

*Full Length Research Paper*

## Actors, distribution circuits and marketing of fish on Bandama River (Côte d'Ivoire)

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**This study was carried out on lower Bandama River between July 2013 and June 2014. For this study, a daily monitoring of fish marketing activities and a repeat-pass survey of fish sellers and their marketing technique in selected localities were performed. The results of this work have shown that sales of fish on the Bandama River are ensured by at least 65 fish sellers (42 Ivorians and 23 foreigners). They are mostly young people at Tiassalé and N'Zianouan and older at Singrobo. They are largely illiterates and we can notice wholesalers, intermediate and retailers. The fish is mostly sold fresh. The transformation of the product is done by traditional smoking exclusively by women. The distribution of fish is done in two circuits: short circuit (in the same locality) and a long circuit (between cities). This market is hampered by the poor roads, lack of adequate means of preservation of the product during transport and random fixing of selling prices.**

**Key words:** Fish wholesalers, commercialisation, artisanal fishing, fish products, Bandama River, Ivory Coast.

### INTRODUCTION

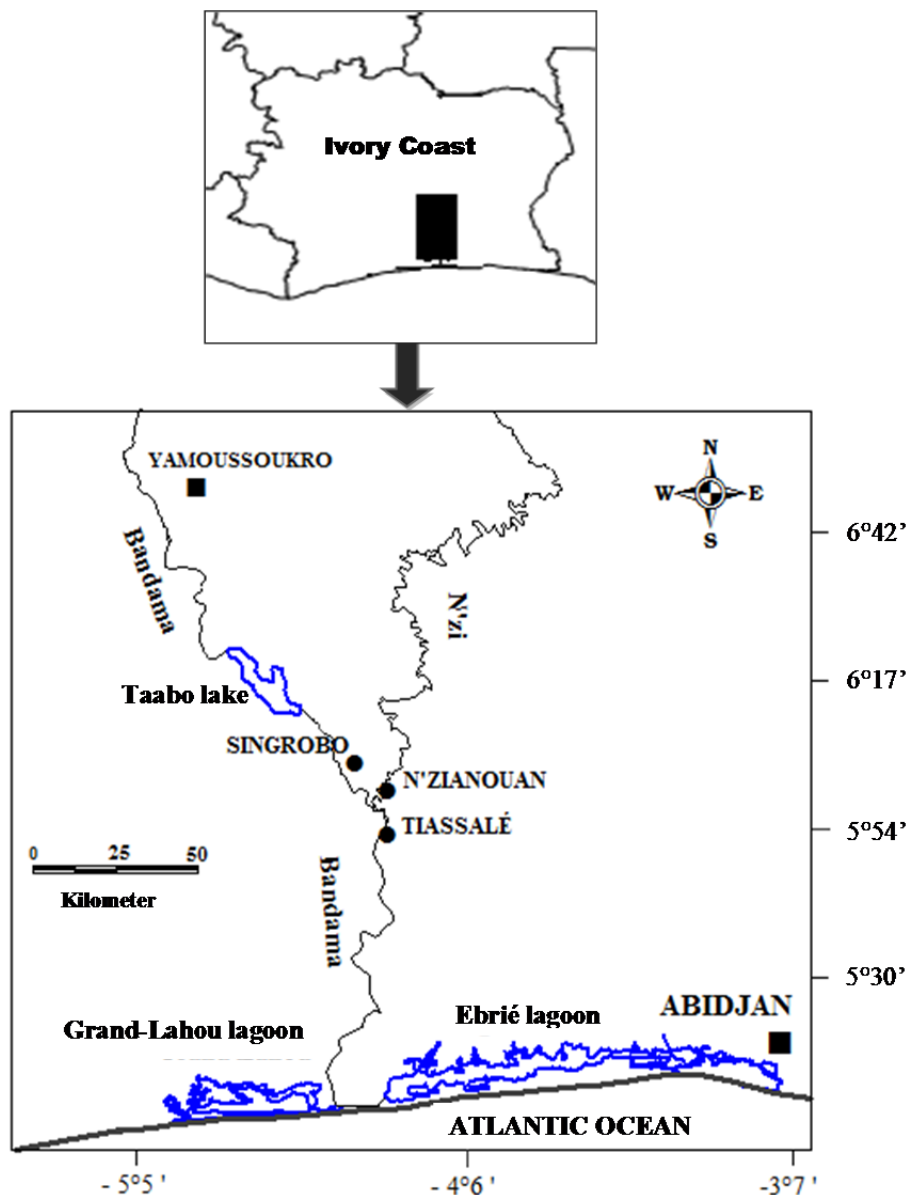
In Ivory Coast, the fish remains the primary source of protein (60%) and its level of consumption is estimated at 16 kg/year/inhabitants for a domestic demand of more than 350000 tons/year (\*PSDPA, 2014). The high demand for fish products has led to important economic stakes in the vicinity of different courses of Ivorian water. Thus, the processing and marketing of fish generate a significant number of jobs and currency thus contributing to the reduction of poverty of people living around these waters (Coulibaly, 2010). Despite this importance, all the Ivorian

