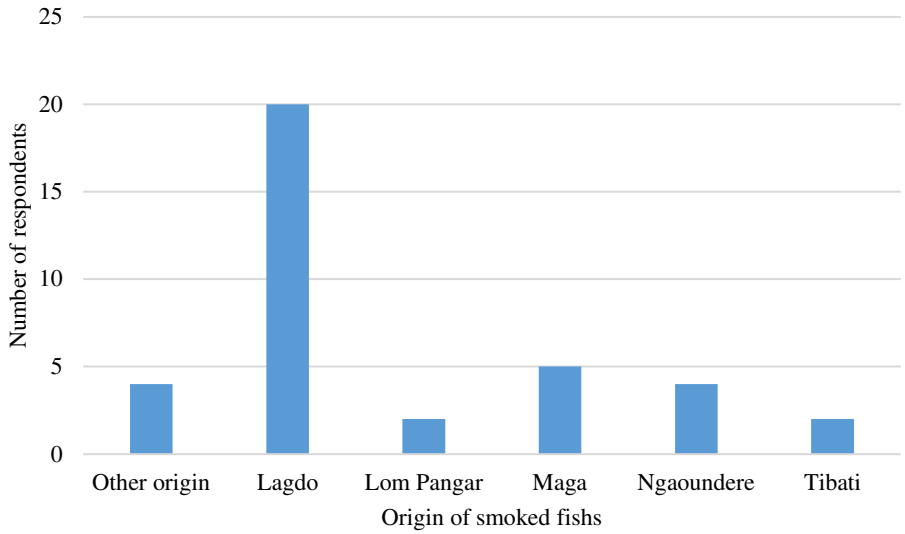

Figure 2: Major sources of fish supply

Figure 2 shows that the sources of supply of smoked fish are diversified. Lagdo stands out as the main source of supply (54.05%).

3.3. Frequency of supply of smoked fish

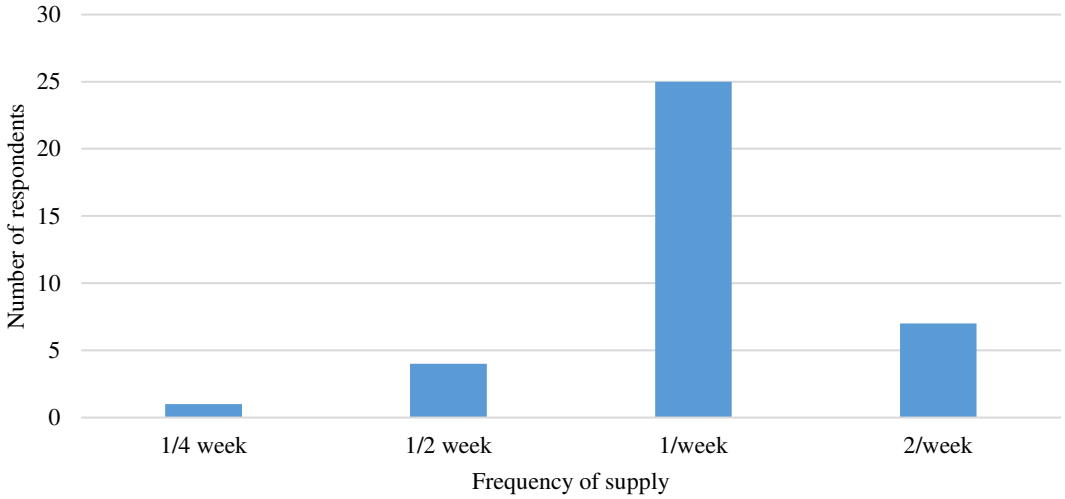

Figure 3: Frequency of supply of smoked fish

The survey shows that the frequency of supply varies from once a week (67%) to once every four weeks (3%) based on the availability and the biological cycle of the various fish species.

