

Characterization and Analysis of the Socio-Economic Issues of Ziguinchor Urban Livestock in Senegal

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Abstract

Despite its importance in the face of poverty and food insecurity, urban livestock production is still poorly understood and suffers from a lack of consideration in African cities. In this respect, this study aims to contribute to a better knowledge of urban livestock farming in Ziguinchor. To do this, the study relied mainly on surveys of 246 agro-pastoralists and interviews at the level of the State's technical services. Geolocation and surface surveys of the main livestock units were carried out using a GPS. The study shows that this production system is practiced by 61.10% of the agricultural households in the city, while women represent the majority of farmers (62.60%). Ethnically, diolas (44.90%) constitute the dominant group (44.90%). Livestock is composed of 10 animal species distributed in 9 zoological families. Family poultry in the poultry farm is more represented with 46.15% of the breeding units. The Néma Kadior cattle fattening farm (0.5 ha) and the Kandé Sibenck small ruminant livestock farm (1.1 ha) are the most important livestock farming units. The mode of rearing is essentially semi-intensive, characterized by the straying of cattle in search of food or herds to pasture. A farmer earns, on average, 773506 CFA francs a year. 73.10% of this income is used for the purchase of foodstuffs and school fees for children. However, this farm is mainly affected by epizootics, theft and poor feed. The development of this production system, which is a strategic axis of urban development, remains linked to a better control of food, livestock management, adequate prophylaxis against diseases and the development of favorable sites to pig breeding.

Keywords: Urban Livestock; Ziguinchor; Poultry; Income; Epizootics

Introduction

The world's population is growing exponentially. By 2030, it will reach 3 billion people, 95% of whom will be in developing countries [1,2]. This population growth will be most felt in African cities with an annual growth rate (4%) Asian or Latin American cities [1]. Africa's urbanization rate will reach 50% by 2035, or even 60% to 70% by 2050; approximately 1.2 billion urban dwellers (Batel, 2015). Food production is expected to double (Renoux, 2008) and waste and effluent production will increase fourfold in cities [1]. The big question is how all city dwellers will feed themselves in light of food insecurity [3], and the high unemployment rate to which they are already subject (Ndiaye, *et al.* 2010). Agriculture could be a response to the demand of urban populations for food [4] and serve as a lever to build a sustainable living environment in urban areas [5] against food vulnerability and impoverishment in cities in both northern and southern countries [6-8]. Moreover, the counter-performance of rural agriculture and the food deficit further encourage the development of an urban agricultural activity whose main areas are horticulture and livestock [9]. Urban livestock farming is one of those agricultural activities that are developing and supporting thousands of families in southern cities [10]. It contributes up to 44% of the agricultural GDP of West African countries [11].

¹Produit intérieur Brute

In Kampala, Uganda, 70% of the poultry and eggs consumed are the result of years of farming in the town [12]. (Tinker 1995). The study conducted by Ali., *et al.* [13] in Maradi (Niger) showed that 60.9% of urban households and 81.1% of those periurban were engaged in commercial livestock, whose incomes are mainly used to cover social security costs (purchase of food, holiday expenses, ceremonies health costs etc.). In Bobo-Dioulasso, more than 40% of the pig meat consumed comes from urban farming [14]. In Senegal, urban poultry farming in the Dakar region is able to mean 65 - 70% of the national demand for chicken [15]. In the city of Thiès, it generates monthly nand margins (50521 to 72417 FCFA) that are higher than the nationally guaranteed professional minimum wage (36243 FCFA) [16]. Urban breeding also has social and cultural functions in some African cities. In Mali and Burkina Faso, animals are raised in the city for religious holidays, but are also an investment in the event of a financial problem [17].

However, despite being a strategic axis of resilience to poverty and the fight against food vulnerability [10], livestock farming in cities is still unknown, despite the fact that urban green spaces are becoming more and more “animalized” more [9,18]. In Ziguinchor, livestock farming is distinguished by a diversity of animal species and is the city’s main source of meat [5]. Urban gaps and periurban valleys also offer great grazing potential [19]. However, despite its various advantages, urban livestock farming in Ziguinchor is one of the great forgotten of the municipal authorities and the scientific community. There is no master plan for urban development or local development that provides for the prospects to promote urban livestock. It is added that despite the diversity of scientific studies of an agro environmental nature [19-24], few are specifically interested in urban livestock. It is in this context that this study aims to promote a bandter integration of livestock into the urban system of Ziguinchor. It attempts, in a specific way, to analyze the zootechnical characteristics, roles and constraints of breeding in the city of Ziguinchor.

Materials and Methods

This section presents the commune of Ziguinchor and the research methods deployed for the study.

Introducing the study area

The municipality of Ziguinchor, site of the study and administrative capital of the region of the same name, was established in 1888. Located in south-west Senegal, this commune is located between the meridian 16 and 17 degrees and the parallels 12 and 13 degrees. It is organized in 27 wards (ANSD², 2015) [25]. Figure 1 provides an account of its spatial organization, located along the Casamance River and bordered on either side by cultivated flood-watering valleys.

