

## Original Research Article

# Gears and modes of exploitation of edible frogs in the peri-urban localities of Man (Côte d'Ivoire)

### ABSTRACT

**Aims:** The exploitation of frogs has increased in recent years in several areas of Côte d'Ivoire. In the region of Tonpki in the west of the Côte d'Ivoire, these amphibians are used to fill the deficits in animal proteins of the populations. The study carried out aimed to evaluate the modes of exploitation of edible frogs.

**Place and Duration of Study:** The present study was performed during the month of January to February 2022. The survey was conducted in the villages of Kassiapleu, Kouitongouiné and Gbangbéguiné. These villages are located in MAN (West of Côte d'Ivoire).

**Methodology:** Surveys have been carried out among actors exploiting this animal resource. The study involved 210 consumers and 15 frog harvesters in the locality of MAN. A well-structured questionnaire provided data on fishing techniques and frog consumption patterns.

**Results:** This study reveals that there are two main fishing methods: arrow fishing (57.1%) and hook and line fishing (42.9%). The catches are made in different humid ecological zones and the exploitation is only intended for local consumption. The smoked form is the most popular with consumers (59.5%). The majority of respondents consume this meat because of the taste (83.3%) compared to that of chicken (44.8%) and fish (31.4%).

**Conclusion:** In view of these results obtained, the establishment of a rational exploitation strategy must be considered for the conservation of edible frog species.

**Keywords:** *Harvesting, Frog, Conservation, Côte d'Ivoire*

## 1. INTRODUCTION

Frogs are amphibians that are found in nature on all continents. Frogs are now subject to overexploitation by humans either for consumption or for scientific research [1]. In Africa in particular, frogs constitute a very important food resource [2]. Indeed, they represent an essential means of subsistence in rural communities [3].

In several countries including Nigeria, Cameroon, Benin, Burkina Faso, Ghana, Madagascar and Guinea, the trade in frogs is very flourishing and they are used on a large scale as an essential source of animal protein [1]. For example, in Nigeria and Burkina Faso in 2010, the number of frogs captured and sold were 2,738,610 and 564,640 frogs respectively [4]. The craze around this meat in the world would be linked to its organoleptic and nutritional quality. Harvesting of amphibians is often associated with the rural poor supplementing their diet with any available protein [5].

In Côte d'Ivoire, the consumption of frog meat is mainly observed among certain peoples of the west and midwest, notably the Yacouba, Guéré and Wobé. The frog is part of the food habits of these peoples. It is an important source of highly valued animal protein and the species most consumed by these peoples is *Hoplobatrachus occipitalis* [3].

In the peri-urban areas of Man, a city located in the west of Côte d'Ivoire, these frogs are eaten. There is an overexploitation of this resource by the population often leading to its rarity. Most of the frogs consumed are taken from natural stocks. However, the data produced in this area is very limited. Hence the need to carry out this work which aims to provide data on the practice of fishing and consumption.

## 2. MATERIAL AND METHODS

### 2.1 Study Area

The survey was conducted in the Tonkpi region in Western Côte d'Ivoire in three peri-urban localities of the city of Man. Man located in the west of Côte d'Ivoire between 7°24'45"North and 7°33'13" West. The region's climate is subequatorial. This climate is characterized by two seasons which are a rainy season (April to October) and a dry season (November to March). The average annual precipitation is 1632 mm and the average annual temperature varies around 25°C.

### 2.2. Survey Method

The survey took place during the month of January to February 2022. The study was conducted in the villages of Kassiapleu, Kouitongouiné and Gbangbégoniné among 210 consumers and 15 frog fishermen. To facilitate communication, a guide was contacted who sometimes acted as a translator in the local language Yacouba. Respondents were randomly selected from the population. A series of questionnaires have been developed through a survey sheet. The first part of the survey carried out among fishermen focused on information relating to the gear used and the fishing methods practiced. While the second part was made with consumers of frog meat. For consumers, the information sought concerned the mode of consumption, the form and the reasons of frog consumption.

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### 2.3 Statistics:

All data collected were entered and analyzed using SPSS software version 20.0. The graphs were drawn using the excel table.

## 3. RESULTS

### 2.1. Gears and methods of capturing frogs

The survey of fishermen in the three villages showed that there are two modes of catching or harvesting frogs: arrow fishing or spearing fishing and fishing with a hook and line.

The fishing method frequently used is arrows fishing which is practiced by 57.1% of fishermen. It consists of the use of 3 to 4 arrows surmounted on a wood which serves as a support (Figure 1). Spearing technique is done most effectively at night, using a bright spotlight to momentarily daze and immobilize the frog. Afterwards, the fisherman can knock him out or pierce him with the arrow. A torch as bright spotlight attached to the head or in hand, serv as a light. This light helps also to distingue frogs and toads at night. Indeed frogs have light eyes while toads have red eyes at night.