fisheries sector suffer to many conflicts that justifies in one hand, the choice of studying a segment of the sector (production or processing and marketing), on the other hand, a spatial location on a region (Mahyao, 2013). In spite, watercourse have not been taken into account a long time in fishery statistics of this country, since available statistics are essentially based on lakes fishes marketing. Today, there is necessity to acquire data on fish marketing network in watercourse. The fish is sold in Bandama River, but there are no reports on

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Abbreviations: PSDPA, Strategic plan for the development of fisheries and aquaculture in Côte d'Ivoire; FCFA, Franc African financial community.

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**Figure 1.** Map of the study area indicating the sampled and investigation sites localitie.

economic statistics in this area. This study introduces a series of publication on the marketing of fish in order to increase knowledge about fishing in the Bandama River. This study aims to analyze the organization of communities of fish wholesalers, the processing, the distribution chain and marketing of fishes on the Bandama River.

## MATERIALS AND METHODS

### Study area

The study was carried out on Bandama River in downstream of Taabo lake (6°00'-6°20' N and 4°90'-5°00' W). This study was done

in three areas (Figure 1). The first, Tiassalé is located at 5°53 N and 4°49 W where three wharves were visited. Then, N'zianouan where one wharf was visited is located between 6°00 N and 4°49 W and the last, Singrobo located at 6°05 N and 4°55 W present also one wharf.

### Data collection

As part of this work, a daily monitoring of fish marketing activities and a repeat-pass survey of fish sellers and their marketing technique in selected localities for this study were performed. The survey was conducted from July 2013 to June 2014 and took into account all categories of fish sellers. Previously, a preliminary survey was conducted in Tiassalé, Singrobo and N'zianouan from 4 to 11 June, 2013. This survey allowed us to conduct an initial

survey of fish sellers. The stations investigated were selected based on the existence of a commercial fish, their accessibility in all seasons and the density of their population. Subsequently, a questionnaire was administered to each fish wholesaler for the following information: name, nationality, sex, date of birth, educational level, main activity, alternative activities, origin and destination of the fish, transport technique used, conservation made and fixing of the product price. They also have direct field observations to verify the information gathered from the actors. The criteria for classification of fish sellers, based on the time devoted to the sale, the distribution of fish traders by age are based on those of Vanga (2004) and Tah et al. (2009). The distribution of fish traders by level of study is done according to Boguhé et al. (2011). Excel 2003 software was used for the various data processing operations.

## RESULTS

### Population of fish sellers

The sample of our study has identified 65 fish sellers. This group is formed mainly of women (91%) and few men (9%). This is about 08 wholesale merchants, 08 intermediate and 49 retailers. These are fish wholesalers distributed between 21 to Tiassalé (32%), 29 N'Zianouan (45%) and 15 to Singrobo (23%). Wholesalers buy fish in the camps and villages, Bandama River shore, transporting it to sell wholesale to intermediaries. Intermediate sell the fish to retailers who practice the different markets of the region.