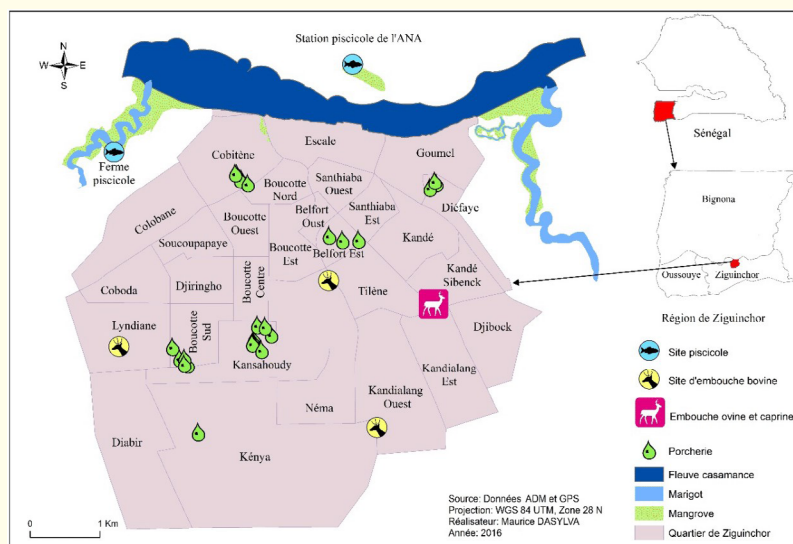


Figure 1: Ziguinchor town location map.

²National Agency for Statistics and Demography

The city of Ziguinchor is characterized by a South Sudan-coastal climate [26]. The average annual rainfall is estimated between 1981 and 2017 at 1310.54 mm. Despite the rainfall variability, Ziguinchor is one of the most watered cities in Senegal. This good rainfall correlated with the extent of the depressions offers this city great potential for the development of plant and animal production.

According to ANSD's population projections [25], the city of Ziguinchor is estimated to have a population of 232217 in 2017. It is also a cosmopolitan city composed of 26% of agricultural households [27] and is mainly populated by diolas (35%) and Mandingos (18%) who practice agricultural activities in urban gaps and periurban valleys.

The choice of sites

The choice of neighbourhoods for the study was based on the non-probabilistic sampling method, based on a priori judgment [28,29]. The choice of this type of sampling is based on several works [8,19,24] and pre-survey missions carried out at the commune level, which provided basic knowledge about the realities of urban agriculture in Ziguinchor. For this purpose, 8 neighbourhoods were chosen, 4 of which were in urban areas (Nema, Boucotte Sud, Boucotte Ouest and Tilène) and 4 others in suburban areas (Kandialang, Lyndiane, Kenya, Djibock).

Data collection

Data collection is based on agro-socioeconomic surveys and mapping of livestock units. A detailed questionnaire was developed, tested and complained with the producers. It focused on four main diagnostic areas: the profile of livestock producers, practices, socio-economic functions and constraints of the urban livestock system in Ziguinchor. The questionnaire was administered to 246 identified producers, due to a minimum of 30 breeders in each of the eight selected neighbourhoods. This responds to the biostatistical law of sample representativeness and the normality of approximations [30]. Due to the lack of statistics and a comprehensive database of urban herders in the city [5,8], data collection relied on door-to-door. The procedure is to identify livestock units in the neighbourhoods and then identify, from near to near, their owner.

Individual semi-structured interviews and group interviews (3 to 5 people) covering the main lines of the above questionnaire were carried out. They targeted mainly local elected officials, district leaders and delegates and the presidents of breeders' associations. They also targeted some resource people from the regional directorates of livestock, urban planning and planning.

Surface lifts and the taking of the geographical coordinates of the main breeding units identified in the neighbourhoods were carried out using a GPS (Garminandrex 20x). Field observations have verified or consolidated information from investigations. The photos, using a 16-megapixel smartphone, provided illustrations of the town's breeding activities.

Data processing and analysis

The map data has been corrected and extracted by MapSource software. They were vectored using Qgis software and the maps were made using ArcGIS 10.2.2 software.

Survey data was processed using Sphinx Plus2 software. It allowed for the performance of uni-varied and multivariate analyses associated with Fisher's comparison tests and Chi²'s independence tests at the alpha meaning threshold (5%). This software has helped to determine the central trends of the various aspects related to urban livestock. Data obtained using the maintenance guide were the subject of a report and cross-analysis of content in accordance with the approach of Duchesne and Haegel [31].

Results

The results of the study describe the profile of livestock producers, the diversity of livestock species, the livestock farming systems and feeding methods and the functions and constraints of urban livestock farming in Ziguinchor.

Socio-demographic profiles of breeders

Livestock farming is one of the main components of urban agriculture practised by 61.1% of agricultural households in Ziguinchor. Living in households composed of an average of 12 people, Ziguinchor’s urban herders are mainly represented by women (62.60%). The average age of these breeders is estimated at 45 years. The youngest is 19 years old and the oldest is 85 years old. Of these, 65.4% are natives of the city of Ziguinchor and 34.6% are displaced from the social crisis that lasted for more than 30 years in Casamance.

