ARTISANAL FISH FARMING AND YOUTH EMPLOYABILITY IN CÔTE D'IVOIRE

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ABSTRACT

Analysis of youth employability on the labor market in Côte d'Ivoire is a very complex phenomenon because it is influenced by the diversity factors that determine its evolution. The youth employability is a challenge for the national and international community. It is about the problem of efficient use of human resources for the construction of sustainable development. This study highlights artisanal fish farming as a sector that leads to decent youth employment in Côte d'Ivoire. The results revealed that more than half of the surveyed lands were inherited (54.63%). These farms (81.82%) have regular access to water, which facilitates the implementation of fish farming activities. About 69.49% of farms have their source of water coming from the groundwater. Small scale farms are the most dominant (45.57%). In terms of access to inputs, 63.21% of farms produce their fry and 64.08% make their own food. The study shows that fish farming is an important development sector and therefore constitute an interesting alternative to youth employability in Côte d'Ivoire.

Keywords: Employability, young people, Small-scale fish farming, Côte d'Ivoire

1. INTRODUCTION

Employability is the ability to evolve autonomously within the labor market in order to achieve, in a sustainable way, through employment, the potential we have in ourselves. Employability depends on the knowledge, the skills and the behaviors we have, the way we use them and we present them to the employer (Finot, 2000). According to the International Labor Organization (ILO), employability is "the ability of everyone to find and keep a job to progress at work and to adapt to change throughout their working life" (Finot, 2012). The issue of the youth employability in Côte d'Ivoire remains a major problem insofar as it is primarily concerned with the conditions of entry into working life of the new generations.

For decades, the Ivorian State has been working through various measures and programs to remedy this situation. The arrangements defined since 2010, in particular the

National Development Plan (PND), the employment assistance program, the special job creation program, the professional retraining have targeted young people whose unemployment rate in 2013 was 9.6% for 14-24 year olds and 5.9% for 25-35 year olds (INS, 2013). According to this national survey of the NSI on the situation of employment and child labor, young people make nearly ¾ of the unemployed, who number 426,225. Despite the various efforts made by the Ivorian State, access to youth employment remains a concern. It therefore seems necessary to continue thinking about the employability of young people in order to reduce unemployment and contribute to the reduction of poverty, hunger and contribute to sustainable development. In view of all the significant potential of the country's various economic sectors (agriculture, trade, tourism, NICT, crafts), which constitute potential or existing job niches, this study will attempt to highlight a sector that is a source of employment: fish farming, more specifically artisanal.

Artisanal fish farming is a small commercial production, which is mainly developed in peri-urban areas. It provides the best environment for input supply and fish marketing. It is an income activity involving the acquisition of inputs in fixed quantities and the marketing of part or all of the fish production. This activity is carried out in small area ponds, which are usually built manually and use vernacular methods.

2. METHODOLOGY

To carry out this study, several techniques were combined. These are mainly documentary research and field investigation. The documentation was marked by visits to libraries, documentation centres, research centres and via the Internet in order to consult documents related to the subject under discussion. The field study consisted of visiting farms in Abidjan districts and lagoons, both active and inactive. A total of 117 farms were subjected to a questionnaire in order to learn more about the characteristics of this agricultural activity, fish farming. The data obtained were processed using the "EXCEL" and "SPSS" software. Figure 1 shows the study area and the locations surveyed.

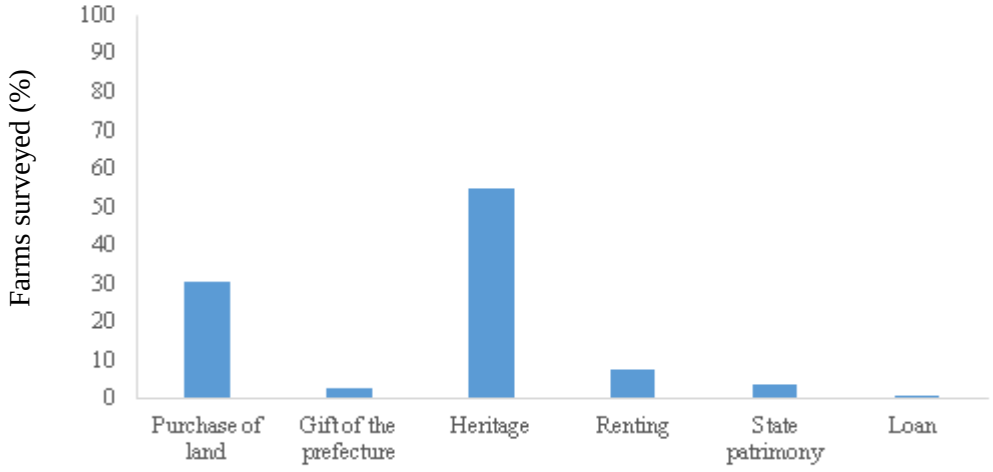
Figure 1. Location of the Study Area in Côte d'Ivoire (CNTIG Administrative Map - 2011)