Also one of the capture methods mentioned was fishing with a hook and line. This method is practiced only during the day. It was practiced in these villages by 42.9% of the fishermen. The fishing with a hook and line consists of one to three hooks surmounted on a wire or cord of about 1 to 3 m and all connected to a wooden handle. Hooks baited with live insects, earthworms, or flowers of *Leucanthemum vulgare* are dangled in front of the frog.



**Fig. 1:** Instrument used for arrow fishing

## 2.2. Location of capture and marketing circuit of frogs

The survey results showed that the capture areas of these frogs are wet ecosystems represented by shallows (53.3%), abandoned ponds (33.3%) and small rivers (13.4%). It should also be noted that the scarcity of frogs was reported by all the fishermen interviewed. During this survey, 73.3% of the fishermen revealed that they caught frogs of small caliber or size. On the other hand, 26.7% of fishermen catch large frogs with a good market value during their campaign. Figure 2 shows the different frog capture areas.

Concerning the production and marketing circuit of frog meat, it is simple and informal. Captured frogs are for local consumption only. The frogs once harvested in ponds, rivers and swamps by the collectors, are distributed on the wholesale and semi-wholesale markets. Some collectors sell the frogs directly to consumers. The commercialization of frogs in retail markets is ensured by sedentary sellers and itinerant sellers (Figure 3). Captured frogs are sold either dried or smoked (Figure 4).

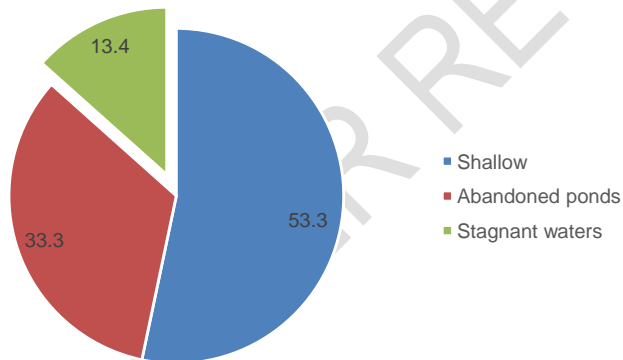
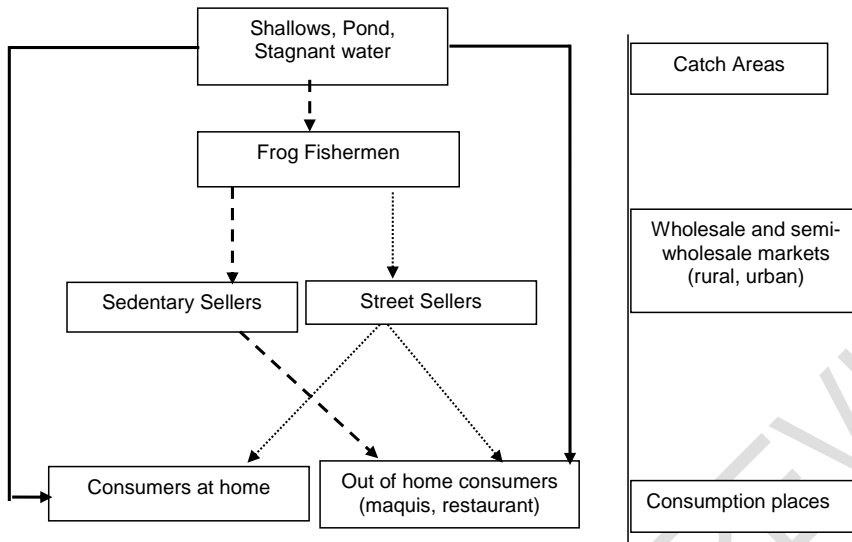


Fig 2 : Different frog capture areas



**Fig 3: The frog marketing circuit**



**Fig. 4 : Sale of dried frog in the market**

### 2.3. Frog Parts Preferences by Consumers

The survey in the three localities showed that frogs were consumed in three forms. Most respondents liked to consume them in the smoked form (59.5%) and in the fresh form (38.1%).

According to the information collected, there is a discrepancy as to the preference of the different parts of the frog. The leg was the part that was the most preferred by the respondents (64.3%). Others, on the other hand, prefer all the parts as well as eggs. They represented 33.3% of those surveyed.

#### 2.4. Reasons for consumption

It emerges from this survey that the major reason for the consumption of the frog is linked to the taste of this amphibian. Consumers who ate frogs for their taste represented 83.3% of respondents. Other reasons were also mentioned by respondents. The latter mentioned that the frog was either part of their food habit (12.4%) or that they consumed it for pleasure (2.4%) or for lack of meat (2.4%) (Figure 5). Our investigations have shown that the taste of frog meat is compared to that of several other animals (Figure 6). According to consumers, the meat closest to frogs is that of chickens (44.8%) followed by fish (31.4%).