The difference in the distribution of breeders according to andhnic groups as well as matrimonial status is highly significant ($p=0.001$). For andhnic groups, diolas (44.90%) and Mandingos (16.80%) are dominant. They are followed by Fulani (11.20%), dangling (10.30%) and mankagnes (8.40%). Minority andhnic groups are manjacks (4.70%), serers (2.80%) and the bainouk (0.90%). Regarding their marital status, the group of married people dominates with 74.80% of cases. Widowers, singles and divorcees are less represented with 12.20%, 11.20% and 1.90% of cases respectively.

Livestock farmers with little or no education dominate the livestock production system in the city of Ziguinchor. In fact, 38.30% of them are not in school and 29.90% have only primary education. Those with intermediate and secondary education represent 27.2%. Only 4.7% have benefited from higher education. From the point of view of the socio-professional situation, the majority of livestock farmers (47.60%) are housekeepers who combine animal production with market gardening. They are followed by those in informal activities such as urban transporters, dressmakers and mechanics, who represent 29% of producers. Traders and civil servants are less represented, with 17.7% and 5.7% of cases respectively

Species diversity and herd structure

The animal production system of the municipality of Ziguinchor is composed of 10 main species (Figure 2) divided into 9 zoological families.

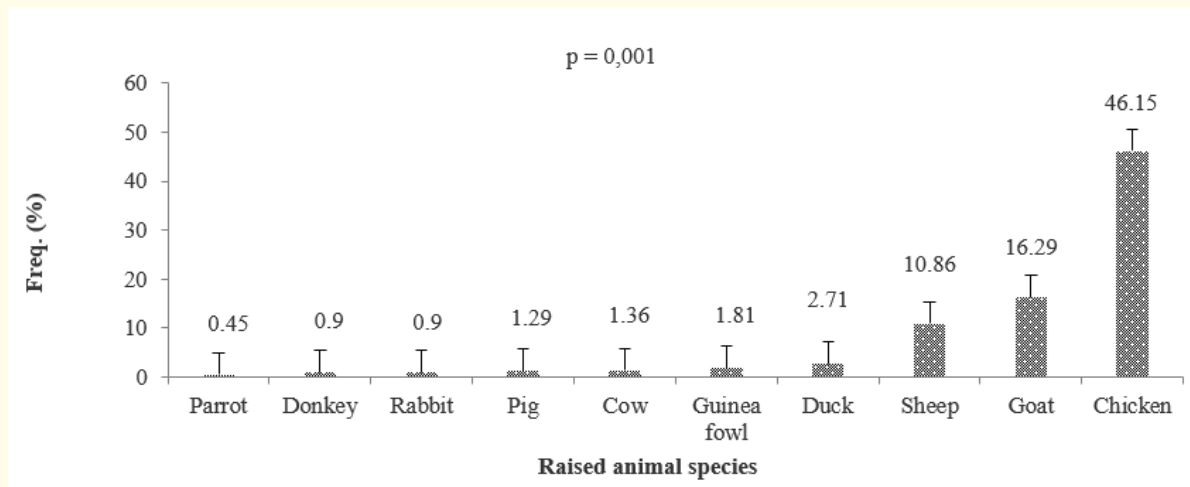


Figure 2: Diversity and frequencies of high animal species.

The small ruminants, belonging to the Caprinae family, are composed of two species: *Capra hircus* L. (goat) and *Ovis aries* L. (sheep). The large ruminants are mainly made up of the cow ndama (*Bos Taurus* L.) of the Bovinae and *Equus asinus* L family. (donkey) of the Equidae family. The omnivores are represented by a single species, *Sus scrofa domesticus* L. (Porc) of the Suidae family. Poultry is made up of three species of different families: *Galus galus* L. (chicken) of the Gallinacae family, *Anas platyrhynchos* L. (Canard) of the Family of Anatidae and *Numida meleagris* L. (pintade) belonging to the Numididae family. The herd is complained by *Oryctolagus cuniculus* L. (rabbit) belonging to the Leporidae family. In addition, the *Poicephalus senegalus* L. (Youyouparrot from Senegal) which belongs to the Psittacidae family. The latter belongs to the decoration or contemplative breeding. In addition to the breeding of domestic animals, there is the fish farming activity that is beginning to take off in the town of Ziguinchor. Figure 3 locates a few breeding units in the commune.

