

ASSESSMENT OF THE ENVIRONMENTAL CONDITIONS OF THE ISIRO PUBLIC SLAUGHTERHOUSE MARCH TO JUNE 2020

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Abstract. The purpose of this work is to assess the environmental conditions of the public slaughterhouse in Isiro where its slaughtering practices are carried out of all environmental rules that are permissible according to the rules of the art. Methodologically, this work borrowed Ishikawa's "five M" rule to identify possible causes of unsanitary conditions in this public institution. It assessed the environmental conditions of the slaughterhouse from the Raw Material, the equipment, the middle, the environment and the method used in the slaughter operations. Structured observation, quality interviewing and auditing and, above all, documentation have been associated with this method of collecting data. This work objectively criticized the working conditions in the public slaughterhouse in Isiro and advocated for the public health of the population and the socio-professional conditions of the staff of that establishment. After quality audits during the study period, each time there was slaughter, these were done under the same conditions: absence of technical and sanitary facilities for veterinary samples and examinations, slaughter in unsanitary conditions, slaughter under extreme violence, skinning on bare soil, lack of personal protective equipment, no energy sources and water, presence of people and animals unwanted Etc. On the economic front, we recorded revenues in the order of \$2 406, 32 an average of \$601, 58 per month collected only by the Town Hall, apart from the DGRHU and the fishing and breeding division that jointly co-managed this institution. The main limit of this work is not to analyze and determine the types of pathogenic germs that could contaminate meat during slaughter in an unsanitary environment.

Keywords: Evaluation, environmental conditions, Isiro public slaughterhouse

INTRODUCTION

The Democratic Republic of Congo, a developing country, is now facing serious political and socio-economic problems that make life difficult for the human and animal populations that inhabit it. These problems include poor food conditions. Yet the DRC has all the assets to provide its population with food in quantity and quality.

If the purpose of raising domestic animals in its practices is to provide milk for some and especially meat production for others, slaughterhouses are tasked with providing consumers with mature, safe meat and good sanitary, organoleptic and nutritional qualities, according to ISO 8402 defines quality as "the set of properties and characteristics of a product or service that give it the ability to meet expressed or implied needs."

While the notion of the intrinsic quality of meat is a relative concept, the key is to slaughter domestic animals while complying with hygienic principles, including the code of practice for fresh meat of codex Alimentarium.

It is in this sense that the slaughterhouse is defined as a public or private establishment, allowing to prepare meats from the carcasses of slaughtered animals, to treat the co-products (elements of the 5th quarter), to submit these products to a health inspection and to protect the consumer from public health risks; and finally determine the commercial quality of these products.

In addition, slaughterhouses are also institutions that generate financial resources in the public treasury because "Meat is the most powerful repairer in the economy". Simply because the economic chain through which the products of the slaughterhouse pass, has several links before reaching the last consumer who must enjoy healthy meat products, unaltered, free of all exotic diseases, especially since most of these cattle come from other neighboring countries.

Paradoxically, despite the presence of public authorities in the public slaughterhouse in Isiro, the environmental conditions of slaughter are poor and have led us to focus our attention on the major concern: "Why are the environmental conditions of slaughter of the public slaughterhouse in Isiro poor?"

This major concern has been addressed to the following questions:

1. What are the environmental in which is the public slaughterhouse in Isiro working?
2. Why are these conditions not of concern to the public authorities in place?
3. How can we improve our environmental conditions?

The hypothesis being a proposal (or set of proposals) provisionally put forward as an explanation of facts, natural phenomena and which must be subsequently controlled by deduction or experience. So, we thought that:

1. Isiro's public slaughterhouse would operate in a state of absolute unsanitary condition;
2. These conditions would not be of concern to existing authorities due to negligence and financial deficiency;
3. The improvement of its conditions would involve the reconstruction of a new slaughterhouse, the rejuvenation of staff, and the granting of the financial recession to the slaughterhouse.

The purpose of this work was to achieve the following business objectives:

- * Describe the environmental conditions of the Isiro public slaughterhouse;
- * Raise the awareness of public authorities about the operation of the public slaughterhouse in Isiro;
- * Propose the reconstruction of a new slaughterhouse, the rejuvenation of staff and the granting of the financial recession to the slaughterhouse.

This work has both a scientific and socio-economic interest. Scientifically, it contributes to deepening knowledge on the environmental management of a public establishment such as the Isiro slaughterhouse. On the socio-economic level, the implementation of the recommendations of this work will be an alarm to draw the attention of public authorities to the improvement of the environmental conditions of this establishment.

