World Journal of Advanced Research and Reviews
eISSN: 2581-9615 CODEN (USA): WJARAI
Cross Ref DOI: 10.30574/wjarr
Journal homepage: https://wjarr.com/

(RESEARCH ARTICLE)

Check for updates

Weight productivity of animals slaughtered at the Niamey cold storage slaughterhouse

MAHAMAN MALAM MOUCTARI Ousseini [1, *], HAMIDOU ILLIASS Kallamou Moussa [1], MOUSSA ADAMOU GUIRE Oumarou [2] and CHAIBOU Mahamadou [1]

[1] *Department of Animal Production, Faculty of Agronomy, Abdou Moumouni University of Niamey, BP 10960 Niamey, Niger.*
[2] *Regional Center of Excellence for Pastoral Production (CERPP-Niger) Faculty of Agronomy, Abdou Moumouni University of Niamey, P.O. Box 10960, Niamey, Niger.*

World Journal of Advanced Research and Reviews, 2026, 29(01), 1203-1211

Publication history: Received on 09 December 2025; revised on 19 January 2026; accepted on 21 January 2026

Article DOI: https://doi.org/10.30574/wjarr.2026.29.1.0157

Abstract

A study was conducted at the Niamey cold storage slaughterhouse on the weight productivity of slaughtered animals. The aim was to assess live weights, carcass weights, fifth quarter weights, and yield. A sample of 100 animals, including 20 goats, 20 cattle, 20 sheep, 20 camels, and 20 pigs, was identified in order of arrival and monitored throughout the slaughter chain. At the end of this study, the slaughtered goats had an average live weight of 18.65±1.80 kg, an average carcass weight of 9.15±2.1 kg, an average fifth quarter weight of 6±1.21 kg, a yield of 49.6%, and 18.77% rumen and blood content. Sheep have an average live weight of 29.60 ±7.53 kg, an average carcass weight of 13.75±13.74 kg, an average fifth quarter weight of 11.65±3.79 kg, a yield of 46.45%, and 14.20% represented by unexploited outputs. Cattle have an average live weight of 338.15 ± 46.9 kg, an average carcass weight of 161.13 ± 63.46 kg, an average fifth quarter weight of 88.9 ± 21.79 kg, a yield of 47.65%, and 26.06% represented by unexploited outputs. Camels have an average live weight of 356.45±84.65 kg, an average carcass weight of 169.4±67.43 kg, an average fifth quarter weight of 59.7±10.52 kg, a yield of 47.52%, and 35.74% rumen and blood content. Pigs have a live weight of 101.05±21.07 kg, an average carcass weight of 54.05±11.25 kg, an average fifth quarter weight of 32.4±13.38 kg, and an average yield of 53.81% and 10.94% represented by waste.

Keywords: Productivity; Animals; Cold Storage Slaughterhouse; Niamey

1. Introduction

West Africa has abundant resources, with nearly 10% of the world's cattle, 10% of sheep, and more than 20% of goats [1]. In Niger, livestock products rank second only to uranium. Coastal countries have a significant deficit and import livestock from the Sahel [2], leading to high demand from Sahel countries. In the Economic Community of West African States (ECOWAS) zone, the average slaughter rate varies from one species to another, standing at 12.7% for cattle and 31% for small ruminants (sheep and goats), 9.74% (camelids) [3]. In East Africa, particularly in Chad, a study on the causes of parasitic infestations and associated economic losses in ruminants highlights those large and small ruminants are slaughtered at the Farcha refrigerated slaughterhouse [4]. However, in Côte d'Ivoire, another study focused on goats [5]. In Niger, the animals slaughtered come from several species, including goats, sheep, cattle, camels, and pigs. Upon arrival at the slaughterhouse, they undergo various operations (water diet, bleeding, skinning, abdominal, and then thoracic evisceration) which transform them into carcasses on the one hand and fifth quarters on the other [6]. However, the process differs for poultry, where, before slaughter, broiler chickens are stimulated by factors such as fasting, capture, loading, and transport in cages [7]. This seriously affects the welfare of broiler chickens and hurts meat quality [8, 9]. The Niamey slaughterhouse is one of the slaughterhouses where the number and diversity of animals

* Corresponding author: MAHAMAN MALAM MOUCTARI Ousseini

slaughtered are numerically significant. An investigation into the weight productivity of these animals is extremely useful for assessing the carcass yield of slaughter animals. Taking into account the demand for red meat in large urban centers in certain African countries, in general, and in Niger in particular, it is necessary to evaluate the weight productivity of animals slaughtered at the Niamey cold storage slaughterhouse in order to quantitatively assess data on slaughter animals. The objective of this study is, on the one hand, to highlight the different characteristics of each animal, namely origin, age, diet, breed, and sex, and, on the other hand, to evaluate the productivity of animals slaughtered at the Niamey cold storage slaughterhouse.