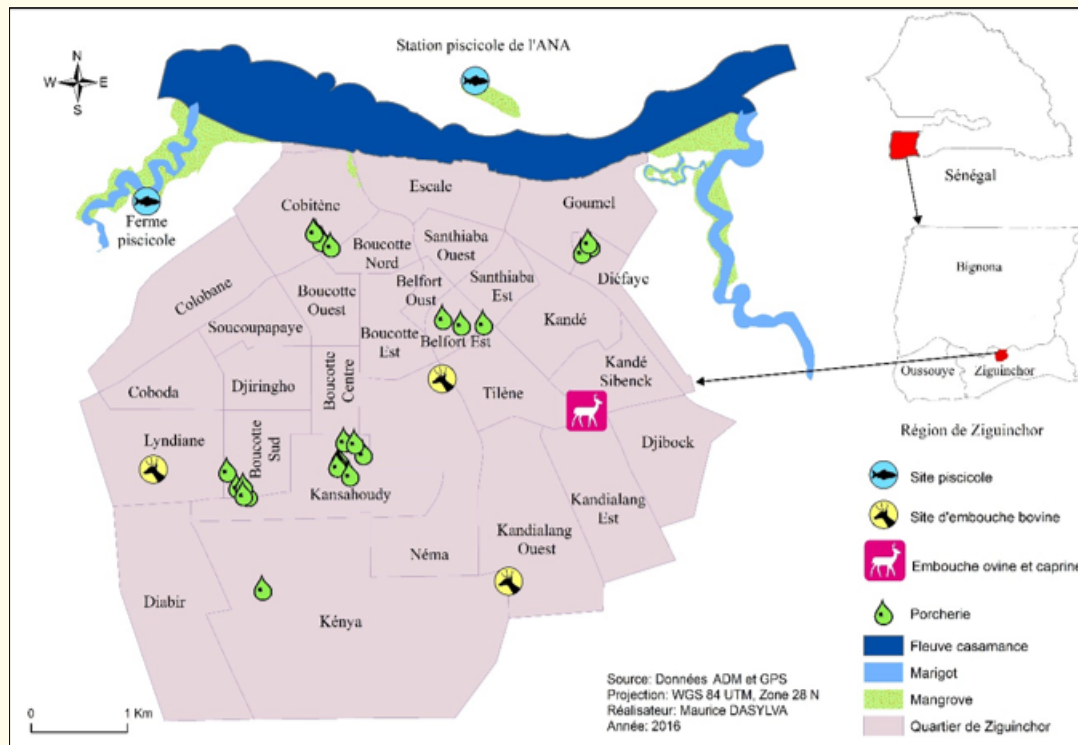


Figure 3: Location map of the main breeding units of the municipality of Ziguinchor.

Family farming is more represented in the commune and is mainly dominated by poultry farming. The number of hens varies on average from 1 to 30 in poultry households. However, broiler poultry farmers can produce up to 750 head per year. Moreover, this activity is emerging more and more in the commune. The presence of a well-equipped brood-laying facility unit (AVIFIA) in the Boucotte East district, the poultry feed manufacturing unit in Boutoute and the cattle feed depot (AVISEN) located in Boucotte Sud is beginning to reduce the problem of rupture of the raw material of the poultry farm in the city of Ziguinchor.

Some poultry farmers have started to practice this activity on the terraces and thus embody the figure of the above-ground production of urban agriculture. Family breeders of goats, sheep and pigs have, on average, 4, 6 and 7 head of cattle respectively and can reach a population of 10 to 20 at best.

The Chi² test shows that there is no significant dependence between the main animal species bred and the sex of breeders (p - 0.332). However, women are much more active in poultry farming as well as in pig farming. They hold 68.80% and 65.60% respectively of the production units of each of these types of breeding. They are also more represented in the breeding of goats with 60% of cases of production units. On the other hand, men are more involved in raising cows and sheep with 59.20% and 66.70% respectively of the production units of each of these types of breeding. Moreover, all the donkeys noted are owned by men. Table 1 is the result of cross-analysis between the main animal species and the producer andhnic group in the city of Ziguinchor.

Table 1: Distribution of major animal species raised by producer andhnicity.

Andhnic groups	% of breeding units of the main animal breeds						
	Cow	Goat	Sheep	Pig	Chicken	Duck	Donkey
Diola		36,7	39,1	53,1	45,2	75	
Mandingue	33,3	23,3	13	-	20,6		
Bainounk		3,3		6,3	1,4		
Manjack	-	-	4,2	9,4	4,1		
Mankagne	-	10		28,1	6,9	25	
Peulh	66,7	20	26,1	-	6,9		
Balante		6,70	8,7	3,1	12,3		
Serere	-	-	4,4		2,7	-	100
Wolof	-	-	4,6	-	-		

(-): indicates the lack of practice of this type of breeding among the corresponding andhnic group (0%).

This table shows that cow rearing is exclusively practised by The People and Mandingos, who own 66.7% and 33.3% of the production units respectively. Duck farming units are exclusive properties of diolas (75%) and mankagnes (25%), while donkey farming is only practiced by the seers. It is important to note, however, that most andhnic groups are interested in raising hens, goats and sheep with, always a predominance of diolas. On the other hand, pig farming is mainly exercised by the dominant andhnic groups in Christianity in Ziguinchor such as diolas, mankagnes, manjacks and bainounks. They hold 53.1%, 28.1%, 9.4% and 6.3% respectively of the production units of this type of breeding.

Those who make livestock a full-time occupation account for 7.5% of producers compared to 92.5% who make it a secondary activity. In this regard, there are two feedlots in the city. The small ruminant area is located in the Kandé Sibenck district and covers an area of 1.10 hectares (Figure 3 and 4). This small ruminant fill-up park polarizes the clientele of all the Lower and Middle Casamance, that of northern Guinea-Bissau and southern Gambia especially during the feast of the “*Tabaski*”⁴. It brings together about 90 breeders organized in family groups or economic interests. About 490 heads of small ruminants per week, or 23520 per year, made up of goats and sheep arrive in this feedlot.

The main herd of cattle feeding in the town of Ziguinchor is located in the district of Tilène Kadior (Figure 3) and covers an area of 0.5 hectares. It has about 56 herders and about 50 workers responsible for transporting the cows to the Boutoute slaughterhouse or the receiving villages. These breeders are also organized into family groups or economic interests like those of small ruminants. About 80 cows arrive in this park every week throughout the year; 3840 head per year.