### Nationality and ethnicity

Fish sellers identified during this study are of various nationalities with different ethnic proportions (Table 1). The Ivorians represent 65% of all fish sellers of the lower Bandama River. Foreigners represent 35% of fish wholesalers in the study area. Foreigners were shared among Malians and Guineans (40% each). Fishermen from Burkina Faso are 16% and Senegalese are 4%. The Ivorian population is dominated by the Baoule with 38% of this community. The foreign population is dominated by Bozo who represent 39% of this workforce.

### Level of study

Figure 2 shows the distribution of fish sellers depending on the level of instruction. Some were educated (32%) and others were illiterate (68%). The non-schooling person include 50% of Ivorians and 50% foreigners. The Ivorians schooling represent 95% of this population against 5% foreigners. The distribution of schooling people according to their nationality and level of education (Figure 3) gives the following information: among Ivorians, 40% have primary education, 35% secondary and 25% were in university. On foreign traders, the only educated has the secondary level.

### Age slice

Figure 4 shows the distribution of fish sellers identified in the study area based on age. The analysis of our results shows that the sale of fish is ensured mostly by persons whose age is less than 30 years (42%) and between 30 and 45 years (40%). Persons with more than 45 years represent 18% of this workforce. Persons under 30 years were divided between Ivorians (59%) and foreigners (41%). The age slice between 30 and 45 years includes 65% of Ivorians and 35% foreigners. The fish sellers over 45 years old include 75% of Ivorians and 25% foreigners.

### Categories of fish sellers

On the lower reaches of the Bandama River, the 65 fish sellers identified include professional (60) as 92% and occasional fish sellers (5) as 8% (Figure 5). Professional fish sellers consist mainly of Ivorians (62%) and 38% foreigners. Occasional fish sellers are only Ivorians. This group of sellers includes students (8%), which sell only during holidays and sometimes in the absence of the mother. Women whose principal activity is the sale of food are also part of the latter group.

### Fish processing

Smoking is the only transformation technique observed in the places visited. It is performed exclusively by women. The smoking may last up to three days depending on the species, size and target market. This is a technique that cooked and partially dried fish. Traditional kilns made of clay and resembling chicken coops (Figure 6) whose heights vary between 80 and 100 cm are used for this purpose. It also counts metal drums (Figures 7 and 8), which the bottom third was cut to allow the supply to the fireplace. Heights barrels were distinguished between 53 and 89 cm. Fish is disposed at the top of the barrel on a metal grid placed over the fireplace supplied with firewood. The fish were returned every 15 minutes. At the end of smoking, the fish were installed on other barrels for leave to drain the fat from cooking. At the end of smoking, the fish were installed on other barrels for leave to drain the fat from cooking. Fish wholesalers use between 500 and 1000 CFA of wood per day for this activity. For 78% of women, smoked fish production is voluntary while 22% do so only for the conservation of the product or on order.

### Market organization

At Tiassalé, fish is sale fresh. The main market of modern construction features stalls in concrete plank. Completely covered, it also has a cold room for the conservation of the fish. It also has the secondary markets, the sale is

**Table 1.** Distribution of fish sellers by ethnicity and nationality at Tiassalé, N'Zianouan and Singrobo on the lower Bandama River from July 2013 to June 2014.

Localities Nationalities/Ethnics	Tiassalé		N'Zianouan		Singrobo		Total per ethnic and nationality	
	Number	%	Number	%	Number	%	Number	%
<b>Ivoriens</b>								
Baoulé	1	4.76	7	24.14	8	53.33	16	24.62
Maouka	1	4.76	1	3.45	0	0.00	2	3.08
Wobé	0	0.00	1	3.45	0	0.00	1	1.54
Bété	1	4.76	1	3.45	0	0.00	2	3.08
Agni	1	4.76	0	0.00	0	0.00	1	1.54
Malinké	3	14.29	3	10.34	2	13.33	8	12.30
Sénoufo	4	19.05	0	0.00	0	0.00	4	6.15
Gouro	2	9.52	0	0.00	0	0.00	2	3.08
Dida	0	0.00	2	6.89	0	0.00	2	3.08
Abron	0	0.00	1	3.45	0	0.00	1	1.54
Avikam	0	0.00	1	3.45	0	0.00	1	1.54
Attié	0	0.00	0	0.00	1	6.67	1	1.54
Abbey	0	0.00	0	0.00	1	6.67	1	1.54
Total of Ivoriens	13	61.90	17	58.62	12	80	42	64.62
<b>Maliens</b>								
Bozo	2	9.52	4	13.79	3	20	9	13.84
Total of Maliens	2	9.52	4	13.79	3	20	9	13.84
<b>Burkinabés</b>								
Mossi	0	0.00	3	10.34	0	0.00	3	4.61
Dagari	0	0.00	1	3.45	0	0.00	1	1.54
Total of Burkinabés	0	0.00	4	13.79	0	0.00	4	6.15
<b>Sénégalèse</b>								
Peul	0	0.00	1	3.45	0	0.00	1	1.54
Total of Sénégalèse	0	0.00	1	3.45	0	0.00	1	1.54
<b>Guineans</b>								
Koniaka	4	19.05	1	3.45	0	0.00	5	7.69
Gbressè	2	9.52	2	6.89	0	0.00	4	6.15
Total of Guineans	6	28.57	3	10.34	0	0.00	9	13.84
Total per localitie	21	32.31	29	44.61	15	23.08	65	100