2. Materials and methods

2.1. Study site

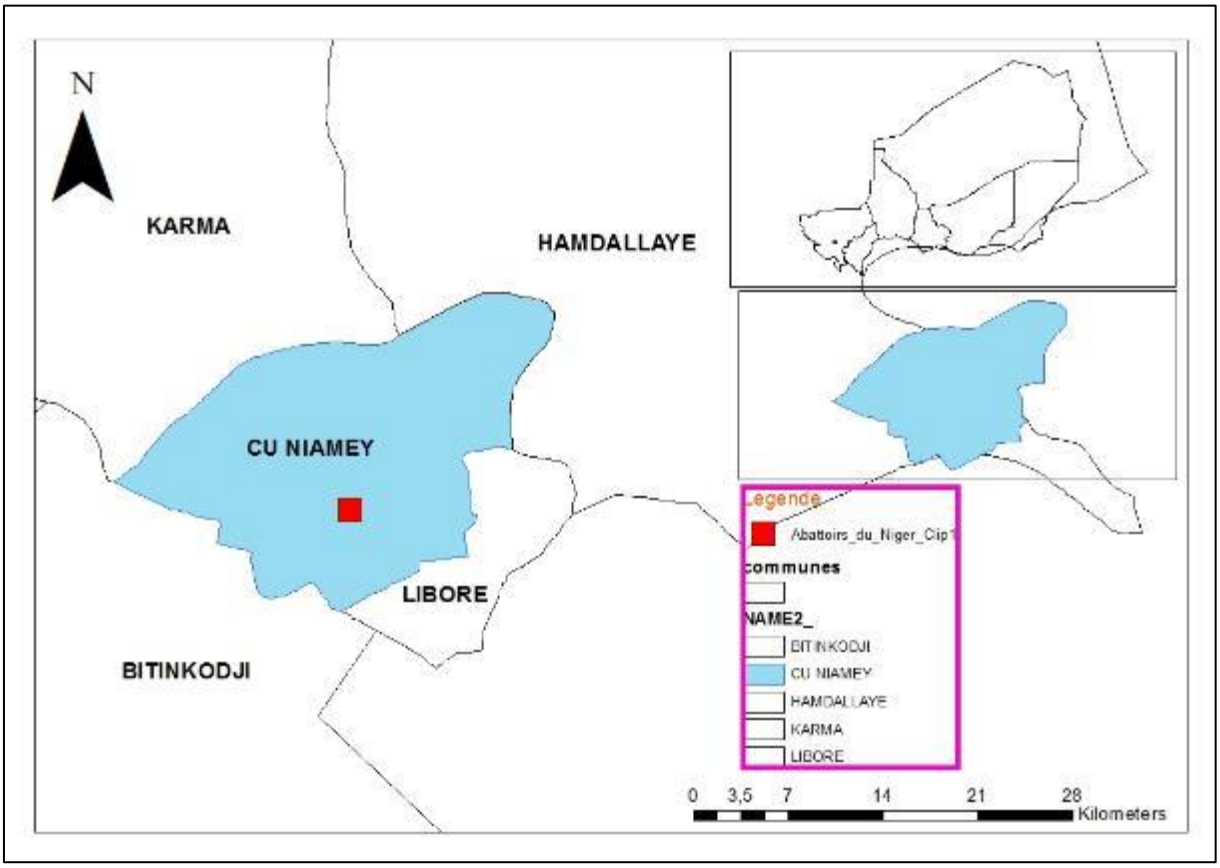

Figure 1 Location map of the city of Niamey

2.1.1. Niamey Cold Storage Slaughterhouse

The Niamey Cold Storage Slaughterhouse (AFRIN) is located in the Gamkalley industrial zone, on the banks of the Niger River at an altitude of 185 meters between 13°24' north latitude and 2°07' east longitude. AFRIN covers an area of more than 20 hectares [10].

2.2. Equipment

2.2.1. Technical equipment

All warm carcasses of large and small ruminants were weighed using scales at the carcass weighing station.