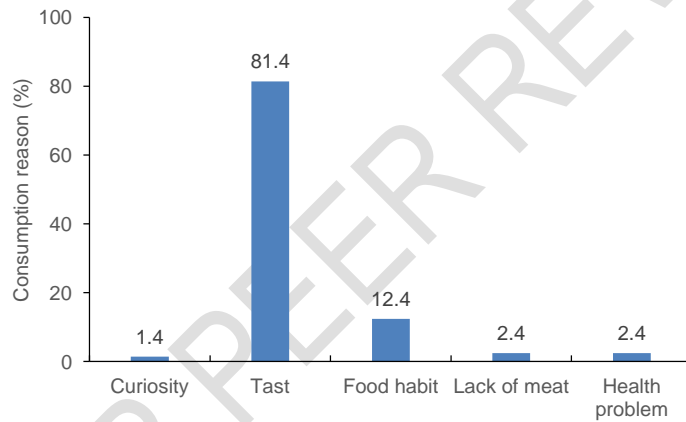


Fig 5 : Reasons of consumption of frog in the localities

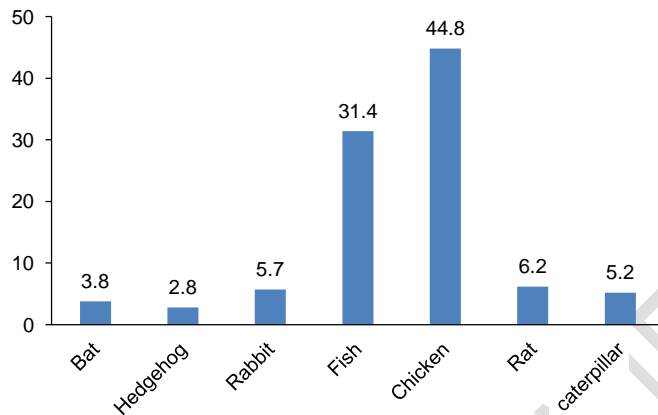


Fig 6 : Different animals used in the frog taste comparison

#### 4. DISCUSSION

The survey carried out in the three localities of the commune of MAN showed that the consumption of frogs is real. The marketing channel for frogs is relatively simple and informal. The frogs are caught in wet areas like shallows and swamps. Catches are made either using fishing lines or using an arrow.

These different capture techniques are identical to those practiced by fishermen in the town of Daloa [6]. The most used technique was arrow fishing (57.1%) which is practiced at night. This is due to the fact that this technique makes it possible to capture a large number of frogs because they are more abundant on moonless nights. It should be noted that most frog species are more active at night and collecting is usually a nocturnal activity involving handheld or headlamps [5]. However, Neang [5] also reported the use of wooden traps and harpoon guns, a kind of traditional gun used by hunters to capture frogs. Similarly in Burkina Fasso in the province of Ganzourgou, gear such as nets (39.45%) and traps (22.40%) are used as means of catching frogs [7].

The exploitation of frogs in the three surveyed localities aimed to satisfy the local market. This is contrary to the results of work carried out in Benin, Nigeria, Cameroon or Madagascar where the exploitation of frogs is oriented towards external markets or interurban circuits for large hotels [4].

Frog meat was consumed after evisceration without skinning or with skinning. In this study, frogs were eaten either smoked (59.5%) or fresh (38.1%). In Burkina Faso, a survey of 129 consumers showed that the consumption rate of the smoked form was 35% [2].

The frog leg were the most appreciated part (64.3%). Our results are higher than the data (20%) reported by Keita *et al.* [6]. The popularity of eating frogs' legs was mentioned in the work of Hardouin [8]. The diversity of preferences in the forms of consumption of frog meat (fresh, smoked) also reflects the diversity of perceptions that the population has of this animal that is both prized and feared. According to Nzigidahera [9], this mistrust probably stems from the toxins secreted by the toad, which is mistakenly assimilated to frogs.

This study also revealed that the consumption of frogs was also linked to its organoleptic quality which is similar to that of several animals such as chicken (44.8%) and fish (31.4%). Our results corroborate those of several authors who have reported the association of frog meat with fish [9] or chicken [10]. According to Altherr *et al.* [9] it is perhaps in relation to this quality that frog consumers have given it the name "jumping chicken" in certain countries such as Nigeria and Indonesia.

#### 4. CONCLUSION

This study was carried out with the aim of providing scientific data on the mode of capture and consumption of frogs in peri-urban localities of Man. The results showed that the frogs are captured in the natural environment. This capture is done with line and arrow without any regulation. In view of the abusive exploitation of frogs in these localities, the implementation of strategies by the creation of farms appears as an option not only to improve the permanent supply of markets but also for the conservation of the species consumed.

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