3.4. Species of smoked fish found on the local market

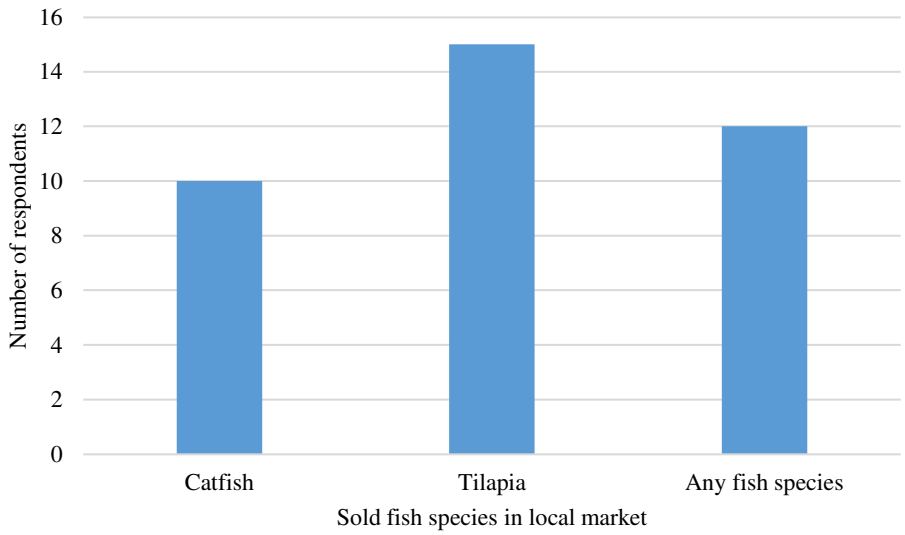

Figure 4: smoked fish varieties found in the local market

The different species of fish found on the market are presented in figure 4; so that 40.54% were Tilapia species, 32.43% were Catfish species and 27.03% were other species.

3.5. Most frequently important smoked fish species

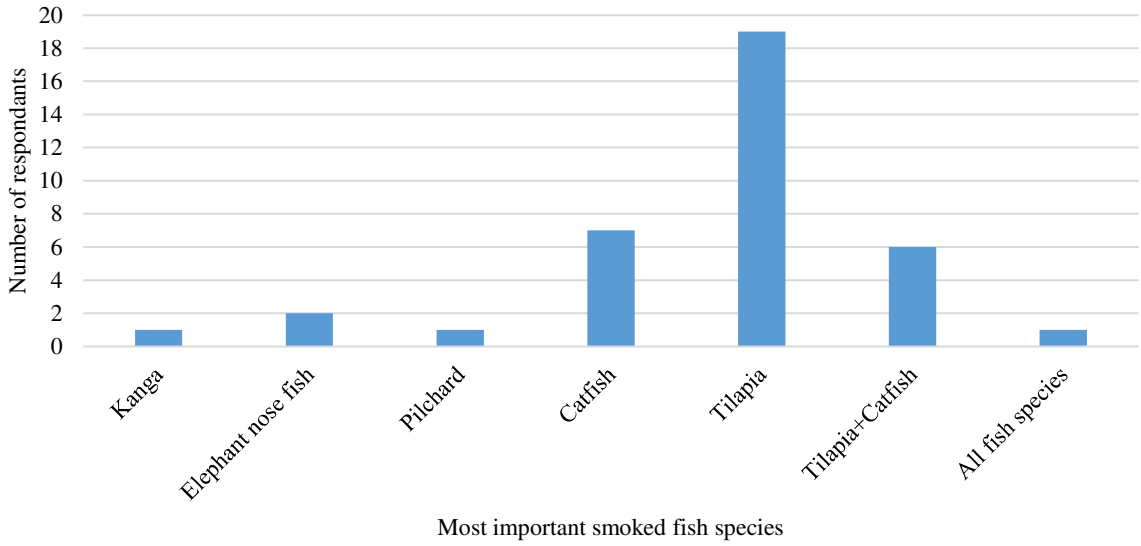

Figure 5: Most popular smoked fish species

The species of fish most in demand according to the dealers are recorded in Figure 5: Tilapia (51.35%), Catfish (16.22%), Tilapia and Siluridae (16.22%); Niger elephant fish (5.41%).