Small ruminants and the fifth quarter were weighed using a Pocket Balance weighing scale with a minimum capacity of 1 kg and a maximum capacity of 100 kg. The live weight of large ruminants was determined using a direct-reading tape measure. This is used to estimate the weight of animals based on their chest circumference. For each animal, the live weight (weight before slaughter), carcass weight, viscera weight, and fifth quarter weight were determined.

The gross carcass yield was calculated using the following formula:

Gross yield (%) = $\frac{Carcass\ weight}{Live\ weight} \times 100$

2.3. Methods

An interview was conducted with four (4) administrative staff (the Technical Director, Head of Production, Head of Statistics, and Head of Slaughter) and three (3) veterinary staff, focusing on the operation of the slaughterhouse, hygiene, and meat quality.

Two (2) questionnaires were administered to the Production Manager and animal owners on the origin, age, sex, breed, and diet of the animals. Direct observation was made of the slaughter operations. A sample of 100 animals consisting of 20 goats, 20 sheep, 20 cattle, 20 camels, and 20 pigs (all breeds combined) was identified according to the order of arrival at the slaughterhouse. The entire head, including horns, legs, and skin and/or hides of each animal, was weighed. The intestines, rumen contents, and viscera were placed in a bag for weighing. Age was determined by the dentition method and by the horns in cattle.

2.4. Data processing

The results obtained were analyzed and processed using Excel and SPSS software. An analysis of variance test was also performed.

3. Results

Table 1 shows the minimum and maximum age ranges.

Table 1 Age of animals slaughtered at AFRIN

Species	Minimum age (months)	Maximum age (months)
Goats	6.5	48
Sheep	4.5	72
Cattle	20.5	132
Camels	24.5	168
Pigs	6.5	24

The age of cattle slaughtered ranges from 20.5 to 132 months, that of sheep from 4.5 to 72 months, that of goats from 6.5 to 48 months, camels are between 24.5 and 168 months old, and pigs are between 6.5 and 24 months old.

3.1. Origin of the animals

The animals slaughtered at the Niamey cold storage slaughterhouse come from the Tourakou market in the city of Niamey and various markets in the Tillabéry region, as shown in Table 2.

Table 2 Origin of animals from various markets in the Tillabéry region**.**

Markets of origin	Approximate distance (km)	Orientation in relation to the city of Niamey
Baléyara	100	NORTH EAST
Bonkoukou	140	NORTH EAST
Ayorou	200	WEST
Téra	178	WEST
Torodi	56	WEST
Kollo	30	SOUTH EAST

3.2. Species slaughtered

The species slaughtered at AFRIN (Statistical Service (2021) are cattle (9,030 head), sheep (16,000 head), goats (4,000 head), camels (231 head), nd pigs (150 head). Large ruminants are the most slaughtered animals, with a variation of 612 to 650 head per day for all species combined.

3.3. Diet

The diet of animals slaughtered at the Niamey cold storage slaughterhouse consists of natural fodder and feed supplements such as crop residues and by-products (peanut and cowpea tops, sorghum bran, maize bran).

Weight performance and yields of the different species slaughtered

Table 3 shows the weight performance and yields of the different species slaughtered.

Table 3 Weight performance and yields of the different species slaughtered

Species	Goats	Sheep	Cattle	Camels	Pigs
Average live weights (kg)	28,65±7,54[a]	18,40±3,34[a]	338,15±87,10[b]	382,15±99,58[b]	97,35±21,44[b]
Average carcass weights (kg)	13,63±3,88[a]	9,20±2,23[a]	167,00±66,47[b]	169,40±69,18[b]	54,05±8349[b]
Average weight of viscera (kg)	5,55±2,06[a]	2,85±0,87 [a]	39,40±8,65[b]	27,65±5,06[b]	14,75±2,77[b]
Average weights of heads/feet/hides and skins (kg)	6,00±1,83[a]	3,15±0,81[a]	49,60±13,72[b]	31,80±5,85[b]	20,65±1,81[b]
Yield (%)	49,62±4,33[a]	47,43±2,31[a]	47,68±8,55[b]	42,93±7,18[b]	55,90±5,67[b]

Averages marked with the same letters (a, b) on the same line are not significantly different at P<0.05 according to Tukey's post hoc test.

Table 2 shows that the average live weight of camels (382.15±99.58 kg) is the highest, followed by cattle (338.15±87.10 kg), pigs (97.35±21.44 kg), goats (28.65±7.54 kg), and sheep (18.40±3.34 kg).