MATERIALS AND METHODS

The collection of data on the assessment of environmental conditions was carried out in two stages: the first was to observe several times the entire slaughter procedure within this establishment. A second one made it possible to carry out the quality audit and finally to assess the current environmental conditions of the Isiro slaughterhouse and those in which slaughtering could have been according to the pre-established standard in different codes, including the Manual of Inspection Methods for Slaughterhouses, Codex Alimentarius, Hygiene Code of the Democratic Republic of the Congo, etc.

Throughout the investigation, several materials were used to conduct the observation. First, it was a matter of observing the room of the slaughterhouse which was

called to receive the animal brought for slaughter. This room was taken in all its composition and thus its tools.

Secondly, cattle are the biological material to be observed because other types of domestic animals are not brought to the slaughterhouse for slaughter and at the end we used the note blocks to record the information received, the camera to take pictures, a Simba motorcycle to arrive once or twice a week at the slaughterhouse

Methodologically, the evaluation of the environmental conditions of slaughter in the public slaughterhouse of Isiro was made according to the rule of the «five M».

This rule consisted in considering, at each step of slaughter, the Raw Material, the Material, the Environment, the Labour force, the Method used during the slaughter operations under given environmental conditions.

Slaughter practices were observed twice weekly from March to June 2020 and some statistical tools were used

- Arithmetic mean (μ)

The arithmetic mean (or simply mean) of a set of n numbers is the quotient of the sum of these numbers by the number n of elements in the set. It was symbolized by is noted μ .

$$\mu = \frac{\sum_{i=1}^n x_i}{n}$$

With $\sum x_i$: the sum of the observations and
 n : number of observations.

It allowed us to summarize the set of observations to a central trend index and to facilitate the comparison of the monthly tax amount.

RESULTS AND DISCUSSIONS

Assessment of environmental conditions at the Isiro public slaughterhouse

The evaluation of this procedure revealed different practices in the slaughter of animals within this establishment and the Ishikawa method was operationalized as follows:

Raw material

The animals slaughtered at the public slaughterhouse in Isiro came from different countries but also from the Ituri province. These cattle arrive on foot, accompanied by their owner or by herdsmen, who will place them in a housing pen in several directions with risk of escape and rambling. However, it should have only one so that the animals can be moved in one direction from the unloading point to the slaughter point.

So, when the customer arrives, he chooses his own animal. After the conclusion of the contract, which is carried out by an eye assessment of the carcass, the cowman attaches it to send it to the slaughter hall in an atmosphere of extreme violence and distress for the cattle.

For, the day before slaughter, after ante-mortem inspection, the animals were transferred from the housing park to the supply corridor to the bleeding room. They spent the night there and were subject to rest and a water diet.

For the slaughterhouse in Isiro, there is no ante-mortem inspection, it also happens that the cattle arrive at night when everyone is gone. Even the slaughterhouse sentry does not exist. Thus, the animals pass directly from the housing pen to the bleeding room.

According to the interview obtained by the veterinarian of that slaughterhouse, on the day of slaughter, once in the bleeding room, the bovine animals were stabilized by means of the cylinder and suspended by means of a lifting device by a hind leg, so that the jugular vein was sliced above the ground, the blood collected properly as well as dressing followed

by washing. The skinning occurred gradually by circulating the suspended carcass on the rails to prevent the carcass from being in contact with the ground, contrary to what is observed these days.

To rid the abdominal viscera, they should be removed from the abdominal cavity with all possible care to prevent their bursting and soiling of the carcass. Viscera should be placed on a clean trolley. At present, the viscera are exposed immediately on the ground without hindrance and under the benevolent eye of the management team and all the public services present in the slaughterhouse at the time of the slaughter. All stomach viscera are deposited on the ground filled with the blood of the animals slaughtered on the same day or days.

Equipment

All the material used for the preparation of the carcass in the slaughterhouse of Isiro poses a problem, starting with the supply corridor which should transport the animals from the housing pen to the room of bleeding is today without roof, totally non-operational. The rails and the lifting device of the beast are completely rusty, the scale also no longer works, the table where viscera should be placed while waiting for the enema and veterinary inspections tend to disappear under the force of rust. Knives and all other cutting equipment do not exist, each harvester has its own tools that it uses without sterilization beforehand on as many animals that it slaughters the same day.