made on bags, tarps or in bowls. The sale of fish at N'Zianouan is done on the roadside under parasols without real hangars. The sale is usually made when car drivers passed by. The fish is smoked at home before being conveyed to the market. There are also secondary markets. Fresh fish is sold usually at the home of fish seller and occupies 9% of men. At Singrobo, sheds are built roadside to serve market. It was under these sheds the fish is smoked and sold. No cold room were observed at these places and N'Zianouan and Singrobo. However, some fish sellers have refrigerator for storage of fresh fish. Different markets are accessible by roads of variable quality. The main road linking Tiassalé to N'zianouan and

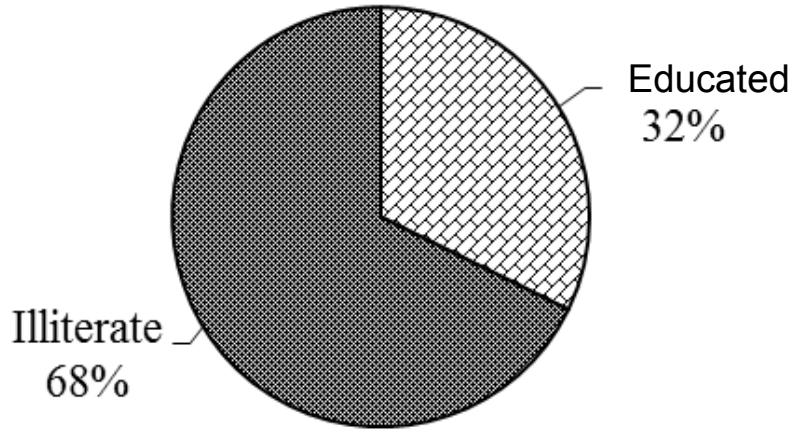
Singrobo and other cities is paved. The internal pathways that connect these three areas to villages and camps are not paved and impassable during the rainy season.

### Marketing circuits

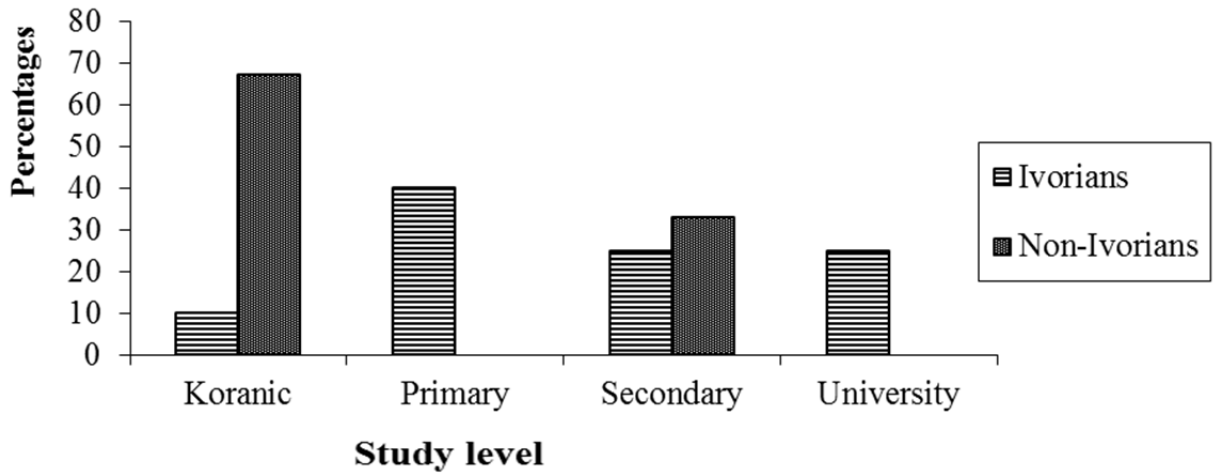
Two circuits were noted on the lower Bandama River (Figure 9).