The average live weight of sheep at the Niamey slaughterhouse is 28.65±7.54 kg, while that of goats is 18.40±3.34 kg. The live weight of cattle is 338.15±87.10 kg. The average live weight of camels is 382.15±99.58 kg, and the average live weight of pigs is 97.35±21.44 kg. The results of the variance analyses show that there is a significant difference between the average live weights of sheep compared to those of cattle (P=0.00), camels (P=0.00) and pigs (P=0.00) on the one hand, and between the average live weights of goats and cattle (P=0.00) camelids (P=0.00) and pigs (P=0.00) on the other hand. The same observation was made for the other parameters, in particular carcass weight, viscera weight, head/leg/hide and skin weight, and yield.

3.3.1. Average carcass weights of different slaughtered species

At the Niamey cold storage slaughterhouse, the average weight of a sheep carcass is 13.63±3.88 kg, that of goats is 9.20±2.23 kg, and that of cattle is 67.00±66.47 kg. Camel carcasses weighed an average of 169.40±69.18 kg at the Niamey cold storage slaughterhouse. The average weight of a pig carcass is 54.05±8349 kg at the Niamey slaughterhouse.

3.3.2. Average weights of the fifth quarter

The average weight of the fifth quarter of a sheep at the Niamey slaughterhouse is 11.65±3.79 kg, which represents 39.35% of the live weight. The average weight of the fifth quarter of a goat is 6±1.51 kg, which represents 32.17% of the live weight. The average weight of the fifth quarter of a bovine at the Niamey slaughterhouse is 88.8±21.79 kg. The average weight of the entire fifth quarter of camels at the Niamey slaughterhouse is 116.7±79.36 kg. The average weight of the entire fifth quarter of pigs is 35.25±13.56 kg at the Niamey cold storage slaughterhouse, which represents 35.25% of live weight.

3.3.3. Gross yield (carcass) of the different species slaughtered

The yield obtained is 46.45% for sheep slaughtered at the Niamey cold storage slaughterhouse and 47.65% for cattle. The average yield for camels at the Niamey cold storage slaughterhouse for this study is 47.52%.

3.3.4. Percentage of different parts of slaughtered species

Figure 2 shows the proportions of different parts relative to the live weight of different species.

proportion species

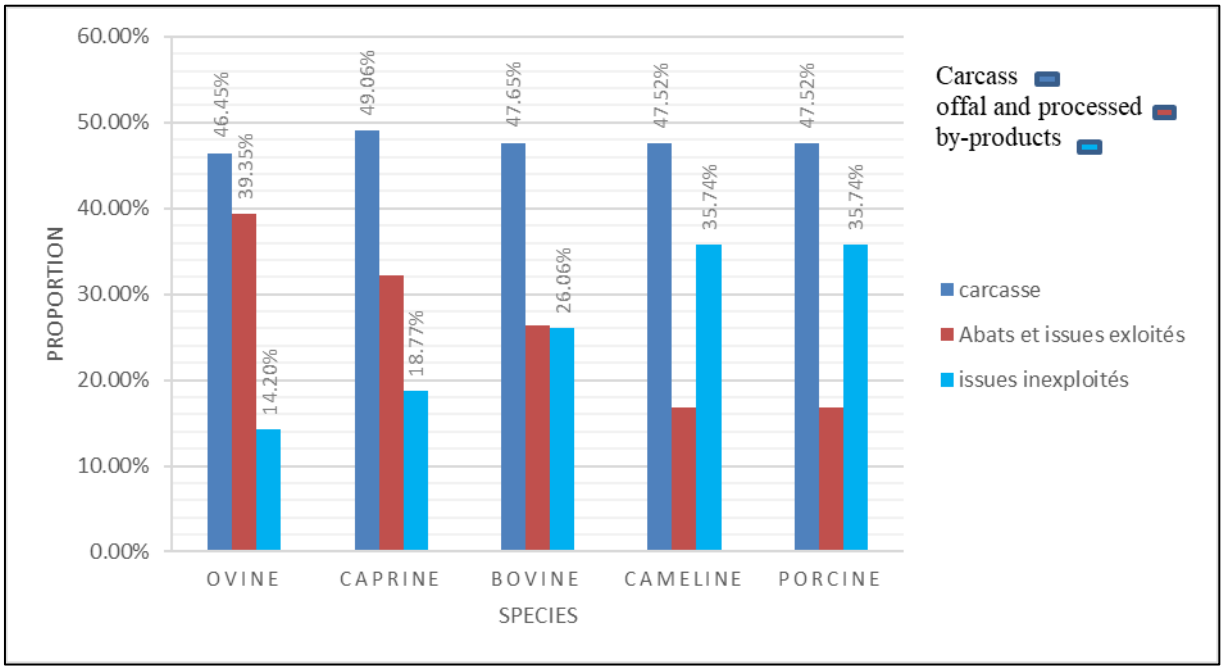

Figure 2 Proportion of different parts of slaughtered species in relation to live weight

In sheep, the carcass, skin, and offal account for 85.80% of live weight. Unused parts such as blood and digestive tract contents account for 14.20% of live weight. For goats, 81.23% is comprised of carcass, skin, and offal, compared with 18.77% of unused parts.