⁴Programme Alimentaire Mondial Fête musulmane (“Aïd al-Kabîr” en arabe) célébrée 100 jours après le ramadan



Figure 4: Small ruminant splover park in Kandé Sibenck.

Cattle fattened and sold in these cattle and small ruminant sparks are purchased through weekly markands in pastoral and agrosylvopastoral areas of the country. These are precisely Matam, Bakel, Mbirkilane, Sinthiou malème, Dawady, Touba, Dara, Kayar, Linguère etc.

Livestock system and feeding mandhods

Two main breeding systems are practised in the municipality of Ziguinchor. Semi-intensive and intensive breeding, respectively, were noted in 86.8% and 13.2% of cases. Cross-analysis of the various animal species bred and the farming system practiced revealed that all breeders of cows, pigs, guinea fowl, ducks and donkeys practice semi-intensive breeding. On the other hand, rabbits and parrots are exclusively raised intensively. Almost all goat farmers (95. 6%), sheep (92%), pigs (90%) chickens (84.6%) semi-intensive breeding. Intensive hen rearing, practised by 15.5% of poultry farmers, has been exclusively noted among broiler producers.

In the case of the semi-intensive breeding system noted, the animals have a pen, perch, pigsty or park where they are boxed at night. During the day, they are left rambling or led by a shepherd in search of food. They are given food from time to time by the breeder.

In the case of the intensive breeding system, the animals are exclusively stored in a site, fed and cared for by the breeder. In fact, the study identified three animal nutrition practices. The mode of feeding by rambling of livestock and the intake of food by the breeder account for 47.6% and 44% of the cases of citations respectively. Herd stood in pastures account for only 8.4% of citation cases (Figure 5).



Figure 5: Cow and sheep herd grazing in Goumel's urban gaps.

Indeed, cattle grazing have been noted among cattle, goat and sheep farmers; especially among those who practice the mouthpiece. For this purpose, the animals are taken to the gaps of certain neighborhoods in the image of Goumel. However, this practice is noted, in most cases, in periurban valleys. The Other Way (6.2%) to feed livestock is the use of leftover meals locally called “Niamou-mbame” (pork food). This practice helps eliminate bad odors and clean up the city.

Urban livestock functions

Urban livestock farming in Ziguinchor is distinguished by the diversity of its socio-economic and cultural functions. Its products are mainly for sale and/or used for other purposes.

Socioeconomic function

The socio-economic functions of livestock farming are mainly reflected in its ability to contribute to the improvement of the financial incomes of agricultural households. The average annual income of a breeder is estimated at 773506 CFA francs, although that of 98.70% of them does not exceed the 4748750 F CFA. However, these incomes vary relatively depending on the high animal species (Figure 6).

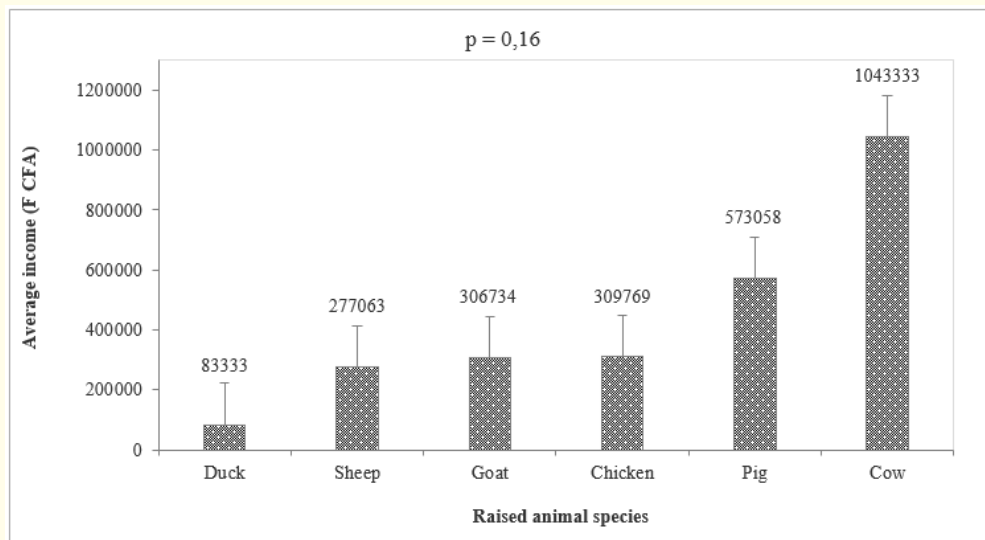


Figure 6: Change in average annual incomes of breeders based on major animal species.

Figure 6 shows that the rearing of ducks, sheep, goats and hens has the lowest average annual income per breeder, which does not exceed 350,000 CFA francs. On the other hand, the raising of pigs and cows, although less represented, has the highest average annual income per breeder.

While family farming has a relatively high average annual income per producer, it is no longer more important for those who work as occupations in the cattle feedstock and small ruminants in the city. The annual population of cattle in Tilène Kadior Park and the small ruminants in Kandé Sibenck Park are estimated at 3840 and 23520 head respectively. It is important to mention, in this regard, the annual turnover derived from the markanding of this cattle in these feedlots. It is estimated at 1,920,000,000 CFA francs at the Tilène Kadior cattle feeding stock and 1,011,360,000 CFA francs at the Level of Kandé Sibenck’s small ruminants. In addition, cow dung is also activity at the Tilène Kadior mouth water (Figure 7).