Environment

First of all, it must be said that the public slaughterhouse in Isiro was built in the 1954's with the aim of supplying good quality meat to the population of the extra-customary center in Isiro who received the animals coming from the Farm in Dili, in the territory of Poko, currently in the province of Bas –Uele. The revenues generated by the public slaughterhouse in Isiro are managed jointly by three state departments, including the DGRHU, the Town Hall and the Fisheries and Breeding Division. Functionally, it is supervised by the Fisheries and Breeding Division under the following 4 technical services:

- Supervision Department: its role is to control the slaughterhouse;
- Management service: its role is to manage the State's materials and revenues;
- Technical service: its role is to examine the meat before delivering it to the population, and if the meat is unfit for consumption, it must be discarded or burned;
- Secretariat service: its role is the management of administrative documents

The environment concerns the plot, the soil, the air, the presence of water sources, incinerators and the room including all its installations. Currently, the land allocated to the slaughterhouse is totally threatened with third-party dispossession. Simply because the barbed wire used in other cases to define the scope of the concession of the slaughterhouse no longer exists.

As for the floor of the slaughterhouse, the FAO recommends that the land adjacent to the slaughterhouse should be covered with concrete, asphalt or similar materials, as well as the access road. Other open spaces may be grassy, but in this case the lawn should be regularly mowed.

No energy source exists to condition the meat after slaughter, especially those of the big cattle for their ripening. And in case it is necessary to incinerate the spoiled meat, we

prefer to throw to nature, at the mercy of dogs and cats who, at each slaughter, show up to share the slaughter fruit .

Technical Rooms:

It includes various successive operational readiness positions such as:

- a) Live Animal Disembarkation Dock that allows the counting of animals upon arrival, their possible weighing and live health inspection.
- b) Housing rooms (waiting rooms), they allow the housing of animals intended for a working day for 24 hours.
- c) Slaughter rooms: slaughter room or hall where stunning, bleeding and pre-skinning are carried out successively.
- d) Skinning Rooms: Where skinning operations take place.
- e) “Clean or Healthy” Operations Rooms are the rooms that house post-mortem operations such as evisceration, slitting, blunting, dousing, sanitation inspection and weighing.
- f) Room of the 5th quarter are used for the treatment: blood; hides and skins (and their storage); viscera, tripe for digestive bags; tallow, intestinal cleansing; horns and hooves.
- g) Refrigeration rooms that allow for the cooling and storage of carcasses and offal. The loading dock was not found, except that a wooden housing pen was observed but presenting too much risk of escape for angry or stressed animals.

Sanitary facilities

Sanitary facilities include several services such as:

- a) Veterinary service where the offices for the veterinary inspector, the archives for technical agents, breeding engineers and the laboratory are located.
- b) Lazaret or sanitary barn that allows suspect, sick and injured animals to be placed under surveillance.
- c) Sanitary slaughterhouse which is a small, simplified slaughterhouse reserved for animals to be sacrificed urgently (rugged, injured), sick and derived from a prophylaxis plan
- d) Holding and seizure rooms under the sole responsibility of the veterinary inspector in the cold sector of the slaughterhouse.
- e) Other sanitary facilities: W.C., showers, infirmary, place to smoke, purification, vehicle cleaning and disinfection station

None of these services were found at the public slaughterhouse in Isiro, not even the sanitary facilities yet every public building, and should have a source of drinking water supply and sanitary facilities for the hygiene of staff and visitors. The wall with the anti-slip tiles never gets washed so that traces of blood can be seen everywhere. And this is where we condition the quarters or half-quarters before delivering to customers.

Labour force

In this work, the workforce involved all those who end up in this industry from the herds that bring the animals, customers, slaughterers, transporters and final sellers into the slaughterhouse. But we’re going to focus a lot more on those who work in the slaughterhouse where none of them get the public pay.

What is exciting is that we also find minor children as drovers, without any protection measures when they bring the animal into the bleeding room, this is done out of exaggerated aggressiveness, times also the animal resists and everyone is put in danger.

On the bleeding side, no personal protective equipment (PPE) is present. The worst is that the clothes they wear are almost not washed after surgery because, in their understanding, these above are regularly dirty and should not be clean yet, it's a better way to contaminate themselves but also to contaminate the meat they handle at any time. Especially when they carry the half-quarter by hand to the conditioning room (Photo IV).