### Short circuit

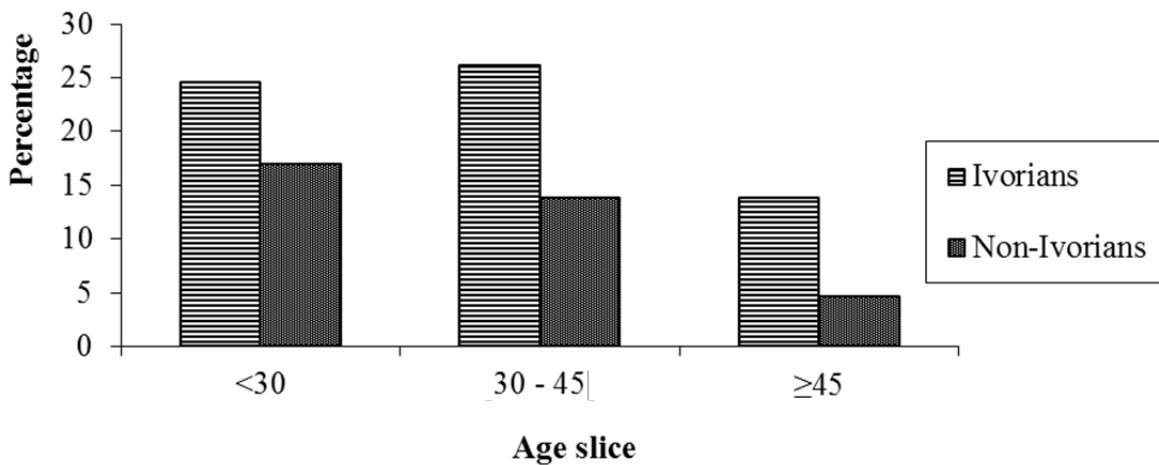
In the short circuit, the fish is offered directly to



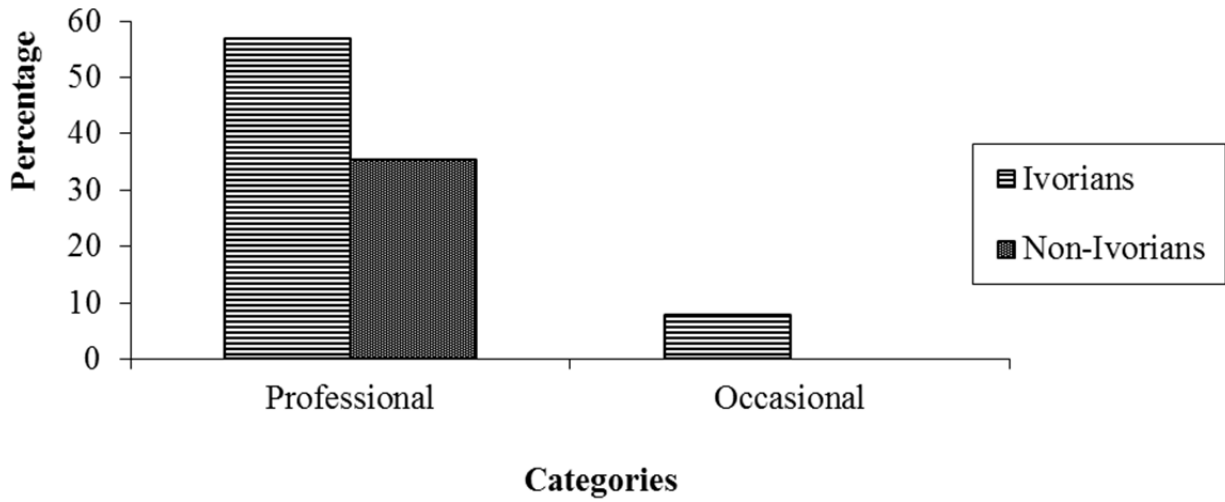
**Figure 2.** Percentages of fish sellers by level of study on the lower Bandama River from July 2013 to June 2014.