3. RESULTS

3.1. Requirements for a fish farming activity

3.1.1. Access to ground

The ground access mode in Côte d'Ivoire has been in place since the colonial period. It is a process of obtaining ground with the agreement of the grassroots communities. Figure 2 shows the proportions of the different ground access modes of the farms surveyed. The predominant mode of access for all active farms was inheritance with more than half (54.63%). Next came ground acquired by purchase, with a representation of 30.56% of all farms studied. Finally, the other modes of access, namely gift, renting, State patrimony and loans, represented 2.78, 7.41, 3.70 and 0.93% of farms respectively. The figure shows that the dominant mode of access is inheritance. This shows that the ground is a family good that is passed from parents to children. However, it can be acquired by purchase, renting or loan.



Ground access modes

Figure 2. Different Ways of Accessing Farms Ground

3.1.2. Access to Water in the Parcels Visited

This research shows that one of the most important factors in the exercise of a fish farming activity is the availability and quality of the water source. No fish farming can be done in the regular absence of good quality water. This situation would lead to enormous mortality and therefore to a loss of production. Figure 3 shows the distribution of farms according to their accessibility to water for fish farming. Access to water was not an obstacle for most producers, although 18.18% of the farms surveyed indicated that they have difficulty accessing water during major droughts. Very often on these farms, fish farmers build dam ponds or very large dams to store water before dry periods. This initiative allows them to carry out their breeding throughout the year.

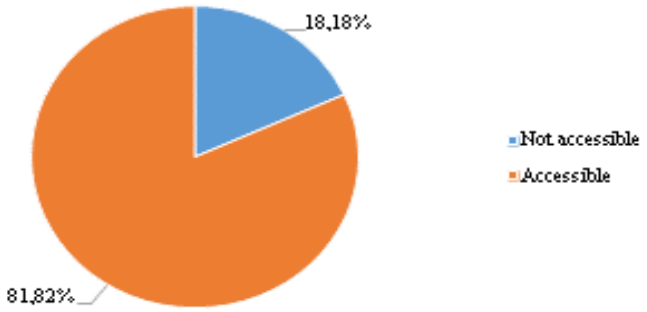


Figure 3. Distribution of Farms according to Access to Water

3.1.3. Origin of Water on Farms

The water used had various origins (Figure 4) with however a greater frequency coming from the groundwater table (69.49%) but also sources or streams (10.17%) and rainwater (13.56%). Lagoons were often used for cage farming at the frequency of 6.78% of the farms visited. The water supply to fish farms was made for the majority of farms surveyed by the groundwater table. This could be explained by the geographical location of the study area. Indeed, the districts of Abidjan and the Lagoons are bordered by the Gulf of Guinea, there are also large bodies of water such as the Ebrié Lagoon for the Abidjan regions, Large Bridges and the Agneby and Bandama rivers for the Agneby-Tiassa and Mé regions. This situation explains the results of farm distribution based on access to water.