4. Discussion

The age of slaughtered cattle ranges from 20.5 months (615 days) to 11 years (3,970 days), with ages exceeding 446 and 448 days, respectively, for cattle fed without concentrate and with concentrate, according to a study evaluating the performance of young crossbred cattle [11]. The age of cattle obtained in this study is similar to that determined by Bastien on Salers steers slaughtered at 23 months [12].

The animals slaughtered at the Niamey cold storage slaughterhouse come from various areas. Large ruminants are the most commonly slaughtered animals, with a variation of 612 to 650 head per day for all species combined. This differs from the results obtained by Coulibaly [13]. who reported that the number of goat species slaughtered was Djallonké goats and Sahelian goats, with 681 individuals (92.53%) and 55 (7.47%), respectively. A study on the determination of phenotypic and zootechnical characteristics in goats slaughtered at the Port-Bouët abattoir for meat in the city of Abidjan showed that Sahelian goats (90%) are slaughtered more than Djallonké goats (10%) [5]. Harvest residues and by-products such as peanut and cowpea husks, sorghum bran and maize bran are similar to those reported by Ayssiwede [14], whose inputs consist of peanut leaves as basic fodder and an experimental concentrate composed of crushed yellow maize, wheat bran, peanut meal, calcium phosphate, oyster shell meal, iodised cooking salt and mineral and vitamin supplements (CMV).

The average live weight of sheep at the Niamey cold storage slaughterhouse is 28.65±7.54. This result is lower than the 40.7 kg obtained by Vias [15] on long-haired entire rams of the Peul bicolore and Touareg breeds in Niger, but very

close to those found by Chitou [6] with 30.5±7.40 kg in Maradi and by CIPEA [16] in Guinean sheep with 30 kg and Arsi sheep from Ethiopia with 32.4 kg. In Senegal, Ayssiwede [14] estimated the average live weight of Ladoum lambs at 66.3 kg. This is close to the result obtained by Chitou [6], which is 18.8±3.31 kg, and that given by CIPEA [16], which varies from 20 to 25 kg for Maradi red goats. Wilson (1981) found that the live weight of a goat is 21 kg. Live weight varies from 20 to 50 kg in Sahel goats and from 20 to 35 kg in Maradi red goats. The live weight of cattle is 338.15±87.10 kg compared to 335.55±49.06 kg at the Maradi slaughterhouse Chitou [6], and 350 kg at the Bamako slaughterhouse [17]. Aka [18], that authors have determined the weight of West African taurine cattle, including Ndama, which weighs an average of 329 ± 20 kg, Baoulé around 184 ± 40 kg, Somba up to 172 ± 13 kg Muturu taurine 157 ± 8 kg and Lagunaire around 200 kg H [19, 20, 21, 22, 23, 24, 25, 26]. The live weight of camels is similar to that obtained by Chitou [6] at the Maradi slaughterhouse, which is 358.4±101.59 kg. This difference could be explained by the type of feed and the age of the animals. The average live weight of pigs at the Niamey cold storage slaughterhouse is 97.35±21.44 kg, compared to that found at the Burkina Faso cold storage slaughterhouse, which is 118.9±2.08 kg [27]. This difference can be explained by age and rearing conditions. At the Niamey cold storage slaughterhouse, the average weight of a sheep carcass is 13.63±3.88 kg. This result is similar to those found in the Menz and Arsi breeds originating in Ethiopia under normal breeding conditions, with average carcass weights of 13.8 kg and 13.9 kg, respectively CIPEA [16], and to that obtained by Chitou [6] which is 13.9±3.6 kg, but higher than that found by Vias [15]. It was determined the carcass weight of Ladoum lambs to be approximately 35.6±7.1 kg [14]. The average carcass weight of goats in this study is 9.20±2.23 kg. This result is close to that found by Chitou [6], which is 8.7±1.76 kg. The weight of cattle (167.00±66.47 kg) is close to that obtained at the Maradi slaughterhouse, which is 163.1±49.06 kg [6], compared to 141.35±34.85 kg found by Wanké [28], 149.05±29.20 kg at the Bamako slaughterhouse [29]. Furthermore, the average carcass weight is 227 kg in Europe [30]. The results obtained in these slaughterhouses in Bamako, Burkina Faso, Maradi, and Niamey are low compared to those found in Europe. This difference can be explained by the breed and fatness of the animals at slaughter. Camelid carcasses weighed an average of 169.40±69.18 kg. According to Bérenger and Robelin, reported by Salifou [31], there is considerable variation in body composition between species of the same species and live weight. The average weight of a pig carcass is 54.05±8349 kg at the Niamey slaughterhouse, which is lower than the 75.7±4.03 kg obtained at the Burkina Faso slaughterhouse (FAOSTAT, 2010). This difference is probably due to age, diet, or rearing conditions. The average weight of the fifth quarter of sheep slaughtered at the Niamey abattoir is 11.65±3.79 kg, which represents 39.35% of live weight. This weight is comparable to that found at the Maradi slaughterhouse by Chitou (2018), which is 11.15±3.32 kg or 36.55%, and by Ayssiwede et al. (2023), who obtained 16.9±1.7 g/kg.