**Figure 3.** Distribution of fish sellers educated by educational level on the lower Bandama River from July 2013 to June 2014.



**Figure 4.** Distribution of fish wholesalers by age slice on the lower Bandama River from July 2013 to June 2014.



**Figure 5.** Distribution of fish wholesalers by professional categories on the lower Bandama River from July 2013 to June 2014.



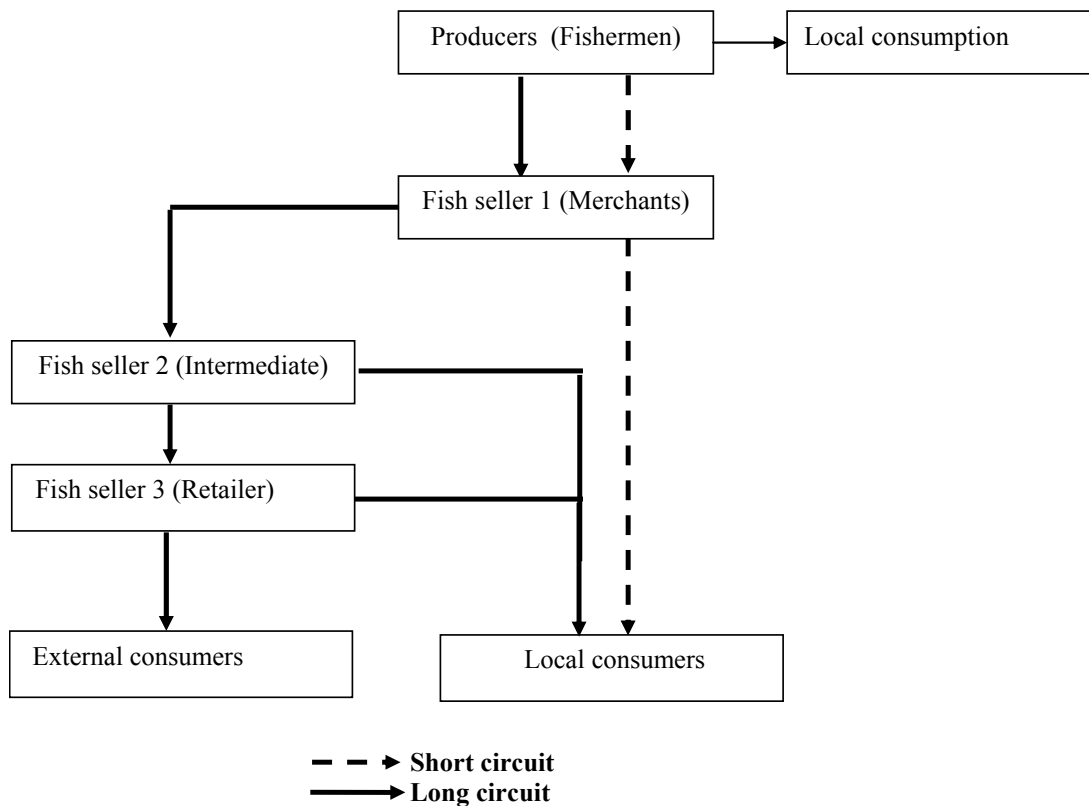
**Figure 6.** Traditional smokehouse of fish (85 cm) at N'Zianouan.