Figure 7: Animal smoke stored in bags at the Tilène Kadior cattle park.

Indeed, the markand gardeners come to buy the dung to fertilize the soil during the 9 months of the off-season, because of 500 CFA francs per bag of 50 kg. About 60 bags of cow dung per month, or 540 per year, are sold. Annual revenues from this activity are estimated at 270,000 CFA francs.

Livestock incomes play an indispensable role in improving the living conditions of urban farmers' households in Ziguinchor. This study found that 73.10% of income is used for food, children's school fees and clothing needs. The other part of income (26.90%) is intended for household health costs, rent and/or payment of electricity bills.

Other functions

Urban livestock has a recreational function. The breeders who practice it for this reason are little represented in the city. They make up only 17.1% of breeders. These include those who practice the decoration or contemplative breeding of rabbits and parrots.

Urban livestock products are also used for religious purposes, as 52.1% of producers acknowledge. This function results in the use of agricultural production for the realization of traditional or religious ceremonies in the image of sacred rites or family ceremonies (festive, funeral...) for which animals are raised. According to the respondents, this agricultural activity is a way to gand rid of the colossal expenses associated with the celebration of ceremonies.

The use of livestock income for children's schooling makes 84.4% of breeders say that this activity has an educational function. In addition, the interactions of livestock production with plant production have been pointed out, as 96% of farmers have pointed out. These interactions are mainly related to the use of animal manure in the fertilization of farms as well as feeding livestock with agricultural residues respectively in 33.80% and 28.30% of citation cases. Added to this is the reinvestment of livestock income in plant production (20%) and, conversely, those of plant production in livestock (17.90%).

Constraints to livestock development

Despite the various functions of urban breeding, it is important to note that it suffers from several constraints in the city of Ziguinchor. Epidemics that attack goats, poultry and pigs are the most cited (42.4% of cases) among its stresses. This is because the team of livestock workers is small and unequipped; The epizootia in pigs is African swine fever (APP). Its frequency in the commune is linked to the

hygienic conditions of the piggeries that promote the proliferation of the bacillus responsible for this disease. In fact, the pig farmers have pointed out the inadequacy of conserving piggeries in areas for habitat use. This is due to the bad odours resulting from the rotting of pig droppings which causes olfactory nuisances in the city as decried by 83.41% of respondents questioned on this issue. The theft of livestock, which accounts for 34.0% of the quotations, is also one of the major constraints of livestock in the town of Ziguinchor. In some parts of the lyndiane and Kandialang, Nema 2 and Cobitene neighbor hoods, populations have reported a recurrence of this phenomenon. To this end, a producer from the Kenia district and another from Nema 2 reported, respectively, that they had been victims of the theft of 12 pigs and 17 goats at one time.

Conflicts between farmers and markand gardeners or rice farmers also reflect the constraints of livestock farming in the city. The rambling and tooth of livestock on crops are at the heart of these conflicts. This state of fact reveals the difficulty of finding, in the commune, a space used exclusively for grazing; especially during wintering. During this difficult time of year to find peanut straw, herders use only the Goumel district for livestock grazing. This area is characterized by the outcrop of the water table favoring flooding. The presence of many vacant lotlots explains the density of the herbaceous mat favourable to grazing livestock.

Livestock farming is not immune to the problem of land insecurity in the city of Ziguinchor. The cattle feeding fleand has been relocated several times. It once occupied the space of the current sappers camp of the Néma 2 sub-district. Subsequently, it was relocated to the current Nema Kadior Hotel. From there, he was relocated to the Kandé district of Mangou-Kouro before he was currently based in Tilène Kadior. The small ruminant feeding park has also been relocated from the Boucotte East district of Tilène before being currently installed in Kandé Sibenck. This displacement occurred only 16 years apart. In fact, until now, there has been no municipal ordinance definitively classifying the sites occupied by these feedlots in order to secure their location. It seems that they are about to be relocated to the village of Boutoute. Negative interactions between livestock and the city are also the result of the effect of animal rambling on urban traffic (Figure 8).



Figure 8: Livestock rambling in Ziguinchor road network.

Indeed, the animals in ramgation are a constraint for the fluidity of urban traffic, because of the multiple road accidents they cause. Although little perceived by the public, this is decried by road transport actors. It therefore urges that it be taken into account in the city's health risk management master plan.

Discussion

The discussion of the results of the study focuses mainly on the characteristics of the actors and those zootechnical of the breeding system. It also focused on the functions and limiting factors of this system in African cities.

Socio-demographic characteristics of breeders

In Ziguinchor, urban livestock farming is a predominantly female-dominated activity (62.60%). It is like the micro-gardening of aromatic and medicinal plants that is practiced mostly by women (99%) [8]. The average age of the breeders rated 45 years in the town of Ziguinchor is relatively equal to that of the this poultry farmers [16] and that of the pig farmers of N'djamena in Chad [32].