The average weight of the fifth quarter of a goat is 6±1.51 kg, representing 32.17% of live weight. According to Chitou (2018), the average weight of the fifth quarter is 6.35±1.32 kg at the Maradi slaughterhouse, representing 33.77% of live weight.

At the Maradi slaughterhouse, the average weight of the fifth quarter of cattle is 86.20±17.1 kg Chitou [6], while in Bamako it is 64.95±26.70 kg by Samuel [29], compared to 88.8±21.79 kg. The results obtained are almost the same in the two slaughterhouses in Niger, unlike in Bamako. This difference can be explained by the animals' diet and age, but also by their condition. The average weight of the entire fifth quarter of camels is 116.7±79.36 kg at the Niamey abattoir. This result is close to that of other author but different from that of Chitou [6], who found 129.25±91.51 kg at the Maradi slaughterhouse. The average weight of the entire fifth quarter of pigs is 35.25±13.56 kg at the Niamey cold storage slaughterhouse, which represents 35.25% of live weight.

The yield obtained is 46.45% for sheep slaughtered at the Niamey cold storage slaughterhouse. This result is similar to that obtained at the Maradi slaughterhouse by Chitou [6], which is 45.57%, and for the Arsi breed, which is 48.6% [16]. In Sahel sheep, the yield is between 40 and 50% [16]. The similarity in carcass yield may be linked to the sheep species, as breeds of approximately the same age can offer similar yields. According some authors, the average yield of the Maradi red goat varies from 44 to 50%, and is 46.27% at the Maradi slaughterhouse according to Chitou [6]. The average meat yield of the Sahel goat and the Maradi red goat is between 40-47% and 45-50%, respectively (Mémento de l'Agronome, 4th edition). The result obtained at the Niamey cold storage slaughterhouse (49.06%) falls between these two ranges. The difference can be explained by age, sex, breed, and fatness. The average yield obtained at the Niamey slaughterhouse is 47.65% for cattle, which is similar to that reported by Chitou [6], at the Maradi slaughterhouse (48.60%) but different from the 42.71% found at the Bamako slaughterhouse by Samuel [29]. It ranges from 40 to 50% according to Larrat [30]. Salifou [31] report that the individual, breed, age, husbandry practices, weight loss before slaughter, defatting, refrigeration, and storage are factors that cause variations in carcass weight and consequently lower yield [32, 33, 34]. The average yield of camelids at the Niamey cold storage slaughterhouse for this study was 47.52%. The latter reported that at the Zinder slaughterhouse, these results fall within the range of 45 to 59% obtained by Faye (1997).

5. Conclusion

In Niger, meat from sheep, goats, cattle, and camelids constitutes the main source of animal products. The objective of this study is to examine the weight productivity of animals slaughtered at the Niamey cold storage slaughterhouse. The study shows that live weight, carcass weight, fifth quarter weight, and yield vary according to several factors, including husbandry practices, breed, sex, condition, and age. It is therefore necessary to improve the productivity of Niger's livestock, which has been facing climatic and health shocks for years.

Compliance with ethical standards

Acknowledgments

Our thanks go to the various actors for their collaboration and to the student for collecting the data.