Method

Although it is not easy to meet all the environmental conditions within the slaughterhouse, there are minimal conditions that could not be left aside such as, avoid stressing the animals before they are slaughtered. On the contrary, it is today embedded in the collective memory that animals destined for slaughter have no right and can be mistreated in any way.

Assessment of the economic conditions of the public slaughterhouse in Isiro

Concerning this economic analysis, we wanted to know the types of domestic animals slaughtered in the public slaughterhouse of Isiro, the revenues obtained and their distribution.

Table 1

Types of domestic animals slaughtered at the public slaughterhouse in Isiro

Types	March	April	May	June	Total
Cattle	18	20	17	27	82
Other	0	0	0	0	0

Source: Data collected on-site at the Isiro public slaughterhouse

Even if the numbers are not precise because slaughtering are recorded outside the slaughterhouse, it has been noticed that only cattle are slaughtered at Isiro public slaughterhouse after an investigation of four months. What about the other such pigs, goats, birds, and so on? This question deserves to be asked but these other domestic animals are slaughtered at home despite the decision of the authorities prohibiting this practice. Of course, the environmental and safety conditions are the basis of this refusal and therefore, no inspection is done for these animals slaughtered in any clandestinely but whose meat is sold publicly in the markets of Isiro.

Table 2

Dispatching of slaughter costs by service

Department	Amount (\$)
DGRHU	5
Town hall	3
Fisheries and Breeding Division	1
Slaughterhouse operating costs	0

Source: Data collected on-site at the Isiro public slaughterhouse

From this table, it has been revealed to us that the cost of slaughtering a cow amounts to \$9 distributed in the accounts of the three services indicated above.

It shows that the public slaughterhouse in Isiro generates revenues collected by other state services, but no part is reserved to facilitate its operation. This is also due to the weakness of the law which did not think of facilitating the financial autonomy of this public institution by retrocessions

Table 3

Presentation of the recipes collected by the Town Hall on the inspection of meat after slaughter.

Table 3: Inspection taxes health control and veterinary certificate or phytosanitary and inspection meats after the slaughter in the slaughterhouse and killing	Month	Amount in CF	Amount in \$
	March	930 000,00	465
	April	1 010 000,00	505
	March	900 000,00	450
	June	1 972 640,00	986,32
Total	-	4 812 640,00	2 406,32
μ	-	1 203 160	601,58

Source: Data received from DGRHU

It appears from this table that during four months of investigations, the Director General of Revenue of the province of Haut-Uele collected an amount of \$2 406, 32 with a monthly average of \$601, 58 per month on the tax related to inspection (health control) and veterinary or phytosanitary certificate and inspection of meat after slaughter in slaughterhouses and slaughterhouses in the city of Isiro.

These data further prove that, apart from the technical services of the Fisheries and Breeding Division, the Town Hall has agents who are present at slaughtering but only to collect taxes and not to exercise effective surveillance on butchers as pointed out, finally, to improve the conditions for slaughtering and selling meat according to the documents that regulate the sector according to international requirements that guarantee slaughter conditions. Where do these inspectors go when slaughtering takes place under the above-mentioned environmental conditions? This indicates negligence on the part of the authorities who have their representatives in public interest establishments such as the slaughterhouse that provides the first citizen of the province (the governor) until the last. Such a situation deserves a correction as soon as possible.

RECOMMENDATIONS

As recommendations, the present work has inventoried the impacts of different factions within the slaughterhouse, the mitigation measures, those responsible for taking these measures, the strategies implemented, the period and a body to monitor these measures. Thus, these recommendations are presented as follows:

Table 4

Presentation of recommendations for improving environmental conditions at Isiro slaughterhouse

Impact	Mitigation measure	Responsible	Implementation strategy	Period	Monitoring
Initial phase					
Risk of subdivision near the slaughterhouse	Secure slaughterhouse boundaries by erecting an impassable fence	Fisheries and Breeding Division and Town Hall	Solicit the Planning and Housing Department	As soon as possible	Ministry of Urban Planning and Housing
Operational phase					
Risk of soil,	<ul style="list-style-type: none"> For solid waste: <ul style="list-style-type: none"> - Build incinerators, dig ditches; - Regular cleaning and waste collection; - Collect solid waste for recovery in 				