The proportion of out-of-school farmers is higher in the town of Ziguinchor (38.30%) compared to 23% in N'djamena [32] and 35.7% in Niamey, Niger [33]. In this city, livestock players mainly operate in the informal sector, with only 5.7% of civil servants. This reflects the substantial nature of urban livestock farming in Ziguinchor.

In this Senegalese city, poultry farming is mainly carried out by women who own 68.80% of the production units. These statistics are in line with those reported by Ndayisenga [34] in rural areas of the St. Louis region of Senegal. However, they are different from those in Chadian cities [35] and those of Thies [16]. In Ziguinchor, the majority of livestock farming is practised by housewives who own 65.60% of the pig farms. Elsewhere, the majority of pig farmers arandhe town of BoboDioulasso in Burkina Faso [10], N'diamémena [32]. and southern Benin [36]. However, Ossebi [37] pointed to a slightly in favour of men (55%) in the natural Casamance pig industry. However, these authors did not specify the specificities between rural and urban areas. As for sheep farming, it is mainly practised by male householders who own 66.70%of the production units. Moreover, this type of predominance of men in the sheep production of the city of Thies had already been noted [38].

Zootechnical characteristics of farms

Although plant production is the most represented agricultural activity, livestock production is well represented in the urban system of Ziguinchor [5]. This urban breeding is diverse from 10 species distributed in 9 animal families. However, poultry farming predominates in this agricultural sector of the city of Ziguinchor. These include the rearing of farmyard poultry in the houses, mainly with the local breed. In this type of breeding, poultry is raised in backyards, kitchens and terraces, as Noted by Fall., *et al.* [16] in the city of Thies. Moreover, it is the low spatial, food and health nature of this breeding that explains, in part, its adoption by agricultural households in the city of Ziguinchor. However, the advent of the industrial poultry manufacturing and/or markanding units is creating an environment conducive to modern poultry farming in this city. This is characterized by the breeding of broilers, some of which can produce up to 750 head per year, is taking off and risks supplanting the family farm of local chickens in the coming years.

Small-scale family farming in the town of Ziguinchor is characterized by an average number of subjects per breeder of small ruminants and relatively small pigs. Goat, sheep and pig farmers have an average of 4.6 and 7 heads each. Mom Lawal., *et al.* [33] have relatively found the same average size of a herd of small ruminants per breeder in the town of Niamey. While Youssao., *et al.* (2008) counted, on average, 19 pigs per breeder in the towns of Cotonou and Abome-Calavi in Benin.

However, it is important to highlight the practices of diversification of livestock that constitute a strength of this production system in the city of Ziguinchor. In fact, a single producer can practice up to four types of livestock in its production unit. This is much more noted among Christian producers (diolas, manjacks, mankagnes and baleen) who practice, at the same time, the breeding of pigs, goats and sheep and chickens. This allows them to have a large number of animals in their households. Saidani., *et al.* [39] noted the same combination practice of several farms in the mountainous areas of northern Algeria.

The practice of semi-intensive farming (86.8% of producers) is more widespread in the town of Ziguinchor, like those of Cotonou and Abomey-Calavi in Benin (Youssao, *et al.* 2008). In this case, the breeders keep their animals claustration in pens at night and release them in rambling in search of food during the day. Moreover, the mode of feeding of livestock by rambling and the additional food supply by the breeder account for 47.6% and 44% respectively of the cases of citations in the city of Ziguinchor. The complementary food provided to animals in most cases consists of agricultural residues from vegandable production. This underlines, to some extent, the complementary nature between animal and plant production. The raising of pigs, often decried by some city dwellers, promotes, to some extent, good-neighbourly relations in the city. Farmers who collect leftover meals from neighbouring households to feed their pigs are involved in the management of neighbours' household waste. Robineau [10] had already noted such practices in the town of Bobo-Dioulasso.

Socioeconomic importance of urban livestock

Although his presence is often forgotten or unknown to political actors [40] the socio-economic importance of livestock in the urban system is no longer an aspect to be demonstrated. This importance is mainly due to the ability of this production system to provide income and animal protein to the poorest urban dwellers [18,33].

In Ziguinchor, livestock farming is a strategic axis in the fight against food vulnerability; so much so that it deserves special attention. This production system is the city's main source of supply of meat. Almost all of the city's butchers source dample in the cattle feeding parks of Tilène Kadior and the sheep and goat feeder shall be supplied by Kandé Sibenck. Added to this is the intensive poultry farming that is beginning to take hold in the ziguinchor urban system. This ability of livestock to contribute to food security has already been demonstrated in several African cities. It brings up to 80% of the demand for animal products to N'djamena [41] and 70% to Moundou [42] to Chad. It accounts for 50% and 60% of the demand for poultry products in Bamako and Cotonou [43]. In Kampala, 70% of the demand for poultry products comes from the breeding of the city for years [12]. While in Bobo-Dioulasso, more than 40% of the pig meat consumed comes from urban farming [14].

Faced with the decline in purchasing power of vulnerable agricultural households in Ziguinchor [27], urban livestock is helping to respond through its ability to improve the incomes of its actors. The incomes of urban livestock are relatively low in Ziguinchor but very significant in their role in the fight against urban poverty [5]. This is complemented by their role in self-consumed plant production by agro-breeders [5].