Disclosure of conflict of interest

No conflict of interest has been declared.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

[1] Richard D, Alary V, Corniaux C, Duteurtre G, Lhoste P. Dynamics of pastoral and agropastoral livestock farming in intertropical Africa (Gembloux Agronomic Press). 2011

[2] Roger Blein et Bio Goura Soulé. Coastal and Sahelian countries: what relationships in livestock marketing? Grain of Salt No. 73-74, July 2016-June 2017, pp. 22-23

[3] Véronique Alary. Desk review: Study of regional trade in livestock and animal products in West Africa (ECOWAS zone) and East Africa (IGAD zone), CIRAD Documentation Service (Baillarguet library), 2006, 136p

[4] Kacou Martial N'Da, Oubri Bassa Gbati, Mahamat Idriss Ahmat, Madina Hadjer, Luc Loubamba. Reasons for parasitic seizures and associated economic losses in ruminants at the Farcha Cold Storage Slaughterhouse (AFF) from 2013 to 2018. African Journal of Animal Health and Production, 2024. hal-04844344

[5] Yapo Akaffou, Moussa Komara, Bi Irie Van Dexter Youan, and Komissiri Dagnogo. Determination of phenotypic and zootechnical characteristics in goats slaughtered at the Port-Bouët abattoir for meat production in the city of Abidjan, International Journal of Innovation and Applied Studies ISSN 2028-9324 Vol. 41 No. 3 Jan. 2024, pp. 867-875

[6] Chitou Sanda Maman Hamissou. Study of the weight productivity of animals slaughtered at the Maradi abattoir. General Bachelor's Degree thesis in Agronomy, 2018, FA/UAM, 39 p.

[7] Xuezhuang Wu, Yahao Zhou, Zhentao Lu, Yunting Zhang, Tietao Zhang. Effect of pre-slaughter fasting time on carcass yield, blood parameters, and meat quality in broilers, Anim Biosci, 2024 Feb;37(2):315-322. doi: 10.5713/ab.23.0262.

[8] Faucitano L 2018. Pre-slaughter handling practices and their effects on animal welfare and pork quality. J Anim Sci. 2018; 96:728-738. DOI: 10.1093/jas/skx064.

[9] Gallo CB, Huertas SM. Main animal welfare issues in ruminants during pre-slaughter operations: a South American perspective. Animal. 2016; 10:357-364. DOI: 10.1017/s1751731115001597.

[10] Gabeye Djamilou, 2014. Waste management at the Niamey cold storage slaughterhouse. Bachelor's degree in General Agronomy, FA/UAM

[11] Sepchat B., Vazeille K., Troquier C., Magnin G., Prache S., Note P., D'Hour P., Veysset P. Performance evaluation of young crossbred cattle finished on grass in two mountain farming systems managed organically, Renc. Rech. Ruminants, 2020, 25, 318-320

[12] Bastien D, Le Pichon D, Valance S, Renon J, Jacques Agabriel, Crassat J.L, Lavedrine M. Study of new methods of beef production from suckler bull calves. Innovations Agronomiques, 2017, 55, pp.71-84. 10.15454/1.5137757610632153E12. hal-01607935

[13] Coulibaly Balla, Soro Soronikpoho, Parfait Kouadio Kouakou, and Diomande Dramane. Morphological characteristics of goats slaughtered at the Korhogo slaughterhouse (Côte d'Ivoire), June 2024 Int. J. Biol. Chem. Sci. 18(3): 917-923

[14] Ayssiwede SB, Atchiwassa S, Missohou A, Bonou MHC, Mbengue FVL, Kabore B, Thior EY, Raes M, Cabaraux JF, Hornick JL. Growth and fattening performance and carcass characteristics of Ladoum, Touabire, and Peul-peul lambs fed ad libitum in the Niayes region of Senegal. 2023, Rev. Elev. Med. Vet. Pays Trop., 76: 37035, doi: 10.19182/remvt.37035

[15] Vias Franck S G, Boukary A R, Kadja MC, Faye Bernard. Trials of incorporating Prosopis sp pods into the fattening diet of sheep in Niger. Annals of Agronomic Sciences of Benin, 2014, 18 (1): 91-108. http://www.ajol.info/index.php/asab

[16] CIPEA. Annual Report. ISSN-3473. Addis Ababa, 1987, 121 pages.