**Figure 7.** Metal barrel (53 cm) used for smoking fish at Singrobo.



**Figure 8.** Metal barrel (89 cm) used for smoking fish at Singrobo.



**Figure 9.** Different fish marketing circuits on the lower Bandama River.

households by the wives of fishermen and other resellers. The fisherman puts the total catch to his wife or to the wife of another fisherman. Only unmarried sell their own products to customers. The woman, separates fish and shrimp, washed and made two parts. The smallest part for the kitchen and the biggest is for sale. Often, a portion is given to relatives. The fisherman gives indicative prices

but, it is the woman who negotiates the sale price of the fish. In some families, women are allowed to sell smaller quantity of fish for their personal expenses. Once in the hands of retailers, the fish is sold on local markets or walked to the auction in the village. The unsold are stored in refrigerator. Some will be smoked and the other sold to the household expenses.

### Long circuit

In this type of circuit, the fish marketed in the sub-prefectures and neighboring cities passes through at least two intermediate from the fishermen to consumers. The first fish seller, in the village or in the camps buy fish. Intermediate traders put the fish in bags they file in a locker. After long distances on foot, bicycle, motorbike or car, they come to sell their goods to distant markets. Once there, fish sellers sell themselves fully to the consumers of these places or book to dealers who will sell it. This second fish seller, usually a woman sells fish in detail as to local or external users and external fish sellers. Some fishermen themselves will sometimes sell their fish to customers sellers and retailers based in cities or nearby villages. The fish is sold fresh and exclusively for all species.

### Destination of fish

The fish caught in the study area can be found on various near and distant markets. The fish supplied to Tiassalé market comes from the surrounding villages and camps (Taboutien, Broukro, Sogrobo, Akakro, Penansou, and N'Godjokro). From Tiassalé, fish are sent on more distant markets such as Abidjan, Divo and its surroundings. At Singrobo, fish is sold on the local market and in other markets including the most privileged are those of N'zianouan, Toumodi and Yamoussoukro. Markets Pacobo and Arenou Aouakro I and II and are also served. Fishmongers of N'zianouan sell their products in the markets of N'zianouan, Singrobo and Tiassalé. These fish come from M'Brimbo and camps including Abafcao. Some practice the Abidjan markets but in rare way. Fish are sold in two forms: fresh or smoked. The fresh product concern all species. Its marketing and distribution begins in the catch areas. Smoked fish are marketed primarily in the areas of processing before being exported.

### Fish prices in different markets

Pricing in different markets depends on the relationships between sellers and buyers. The fixed price also depends on the taste of fish, the nature of the product (fresh or smoked), the quantity purchased, the fishing season and the quantities produced by the fishermen. The most sold fish are the genera *Synodontis*, *Chrysichthys*, *Labeo* and *Distichodus*. The genera *Synodontis* is sold at 800 \*FCFA/kg, while the *Chrysichthys* kilogram costs 635 FCFA. However, *Distichodus* and *Labeo* genera are sold at 1650 CFA francs/kg. But usually women sell the product by rope. A rope is made up of several species and the prices vary between 1200 and 2500 FCFA depending on the size of individuals and species that compose it. Smaller individuals are sold in lots of 200 to

500 FCFA. Only the species *Lates niloticus* (commonly called captain) is actually sold per kg (1700 to 1900 FCFA/kg). Smoked fish are sold by lot and the price of the heap varies from 2000 to 5000 FCFA. The highest prices are observed at Singrobo.