3.6. Fish selection criteria

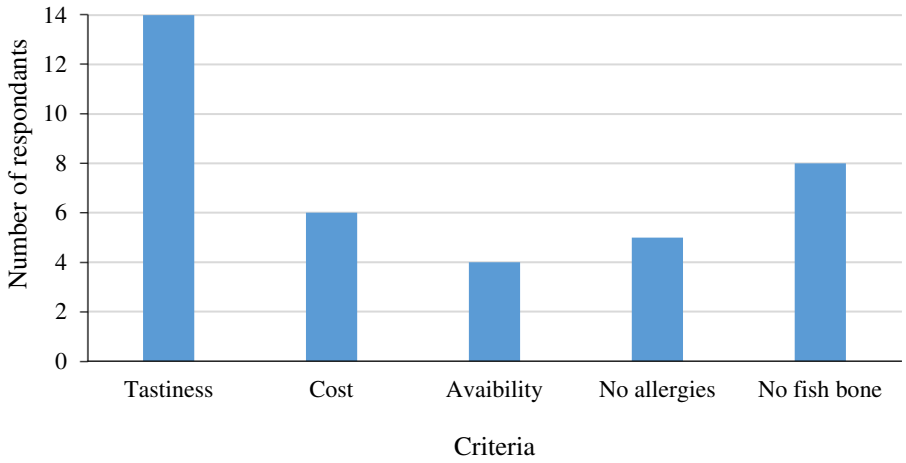

Figure 6: Fish selection criteria

Figure 6 shows that 37.84% of dealers opted for good flavour, 21.62% for fewer bones, 16.22% for cost, 13.51% for no allergies and 10.81% for availability of the species.

3.7. Techniques used in preserving smoked fish and pest control measures

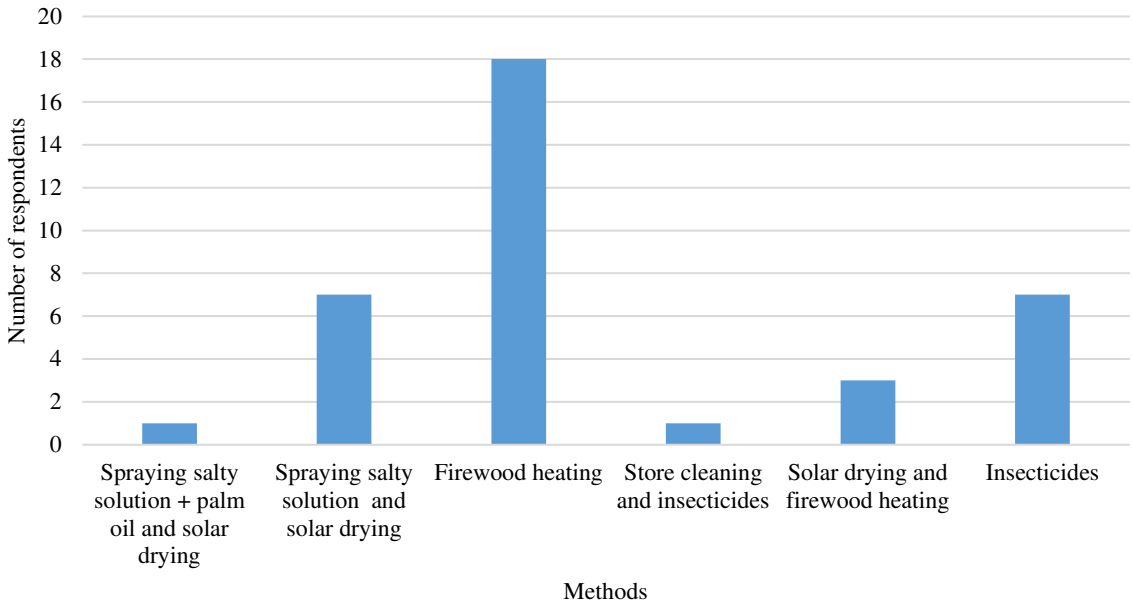

Figure 7: Different preservation techniques and pest control measures for smoked fish

The different preservation techniques and pest control measures for smoked fish identified during the study were: heating (54.05%), use of insecticides (21.62%), sun drying (13.51%), combination of drying and salt water spraying (8.11%) and combination of cleaning the shop and spraying with insecticides (2.70%).

3.8. Different pests identified during the preservation process

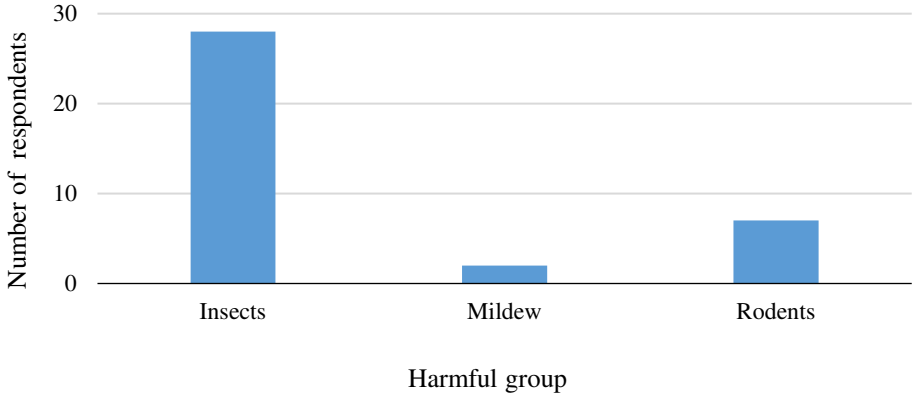

Figure 8: Different pests identified during the preservation process

The field survey identified three groups of pests, namely insects (76%), rodents (19%) and moulds (5%).