[17] Samuel Bérenger Zoumbou. F. Contribution to the study of the fifth quarter at the Bamako refrigerated slaughterhouse. Doctor of Veterinary Medicine, (State Diploma) Veterinary School of Dakar. Cheikh Anta Diop University, 2007, 147 pages

[18] Aka S, Soro B, Kanh M H K, Kpandji I K, Koffi M, Sokouri D. Short-horned dwarf bulls in West African cattle herds: The case of the Lagunaire and Muturu breeds, Rev. Mar. Sci. Agron. Vét. 10(4) (December 2022) 615-622

[19] N'Goran K E, Z L Gbodjo, D D Noel, L H Désiré, S D Paulin, D Ladji. Analyse des paramètres de production et de reproduction de la race bovine N'Dama dans la station laitière de Yamoussoukro, dans la zone savanicoles, en Côte d'Ivoire, 2016, *Int. J. Res. Rev*., 3: 15-20.

[20] Soro B, P D Sokouri, G K Dayo, A S P N'guetta, C V Yapi-Gnaoré. Morphometric and physical characteristics of Baoulé cattle in the "Pays Lobi" of Côte d'Ivoire. Livestock Research for Rural Development, 2015, 27: 124.

[21] Adanléhoussi A, H Bassowa, A Défly, K Djabakou, K Ado-méfa, N T Kouagou. The performance of the Somba cattle breed in rural areas. Tropicultura, 2003, 21: 135–141.

[22] Daikwo S I, D M Ogah, A J Amuda, U A Dike. Prediction of Body Weight of Savanna Muturu Cattle (Bos brachyceros). Asian J. Res. Anim. Vet. Sci., 2018 2: 1–6.

[23] Agbemelo K T. Contribution to the study of indigenous cattle breeds in Togo. The Lagunes breed. Master's thesis in Applied Sciences, Katibougou Rural Polytechnic Institute, Mali, 1983, 98 p.

[24] Hoste Christian, Chalon E, D'Ietezen G, Trail J C M. Trypanotolerant livestock in West and Central Africa. Vol. 3. Review of a decade. Rome: FAO, 1988, 281 p. (FAO Animal Production and Health Study, No. 20/3)

[25] Alkoiret T I, Gbangboche A B. Fertility of Lagunaire cows in Benin. Age at first calving and interval between calvings. Rev. D'élevage Médecine Vét. Pays Trop., 2005, 58: 61-68.

[26] Adjou Moumouni P F. Evaluation of the zootechnical performance of Borgou cattle selected at the Okpara breeding farm, Benin. Doctoral thesis in veterinary medicine. Inter-State School of Veterinary Science and Medicine of Dakar, 2006, No. 20, p. 121

[27] FAOSTAT. Animal production and health, pig sector, Burkina Faso, 2010, 93p.

[28] Wanké Barmou Baraatou. Processing of the fifth quarter of cattle at the Niamey Cold Storage Slaughterhouse, 2019.

[29] Samuel Bérenger Zoumbou F. Contribution à l'étude du cinquième quartier à l'abattoir frigorifique de Bamako. DOCTEUR EN MEDECINE VETERINAIR, (DIPLOME D'ETAT) Ecole vétérinaire de Dakar. Université Cheick Anta Diop. 2007, 147p

[30] Larrat, R. Manual, Veterinary Technical Agents for Tropical Livestock Farming; Paris IEMVT/SEAE. 1971, ISBN: 211002099-7. 520p

[31] Salifou CFA, Dahouda M, Boko KC, Kassa SK, Houaga I, Farougou S, Mensah GA, Salifou S, Toléba SS, Clinquart A, Youssao AK I. Evaluation of the technological and organoleptic quality of beef from Borgou, Lagunaire and Zebu Peulh breeds, raised on natural pastures, Journal of Applied Biosciences, 2013, 63: 4736-4753 ISSN 1997–5902

[32] Clinquart A, Leroy B, Dottreppe O, Hornick J L, Dufrasne I L and Istasse L. Production factors influencing the meat quality of Belgian Blue cattle. In: Belgian Blue cattle breeding. Centre of Excellence for the Agricultural Sector and its Management (CESAM) Day, 26 May 2000. Mons. 2000, 19 p.

[33] Renaud S M, Luong-van T, Lambrinidis G. Effet de la température sur la croissance, la composition chimique et la composition en acides gras des microalgues tropicales australiennes cultivées en cultures discontinues. Aquaculture, 2002, 211, 195-214. doi:10.1016/S0044-8486(01)00875-4

[34] Cartier P, Moevi I. Update on the quality of carcasses and meat from large cattle. Institut de l'Élevage: Paris, 2007, 72 p.

[35] Faye Bernard, 1997. Guide to Dromedary Breeding CIRA EMVT Montpellier, France, 1st Edition 1997, 49p.