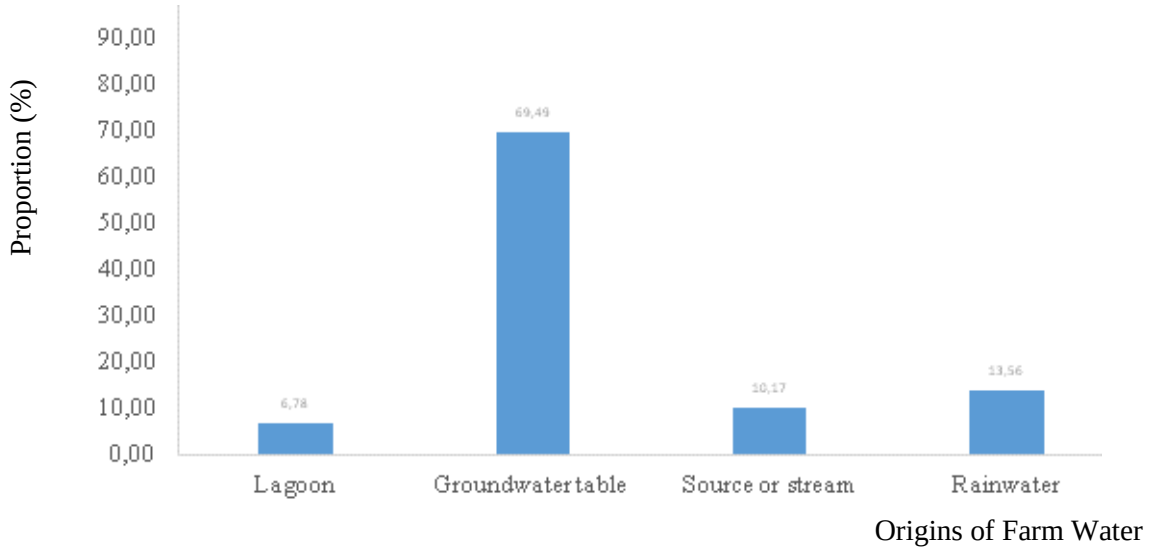


Figure 4: Different Origins of Farm Water

3.1.4. Area of farms

Throughout this survey, a multitude of surface areas exploited by fish farming were encountered, ranging from the smallest to the largest, in both soil and lagoon. The smallest area was found in the Agneby-Tiassa region, estimated at 500 m². The largest, estimated at 80,000 m², is located in both the Mé and Agneby-Tiassa regions. Given the diversity of these surfaces, we decided to group them together in intervals.

The figure 5 shows the distribution of active farms according to the different areas of production. Indeed, not all farms have the same capacities in terms of exploitation areas. In this study, farms were grouped into four groups. Farms with an area between 0.1 and 0.5 ha are the most numerous with a frequency of 45.57%, followed by those with an area of 0.51 to 25 ha (39.24%), farms with 25.1 to 50 ha accounted for only 11.39% and those with over 50.1 ha accounted for 3.8%.