3.9. Periods of smoked fish activity as perceived by retailers

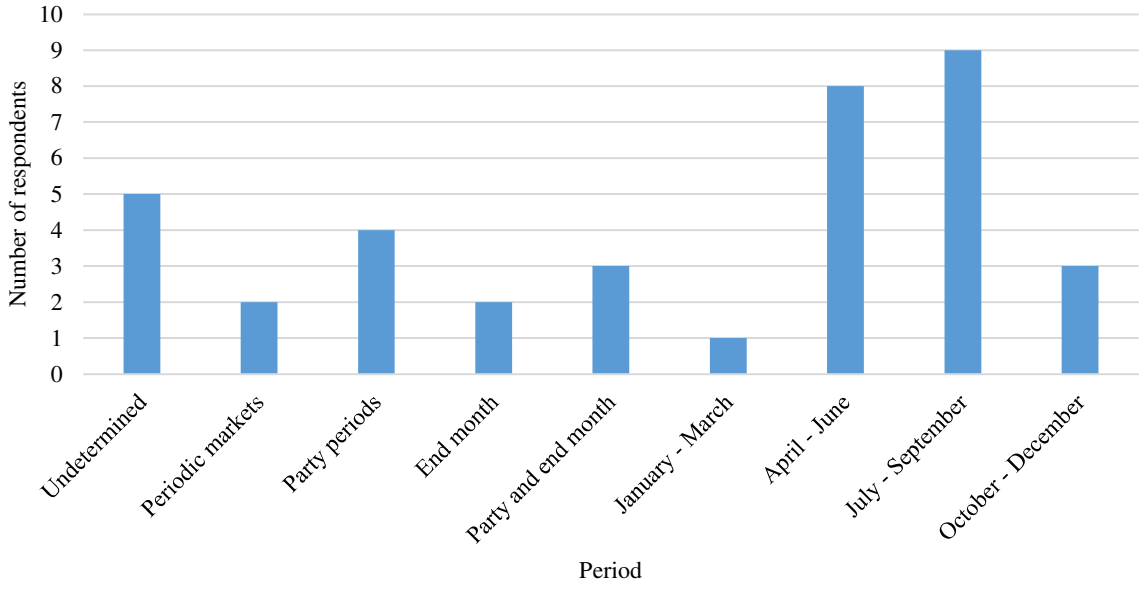

Figure 9: Most successful periods of smoked fish trading

Figure 9 presents the respondents' opinions on the periods of activity (flow of goods) during the year. They were divided into 9 periods, ranging from 2.70% to 24.32%. The most successful periods are between April and September.

3.10. Average daily income of interviewed dealers

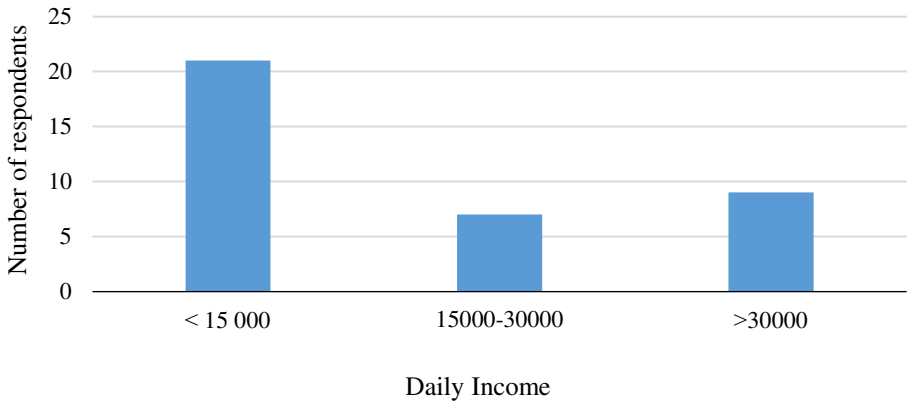

Figure 10: Average daily income of resellers interviewed

For the majority of retailers, this activity generates an average daily income of less than 15,000 CFA francs for 56.76% of the actors identified, 18.92% of actors have an average daily income ranging between 15,000 and 30,000 CFA francs and 24.32% have an average daily income of more than 30,000 CFA francs.