water and air pollution By organic waste	agriculture (composting), crafts (decoration, ornamentation, clothing, etc.) <ul style="list-style-type: none"> For liquid waste: <ul style="list-style-type: none"> - Build the piping system in the pool - Regular cleaning and cleaning of facilities - Guarantee the permanent availability of a water reserve; - Collect wastewater from valves; - Collect blood in a vat for recovery (composting; painting) 	Management structure	Launch a vacancy for experienced consultants in the waste processing sector	During the operation	Municipal Hygiene and Sanitation Service
Occupational risk	Staff Protection Induction and Awareness	Management structure	Monitoring and follow-up on the mandatory use of PPE	During the operation	Labour inspection and public health
Selection and transport of the animal in the slaughter room					
Accident (trampling, fracture, puncture the eye by the horns), contamination and contagion	Avoid brutalizing and stressing animals during their choice or accompaniment Possibility to weigh them and shower to wash their dress	Cattleman Veterinarians	Construction of landing dock and supply corridor and sanitary inspection Must wear the PPE as (gloves, glasses, ankle boots and a soft and lively outfit)	Upon arrival, choice and entry into the slaughter room	Fishing and breeding Division
Slaughter or bleeding					
Blood, lymph and other waste	Hygienic harvesting and recycling of blood and other waste	Harvesters and management structure	Non-slip tiles and washing device with abundant traces of blood	During bleeding and removing the cowhide	Fishing and breeding Division
Risk of contamination by the presence of customers, other animals (dogs, cats and others)	prohibit the presence of foreign persons and other animals in the slaughter hall	Management structure	Establish a slaughterhouse security service	During the operation	Management structure
Slitting and Skinning					
Production of organic waste (stomach	Circulate skinned animal quarters on rails suspended by the winches,	Slaughterers, management	Wastewater treatment system before	During the cutting	Fishing and breeding Division

contents, fat, legs, head, skin, hair) and washing water	inspection and seizure, regular washing and emptying	t structure and veterinarians	discharge		
Cooling and Packaging					
Risk of water pollution by washing and fermentation	Storage in cold storage rooms for ripening	Veterinarians and the management structure	independent energy source at the slaughterhouse to operate the cold room	After slaughter until delivery	Fishing and breeding Division
Packaging and transport to butcher shops					
Production of plastic waste	Use of biodegradable cardboard paper and not plastic packaging	Management structure	Use of Carton Paper Incinerator	During and after packaging	Environmental inspectorate
Risk of dust contamination during unsuitable transport	Prohibit transporting meat on motorcycles or bicycles	Fisheries and Livestock Division Management structure	Use of a container vehicle for the transport of meat from the slaughterhouse to the butchers	During the transport of meat from the slaughterhouse to butcher shops of private individuals	Environmental Inspection & Fishing and breeding Division
Exhibition of meat in butcher shops					
Risk of exposure of meat to dust, insects and mould	Always put meat in refrigerators and never exposed.	Those in charge of the butcher shops	Require construction of hard and electrified butcher shops, with washable pavement, and mandatory PPE to all vendors	During the opening of butcher shops and meat sales	Environmental inspection & accompanied by environmental policing
	Publish meat protection laws that promote the proper functioning of slaughterhouses and killing areas	The Provincial parliament The Provincial government	Popularize the laws that govern the animal slaughter sector	As soon as possible	Provincial legislature

Source: Personal composition based on observations

CONCLUSIONS

The assessment on the environmental conditions of the slaughterhouse in Isiro revealed that slaughtering are carried out under extremely intolerable conditions where carcasses exposed to the ground are observed under conditions beyond what could be considered traditional. This makes the first hypothesis fully confirmed.

Secondly, the presence of inspectors from the Fisheries and Breeding Division as well as from the DGRHU, who only collect taxes, shows that nothing is being done without the knowledge of the public authorities, but they have not ranked this among their priorities, this is a public health issue. This culpable negligence also confirms the second hypothesis.

And finally, with a building built in colonial times, 67 year after it is imperative to think about building a new slaughterhouse that can meet international standards. Thus, the second hypothesis is half confirmed.

The majority of the objectives pursued have been achieved because a decision remains in practice and depends on the political will of the public authorities. Never the less, our alarm will sound and bear fruit as a scientist, imbued with no political tendency.

The improvement of these conditions is urgent on the part the public authorities of the place on the one hand but also of the elected representatives of the people who, at their side, must carry out parliamentary controls slaughterhouse to benefit from retrocessions in their revenue production and collect operating fees to, in order to give to the whole population a quality service.

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