### DISCUSSION

Marketing of fish is mainly ensured by the Baoule ethnic national actors to N'zianouan and Singrobo unlike Tiassalé where it is dominated by the Senoufo. This shows that there are other Ivorians outside the Aizi people that have commercial fishing tradition product (Diaby, 2010). At Tiassalé and N'zianouan, fish marketing is mainly carried out by young people certainly that street vending and races committed to stopping cars at N'zianouan requires a lot of energy as the struggle to fish landing sites to Tassalé. Unlike at Singrobo, older people certainly enjoying the trust of fishermen of receiving the fish at home and would rather sell sitting by smoking without fighting. Wholesalers are distinguished by their various functions: purchase of fish in the camps and villages, transport to markets, distribution and wholesale. They also perform an important function of finance fishing. Intermediaries often considered secondary wholesalers, receive fish wholesalers and sell it to the retailers who practice the different markets of the region. The fish is sold fresh or smoked. However, unlike the trade of fresh fish where we record the participation of male persons (9.23% fish sellers), smoking is exclusively for women as is the case in lacustrine environment (Anoh, 2007; Koudou, 2012) and lagoon (Bédia, 2015). Kouakou et al. (2013) propose an explanation for this virtual monopoly in Ivory Coast. According to this author, originally, smoking was therefore treated as a female domestic work but being paid. A fisherman was therefore required to give all of his catch to his wife, who was smoking and the touching part of the income of the sale. This fisherman's wife relationship underlined by this author is consistent with our observations in all places visited. However, it does not change for fresh produce. The smoking follows two objectives: either to the conservation of the fish or on order. Such a case was mentioned by Koudou (2012) in Lake Taabo and Gsegner (2007) in the region of Bamako, Mali. Smoking techniques are those described by Koudou (2012) on Lake Taabo and Bédia (2015) on the lagoon Aghien-Potou. The majority of women smoke the fish voluntarily certainly the higher prices of the smoked product guarantee them a more substantial profit. The sale of fish in the study area is unremarkable everyday unlike in lacustrine (Vanga, 2001; Koudou, 2012) and lagoon environment (Bédia, 2015) where there are days weekly markets. On the transport and storage of the products of local fisheries, we have to emphasize on the informality of this activity. For though handling highly perishable



products are especially fresh fish and unviscerated, non-use of ice and refrigerated vehicle by the actors in distribution channels, do not always guarantee good quality product in markets. As retailers work on the floor just in canvas bags. This situation was mentioned in the Manantali lake by Kantoussan (2007). According to this author, the fish sales activity on this lake is hit by a basic infrastructure problem for conservation and marketing of fresh produce. Nevertheless, asphaltting the main roads promote the sale of products in large quantities on the markets of the cities in contrast to villages difficult to reach. Another reason for this abundance in urban markets is the high credit worthiness of these markets as noted by Abdou (2014) on the urban community of Niamey. Nevertheless, the production areas (villages and camps) daily have a significant animal protein source, which shows that in rural areas, fish consumption also remains largely developed (Ahmat, 2010). The study of distribution channels identified two types of interconnected circuits each with their own business strategies (various actors). This stratification is widespread in West Africa and this makes the distribution of fresh fish from the artisanal fishery complicated (Abdou, 2014). For variety of distribution channels and random fixing of selling prices, the absence of sales per kilogram also reflects the informality and lack of organization of the marketing of fish in different markets. And this informality justify the absence of figures on the quantities produced, self-consumed, sold or offered for a proper assessment of this business. Moreover, the work of Ahmat (2010) on Lake Tchad; Abdou (2014) in the urban community of Niger; Niang (2009) in Senegal; and Toily (2009) in the area of Abidjan, Agboville and Aboisso in Ivory Coast have shown that this state of affairs should instead encourage the authority in charge of fisheries to organize awareness campaigns on the importance of this sector in the national economy, because the very high rate of illiterate working in this sector is not an advantage for its development.

## Conclusion

The study identified the different actors of fish marketing in the localities of Tiassalé, N'zianouan and Singrobo, on the lower reaches of the Bandama river. This trade is practiced by both genders. These are the Ivorian Baoule ethnic group who have done it mainly from the sale of fish at Singrobo and N'Zianouan. In the other way, to Tiassalé, are Sénoufo, other Ivorian ethnic group that dominate this business. The fish trade is dominated by people whose age is below 30 years at Tiassalé and N'Zianouan and individuals whose age is between 30 and 45 years at Singrobo. The actors, for the most part illiterate, sell the fish fresh but also in smoke form (only women). Sales techniques employed by these actors are the same whatever the locality and define two types of

circuits: short circuit at the intermediate and long circuit with at least one intermediate. The transport of the product is made by walking, cycling, motorcycle or car on mostly unpaved lanes with no real means of conservation. The fixing of sales prices is random and varies from one to another fish wholesaler showing the informal nature of this sector. Considering the enormous economic interest of the fish in this region, the organization of this branch of fishing would be necessary for the well being of all shareholders.

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## CONFLICT OF INTEREST

The authors have not declared any conflict of interest

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