3.11. Professional experience of retailers in the sector

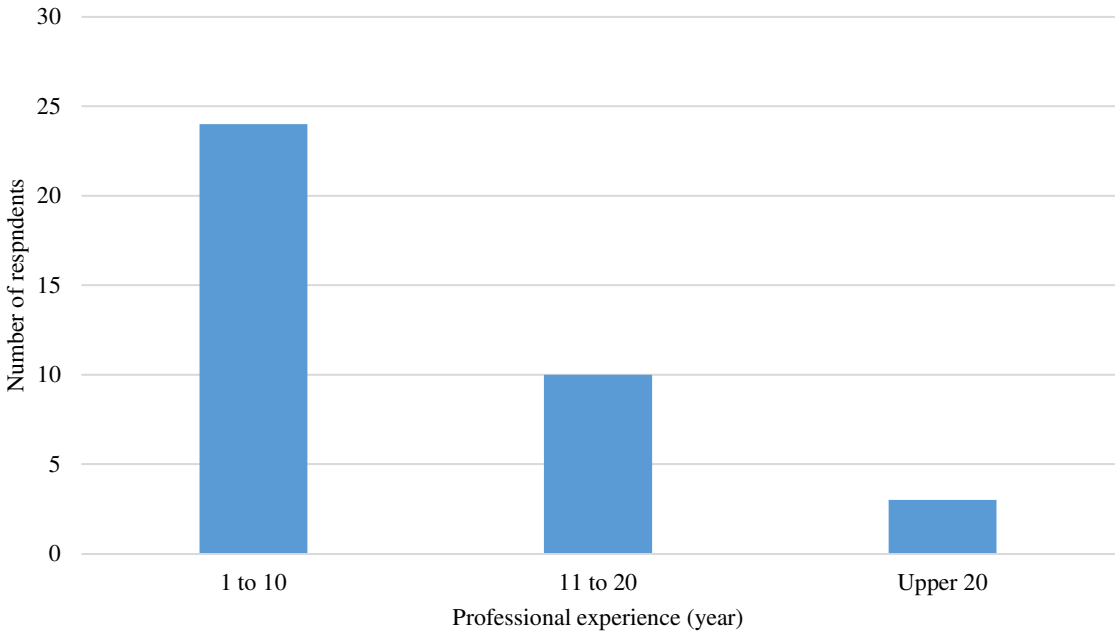

Figure 11: Retailers' professional experience in the sector

The majority of resellers (65%) have between 1 and 10 years' experience in the trade. Only 8% of respondents have more than 20 years' experience and the rest (27%) have between 11 and 20 years' experience.