Like Ziguinchor, the economic function of livestock has been demonstrated in many of Africa's cities. Fall, *et al.* [16]. found, as such, monthly nand margins (50521to72417 FCFA) of a poultry farmer in the city of Thies that are above the professional minimum wage (36243 FCFA) guaranteed in Senegal. Fal, *et al.* [38]. claim the annual gross margins of Ladoum sheep farmers range from 370,000 to 1444400 FCFA in the same city. In Niamey, a breeder earns, on average 44421.5 - 40236.66 CFA francs per month [33].

Breeding is all the more important because it plays several other decisive functions in the city of Ziguinchor. Income from this activity contributes to the improvement of households' living conditions by the fact that they are used, in 73.10% of cases, for the purchase of food, children's school fees and the clothing needs of herders. In addition, the use of agricultural products in the cultural and religious practices of herders is added. These socio-cultural functions are related to sacred rites or funeral ceremonies for which livestock are raised in some cases. According to the respondents, this agricultural activity is a way to gand rid of the colossal expenses associated with organizing these cultural and cultural rites and ceremonies. This cultural function of livestock has been noted in some African cities like Cotonou [36] and Bobo-Dioulasso [44].

Barriers to urban livestock

Urban livestock farming is certainly a strategic axis of socio-economic development in urban areas. However, it is necessary to recall the various obstacles that hinder its development in the city of Ziguinchor. Epizooties that attack goats, poultry and pigs are the most

cited (42.4% of cases). Cases of pig outbreaks in the city may be related to the proliferation of wastewater in open sewers. Pigs going to feed in these unsanitary areas come into contact with pathogens. Ossebi, *et al.* [37] explains this by the practice of pig rambling, which accentuates health problems.

Boussini, *et al.* [45] point out, moreover, that if the practice of livestock farming in the city is particularly questioned by some actors, it is because of the risks of zoonoses induced by the proximity between humans and animals. In Ziguinchor, on the other hand, pig farmers highlighted the problem of inadequate storage of piggeries in habitat areas. This is due to the bad odours resulting from the rotting of pig droppings that cause olfactory nuisances in habitats. Robineau (2014) had already made this remark in the town of Bobo-Dioulasso. They did, however, suggest that the municipal authorities should develop an isolated area of habitats that is exclusively reserved for pig farming, as is the case in Pikine and Guédiawaye in the city of Dakar [46]. In addition, the theft of livestock, cited in 34.0% of cases as a limiting factor in livestock production, is cited. They are considered as a danderrent to livestock. This problem is in most cases explained by the lack of public lighting mainly in suburban areas such as Kenya, Lyndiane, Djabir. Livestock theft is, moreover, the most common problem cited by pastoralists in African cities [1].

The problem of livestock rambling, which is often a source of tension between farmers and urban markand gardeners, is also a factor in the precariousness of livestock farming in Ziguinchor. This problem is related to the lack of feed from livestock, as Gourdine, *et al* [47]. According to these authors, co-products or agricultural residues, which are most often intended for livestock in the city, are not resources that farmers can always rely on because their availability is often seasonal and uncertain.

Conclusion

This study made it possible to characterize the urban breeding of Ziguinchor commune. This farming is practiced by most of the agricultural households of the city. Women represent the majority of breeders. The diolas and mandingues are the dominant ethnic groups in this production system.

Livestock are made up of 10 animal species in 9 zoological families. These species are: *Capra hircus* L. (goat), *Ovis aries* L. (sheep), *Bos taurus* L. (cow ndama), *Equus asinus* L. (donkey), *Sus scrofa* (pig), *Galus galus* L. (chicken) *Anas platyrhynchos* L, *Oryctolagus cuniculus* L. (rabbit) and *Poicephalus senegalus* L. (youyouparrot from Senegal). Family poultry farming for lower-school hens is more represented of the livestock units; although it is beginning to be replaced by intensive production of broilers. In addition to family farming practiced by 92.5% of the players as a secondary activity, we note those who have made it a full-time occupation are in the minority and made up of those who operate at the small ruminant feedlot in Kandé Sibenck and the cattle in Nema Kadior. The breeding line is essentially semi-intensive. In this case, the animals have a paddock, perch, pigsty or park where they are boxed at night and left wandering, looking for food during the day. Other methods of feeding livestock are related to the supply of food by the herder and the conduct of herds to pastures.

Urban livestock farming in Ziguinchor is distinguished by the diversity of its functions, which are mainly reflected in its ability to improve the financial incomes of agro-breeders who earn, on average 773506 CFA francs per year. These incomes play an indispensable role in improving the living conditions of livestock households. 73.10% of this income is used to feed producers and cover various family expenses (schooling and clothing needs).

However, urban livestock production suffers mainly from epizootics and zoonoses, which account for 42.4% of production constraints. Livestock scavenging due to herders struggling to ensure food security for their livestock is a source of tension between farmers and urban livestock keepers. Added to this is the theft of cattle that has become recurrent in the city.

However, the development of urban livestock farming, which is a strategic axis of socio-economic development in Ziguinchor, is subject to better control of feeding, breeding management, reproduction monitoring and adequate prophylaxis against diseases. parasitic and infectious. The municipality will have to develop an area exclusively reserved for pig breeding that does not mix well with habitats.

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