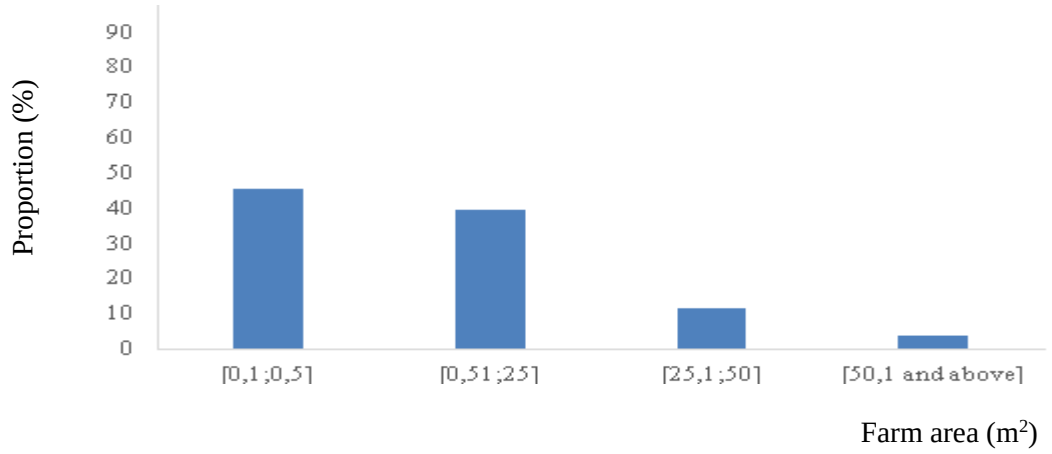


Figure 5. Distribution of Active Farms according to their Average Areas

3.1.5. Accessibility to the Fry

One of the most important elements in the practice of fish farming is the possession of fry. Without fry, a fish farming activity cannot be carried out. There are several practices for obtaining a fry, either through reproduction, purchase or capture. The gift, on the other hand, is a gift that is made out of affinity, the fry offered can come from a reproduction or a purchase of the donor. Reproduction will consist in the loading of genitors who, after a specific period of time, will give birth to many fry. This practice can be done in a traditional or modern way depending on the capacity of the available structures. For purchase, fry are available on farms but also in specialized fry centers set up by the State. Some farms, due to overproduction, sell the surplus of their production to state structures; their role is to produce fry regularly in order to popularize the activity. Seed availability in agriculture in general and in fish farming in particular is often seen as a constraint on production. The distribution of producers according to the modes of access to the fry is presented in Figure 6. There were different ways of acquiring fry by the fish farms:

- Production (63.21%): it characterizes the majority of producers. Indeed, more than half of the fish farmers produce their own fry. This own acquisition is made by the method of breeding species reared either by hand in ponds or by much more modern methods (hatcheries). These producers acquire the sires either by purchase or by selection from their previous generation;

- Purchase (31.13%): some fish farmers by lack of infrastructure or by choice of production prefer to buy fry. In Côte d'Ivoire, there are fish farming extension centers whose role is to produce and disseminate farmed species, with the aim of facilitating and regularizing their acquisition. However, these structures are very often unable to provide fry, due to low production. Farmers will therefore move to other neighboring farms. There are no standards for the sale of fry, fry are sold almost anywhere on farms depending on availability. Most fish farmers who buy fingerlings prefer to take them on neighboring farms, facilitating transport and reducing costs, but also the mortality rate;

- Capture (2.83%): this involves capturing fry in the surrounding rivers, lakes or streams. Indeed, some producers fish in natural waters to catch fry of several species, which they will then use for grow-out;

- Gift (2.83%): these fish farmers take their fry for free from friends or relatives.

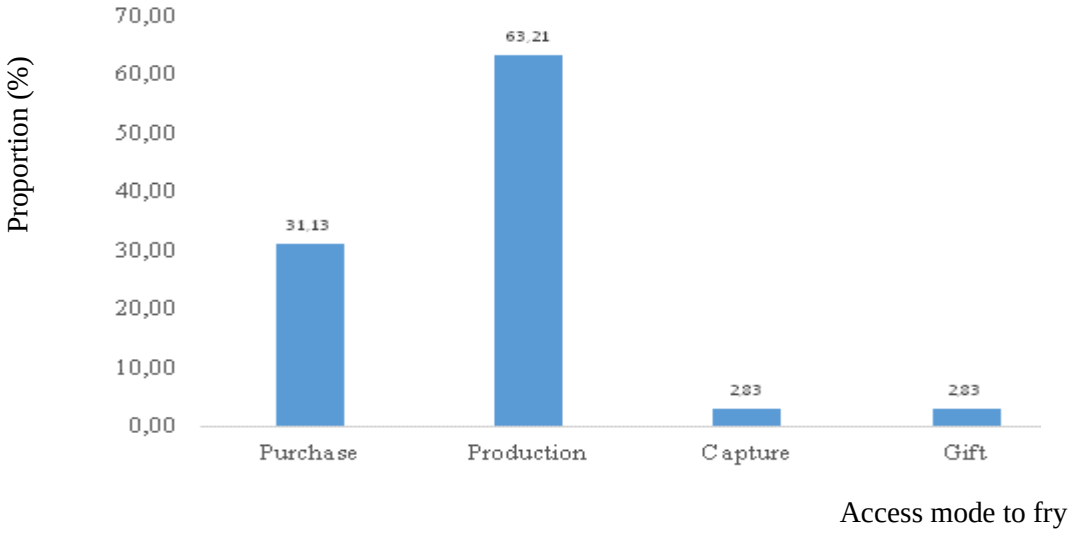
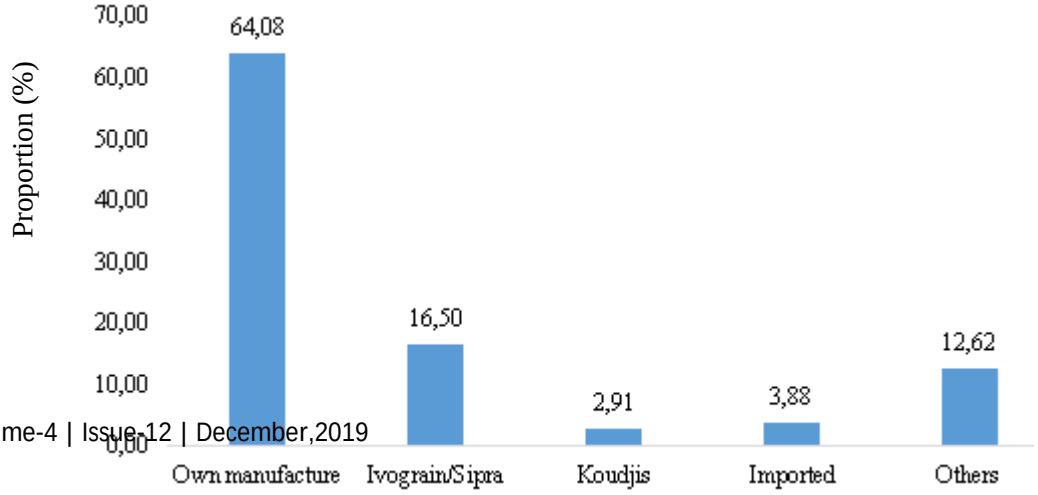