3.12. Representative diagram of retailers' expectations

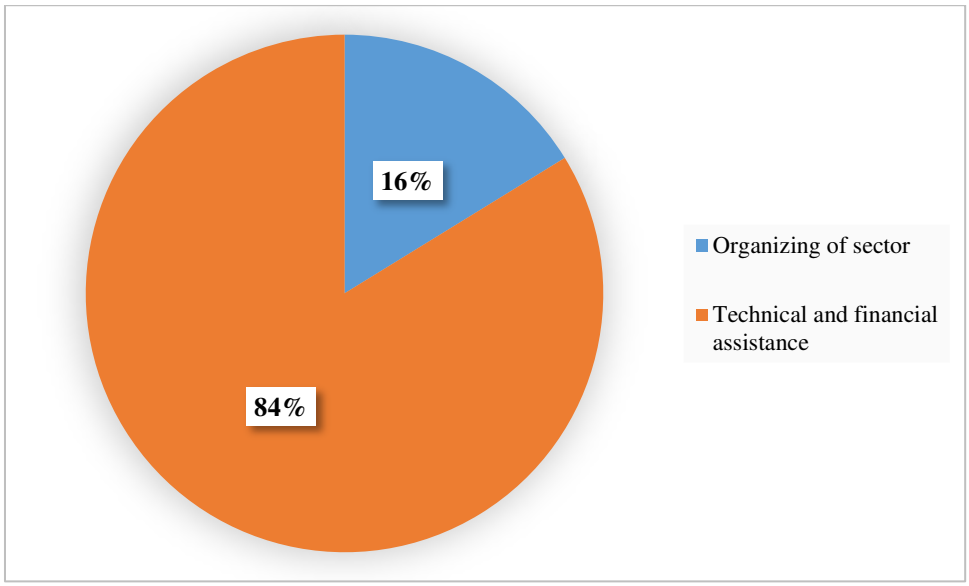

Figure 12: Representative diagram of retailers' expectations

Figure 12 presents the overall expectations of the retailers. Most smoked fish retailers expressed their desire to receive technical and financial support (83.78%) whereas 16.22% wished for a better organisation of the sector.

IV. Discussion

The general objective of this study was to analyse the retail network of smoked fish in the town of Ngaoundere. With regard to the socio-demographic characteristics of the people surveyed, the smoked fish marketing activity is strongly dominated by men (89.19%). The activity is carried out mainly by relatively young people between the ages of 20 and 40 (83.79%) whose household size is between 1 and 5 individuals (62.16%). The predominant level of education is secondary (45.85%). These results are similar to those of Mananga et al [14] who showed that the majority of smoked fish traders surveyed in Brazzaville were aged between 26 and 40 years. Among the respondents, there were several ethnic groups. The Mousgoum, the majority of whom are Muslims, were the most represented ethnic group (72.97%) in the activity. This is because they have cultural tights with fishing and are found in the different production basins (Lagdo, Maga, Lom Pangar). The majority of the respondents worked in the informal sector (94.59%) and made the sale of smoked fish their main activity (89.19%).

The information collected from the traders, whose average length of service in the trade was between 1 and 10 years (65%), indicated that the majority of smoked fish supplied came from Lagdo (54.05%) and the frequency of supply was generally on a weekly basis for 67% of the respondents.

The results showed that the choice of fish species marketed was based on their organoleptic properties (37.84%) and lack of bones. Tilapia is the most popular species (51.35%) because of its good taste, availability and relatively non-allergenic character, followed by Machoiran (16.22%). These results are different from those obtained by Grosse [15] who established that the most consumed smoked fish in Central and West Cameroon is 'bonga'. Smoked fish intended for sale are preserved by various techniques. The one most used by retailers is heating (54.05%) due to its ease of use and low cost. In addition to heating, the use of insecticides (21.62%) is also practiced. Three main pest groups were identified: insects (76%), rodents (19%) and moulds (5%). These results are similar to those obtained by Tamgno et al [16] who concluded that the most abundant pests in smoked fish storage in Madagascar, Benin, Nigeria, Chad, Mali and even Cameroon are insects, especially Lice and Necrobia ([17]–[19]).

The most fruitful period of the activity is from April to September. It coincides with the biological rest period (fishing ban), during which traders sell the stored products by increasing the selling price due to the scarcity of the products.

Constraints

The subjects surveyed (100 %) faced various institutional, financial, economic and commercial constraints:

- Institutional constraints: these are reflected in the absence of reliable and adequate legislation relating to the sector, poor organisation of the sector;
- Financial and economic constraints: the lack of credit and financing for the benefit of the actors handicaps the sustainability of the various commercial activities of smoked fish. In addition, there are fiscal pressures and a lack of an efficient management structure;
- Marketing constraints: these are materialised by a lack of adequate means of storage and conservation leading to significant post-storage losses which cause shortages and price hikes on the market, the inaccessibility or isolation of sales sites, the non-existence of adequate stalls (as most are made of temporary and archaic materials).

V. CONCLUSION

The objective of this study was to evaluate the sales trends of smoked fish in the subdivisions of Ngaoundere I and II (Adamawa-Cameroon). The sale of smoked fish in the study area was mainly practised by men, relatively young and with a secondary level of education. The most represented ethnic group was the Mousgoum. The smoked fish sold on the local market comes mainly from the locality of Lagdo. The most abundant species is Tilapia. The lack of adequate storage facilities was reported by the traders as one of the major difficulties in carrying out their activity. During storage, smoked fish remain a highly perishable commodity and is subject to both quantitative and qualitative depreciation. These depreciations are due to microbial proliferation and infestation by harmful insects. To remedy this preservation problem, retailers often resort to unconventional methods of presevation, including heating over a wood fire and above all the use of unregistered insecticides, which poses a major public health problem.

ACKNOWLEDGMENT

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