Figure 6. Distribution of farms according to the different modes of access to the fry

3.1.6. Accessibility to food

The second most important element in the exercise of fish production remains the food. Indeed, like any living thing, the fry needs to feed itself for its survival and growth. The fish according to the objective and financial means of the producer are fed with a type of feed. All the fish farmers surveyed (100%) use a feed intake, however there are different modes of access. It can come directly from the farm that is to say that its manufacture is done on the spot using raw materials and other elements. There are also local food production structures, suppliers of imported food. As a result, some structures will even import their food from the manufacturing unit.

Figure 7 shows the different modes of access to the food. Several methods exist to stock food. The vast majority of fish farmers surveyed make their own food (64.08%). Another group making purchases is from either Ivograin or Sipra (16.50%) or Kudjis (2.91%), or by import (3.88%) or from other feed suppliers (12.62%) that are the CRO and the FACI.



Access mode to food

Figure 7. Distribution of active farms according to different access modes of the food

3.2. Success Factor of Fish Farming Activity in Côte d'Ivoire

The aquaculture sector is a promising field of employment for the Ivorian population, particularly for young people. It is therefore incumbent on one to take an interest in both the various factors that contribute to the success of the activity.

3.2.1. Accessibility to Ground

The availability and accessibility of ground is the essential condition for any agricultural and therefore fish farming activity. The Ivorian ground resources exploited by fish farming activities remain varied and important.

In the continental domain, Côte d'Ivoire has many lowlands, hydro-agricultural and agro-pastoral reservoirs, and also lake areas that can be developed for the activity. At the lagoon level, the potential is estimated at 220 000 ha distributed as follows: 120 000 ha for lagoons and 100 000 ha for marshes (FAO, 2016).

As for access to ground, the most common is acquisition by inheritance. Indeed, fish farming is most often practiced by the indigenous people of a region, which makes it possible to minimize land conflicts.

3.2.2. Ecological Potentialities

Access to land alone is not enough for the success of a fish farming activity. However, the ecological criteria of the soil are of great importance. The nature of the soil, the soil parameters (acidity, porosity, texture) influence both the choice of soil and the species raised.

Côte d'Ivoire is a favorable environment for the practice of fish farming, both in terms of the availability and accessibility of these lands and also in terms of its ecological potential. This observation is highlighted by Assi (2009) who presents the different fish farming possibilities offered by continental and lagoon waters for the breeding of tropical and exotic species. The author also shows that Côte d'Ivoire has enormous but increasingly coveted land resources available.

3.2.3. Existence of Market

Fish is the most consumed animal protein in Côte d'Ivoire with an average of 11 to 14 kg/habitant/year (FAO, 2008). Nevertheless, more than 60% of this consumption is met by imports; because the country is in deficit with a production from 50,000 to 60,000 tonnes (CNRA, 2016). According to Anonymous (2014), more than 380,000 tonnes of frozen fish and crustaceans were imported in 2010 by Côte d'Ivoire at a total cost of CFAF 169 billion. There is therefore a wide possibility of positioning the aquaculture sector on the Ivorian fish market.

In Côte d'Ivoire, fish represents 94% of the animal protein intake of more than half of the meals. Our field surveys have shown that the farmed fish market is still in the development phase and far from being saturated. For Koffi (2000), fish farming should take greater advantage of market opportunities by regularly supplying the market (seasonal and off-season). According to Assi (2009), there is an unsaturated Ivorian fish market that is far from negligible even though it is still cluttered with taboos and banned. Fish farming has its own clientele from various socio-professional categories. There are also employees, civil servants, traders, high, medium and low incomes, as well as liberal activities generating income, both formal and informal. For the majority of households, fish and fish are perfectly substitutable (FAO, 2016).

4. DISCUSSION

The land is a very important element in production because it is on its accessibility that all agricultural production necessarily depends. During our study, we encountered several modes of access to ground. The most frequent are by inheritance, purchase or lease. It appears from this study that more than half of the land for fish farming was acquired by inheritance. Indeed, according Toily (2009), it appears that most of the time, the land belongs to the owner of the farm (61.3%). This avoids land conflicts and encourages the producer to invest freely without worrying.

The supply of water to fish farms was made for the majority of the farms surveyed by the groundwater table. This situation explains the results of the distribution of farms according to access to water. Indeed, 81.82% of the farms studied have no problem of accessibility to water throughout the year. Some farms may experience lower flow during periods of increased drought such as those experienced in recent years. But this situation has not been a hindrance to activities. Toily (2009) also noted that 81.35% of the fish farmers in

his study have easy access to water. However, the greatest frequency of water used by farms is represented by springs and streams (34.4%) but also rivers (31.3%). These results showed that fish farming could be carried out on several types of water (rain, creek or spring, groundwater table, lagoon). However, the presence of water is not enough for the site to be conducive to the activity. Depending on the season or the characteristics of the area, lack of water or excess water can be a hindrance to the activity. Some farms that are handicapped by water shortages are obliged to use only part of their plot, while in other farms the abundance of water causes material damage (destruction of dikes) and fish losses.

The study showed that most of the production was done on plots of less than 25.1 ha. The average areas encountered for fish production varied from farm to farm. We have a higher frequency of farms with an area between 1,000 m² and 5,000 m² and between 5100 m² and 25000 m². The largest farm areas were around 80000 m² and were located in the Agnéby-Tiassa region. Toily (2009) also noted that the areas farmed vary from farm to farm. Depending on the work, they vary from 1060 m² to 35 ha with an average of 2 ha. According to Kimou *et al.* (2016), the areas farmed are less than 10 ha for 57.4% of the fish farmers surveyed and between 10 ha and 20 ha for 24.3%. These results show the feasibility of this activity even on small areas.

Most of the farms surveyed produced their own fry using the breeding method. The reproduction and rearing of fish, especially tilapia, took place in ponds prepared for this purpose. An exception is made for large operations that had a hatchery. Only 22.37% buy their fry from fry centers (catfish, machoiron) or from neighboring fish farmers (tilapia). As for catches and gifts (by familiarity), they only concern a very small number of farms. This may be due to the ease of production technique for tilapia fry (Toily, 2009). Unlike the production of catfish and machoiron fry, which requires a certain amount of technical expertise and appropriate infrastructure that is almost non-existent on most farms. For decades, in Côte d'Ivoire, only three state structures had specialized in fry production and species extension. These are the CRO for the catfish and the Jacqueville rearing centre (machoiron) and the Monpoyem-Dabou rearing station (tilapia and machoiron), which are unable to satisfy all requests. Also a problem related to fry is that of strains. Most often farms are confronted with a problem of pure strains due to inbreeding, which is observed during the farming cycle by the slow growth of fish (dwarfism). Our different assertions were mentioned in Toily's (2009) work. According to this author, tilapia reproduction is popularized and almost all fish farmers do it on their farms. However, it is from the second production cycle that fish farmers themselves reproduce tilapia in order to obtain fry. The first fry used in the

first production cycle are obtained by purchase from the rearing facilities. These are the CRO and the Mopoyem rearing station. These State structures specializing in the production of tilapia fry, catfish and machoiron make the fry available to farms. The author also highlights the problem of pure strains of fry. He explains that farmers are trying to produce their fry mainly tilapia to reduce operating expenses. Because there is a cost to supplying fry from the centres. The fry are sold between 60 FCFA and 100 FCFA per unit while the catfish larvae are at 100 FCFA and the machoiron at 150 FCFA. These price contradictions show that over the years, demand has been increasingly higher than supply, leading to an increase in price.

With respect to the food, a predominance of farms producing their own food is evident (Toily, 2009). Indeed, this group of fish farmers uses different inputs that are agricultural by-products (cotton cake, wheat bran, low rice flour, fish powder.....) for the composition of the food. Each fish farm has its own formulation and infrastructure, whether artisanal or industrial. However, none of the farms are able to produce feed in extruded or non-extruded granules. Pellets are floating or non-floating granular feeds, recommended at a certain age or size of the fish. Due to a lack of logistical resources, the food is in mealy form, and therefore not suitable for large fish. This choice of manufacturing is due to the inaccessibility of the feed on the market for both availability and cost. With regard to the acquisition of components, fish farmers very often have an easy time obtaining them both for availability and cost, since Côte d'Ivoire is an agricultural country. Nevertheless, they are dissatisfied with the lower quality of these components, especially in terms of protein content. Also in this category, we met producers who feed their fish food waste, animal excrement (beef dung, poultry faeces), some of them adding unsold bread "Gaudio Bread" and one or two agricultural by-products. As far as manufacturing plants or food distributors are concerned, there are a few. Sipra is a local factory producing and selling specialized feed, especially for poultry, and has recently started manufacturing fish feed without really satisfying demand. As for Koudjis, it is a local distributor of poultry and fish feed imported from different countries. A very small proportion of the fish farmers themselves manage to import their feed regularly from Ghana to the supplier Ranaan Fish Feed. All three structures provide fish farmers with mealy to granular feeds of all grain sizes and various protein levels. Other fish farmers are also turning to other structures such as the FACI or the CRO that sell the mealy feed. In their study, Kimou *et al*. (2016) also noted that 71.1% of fish farmers (214 out of 301 interviewed) use agricultural by-products as food at least one stage of production and 53.7% use only by-products. In this work, 67.83% of these farms are located in rural areas. This exclusive use of by-products is found in all the regions visited, with the exception

of the Grand Bridges, Agneby-Tiassa, Aries and the Autonomous District of Abidjan. It explains this by the high availability of these by-products in rural areas and therefore by their high accessibility in terms of cost. The high use of by-products in the regions could be explained by a different culture, influenced by projects to popularize extensive systems among low-income populations. This may be due to the scarcity of affordable industrial compound feeds throughout the country (FAO, 2008; Brechbühl, 2009).

CONCLUSION

The causes of youth unemployment are often attributed to several factors, including aggregate demand, labor market regulations, employment protection laws, the volume of youth labor force and the employability of youth. Employability refers to the types of skills and attributes that can facilitate labor market entry. It includes the level and quality of an individual's education and formation, but also the relevance of work experience and possession of skills. The relative influence of these factors can vary considerably from one country to another and from one development framework to another. They should be examined in the case of Côte d'Ivoire, taking into account local realities and the results of the analysis of this study.

Indeed, the fish farming sector is strongly connected to the growth sectors of the local economy of the study area. Depending on the value chains of the fish farming sector, existing or potential employment niches are identified both before and after production.

It is therefore clear that one of the solutions to facilitate the employability of young people is their integration into the fish farming industry. In other words, it is a sector in which young people can work or be self-employed. Faced with the scarcity of paid employment, young people will try to integrate into the labor market but also to find income to support themselves. Artisanal fish farming is an activity that is part of a context of economic profitability although it can be practiced with small resources.

The ultimate solution to the problems of unemployment and underemployment of urban youth in Côte d'Ivoire is a revival of the agricultural sector. This would increase the absorption capacity of this sector by creating new businesses and jobs.

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