

The Structuring of Goat and Sheep Farming in the Municipalities of the Hinterland of São Francisco Pernambucano

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Keyword— Goat farming; Local Productive Arrangement; Slaughterhouse; zoonoses; Environment; Collective Health.

Palavras - Chave— Caprinovinocultura; Arranjo Produtivo Local; Abatedouro; Zoonoses; Meio Ambiente; Saúde Coletiva.

Palabras clave— Ganadería caprina; Arreglo Productivo Local; Matadero; zoonosis; Medio ambiente; Salud pública.

Mots clés— Élevage de chèvres ; arrangement productif local ; Abattoir; zoonoses; Environnement; Santé collective.

Abstract— This article addresses the research findings on the state of the art of goat and sheep farming in the State of Pernambuco, in the municipalities belonging to the Sertão do São Francisco micro region, Afranio, Dormentes, Lagoa Grande, Petrolina, Santa Maria da Boa Vista and Orocó, pointing to the absence of public health policies regarding the situation of municipal slaughterhouses and the urgent need to improve the slaughter and transport of animals, with a view to the health of the population. As an alternative proposal, it brings the regionalization of slaughterhouses, whose structures can meet the specifications and norms of the Federal Inspection System - SIF, reducing zoonotic rates; elimination of contamination vectors; no release of waste in the open; improvement in the slaughter and processing of animals, in addition to positive impacts on the environment, such as efficiency in the treatment of effluents; atmospheric emissions control; reduction of pests and contamination vectors; elimination of sources of pollution from water sources and, above all, the recycling of water, an important asset in the Brazilian semi-arid region. This is a descriptive study, whose approach was of a quantitative-qualitative nature, approaching bibliographic review, field visit and semi-structured interview. Sampling was non-probabilistic for convenience, involving 58 agents of the APL - Productive Arrangement of Caprinovinocultura.

Resumo— Este artigo aborda os achados da pesquisa sobre o estado da arte da caprinovinocultura no Estado de Pernambuco, nos municípios pertencentes à micro região do Sertão do São Francisco, Afranio, Dormentes, Lagoa Grande, Petrolina, Santa Maria da Boa Vista e Orocó, apontando a ausência de políticas de saúde pública no que se refere à situação dos matadouros municipais e a urgente necessidade de melhoria no abate e no transporte dos animais, com vistas à saúde da população. Como proposta alternativa, traz a regionalização dos abatedouros, cujas estruturas poderão atender as especificações e normas do Sistema de Inspeção Federal - SIF, reduzindo índices de zoonoses; eliminação de vetores de contaminação; não lançamento de resíduos a céu aberto; melhoria do abate e processamento dos animais, além dos impactos positivos no meio ambiente, tais como, eficácia no tratamento dos efluentes; controle de emissões atmosféricas; redução de pragas e vetores de contaminação; eliminação das fontes de poluição dos mananciais e, sobretudo, a reciclagem da água, um bem importante na região do semiárido brasileiro. Trata-se de estudo descritivo, cuja abordagem foi de

natureza quanti-qualitativa abordando revisão bibliográfica, visita de campo e entrevista semi-estruturada. A amostragem foi do tipo não probabilística por conveniência, envolvendo 58 agentes do APL - Arranjo Produtivo da Caprinovinocultura.

Resumen— Este artículo aborda los hallazgos de la investigación sobre el estado del arte de la ganadería caprina y ovina en el Estado de Pernambuco, en los municipios pertenecientes a la microrregión Sertão do São Francisco, Afranio, Dormentes, Lagoa Grande, Petrolina, Santa Maria da Boa Vista y Orocó, señalando la ausencia de políticas de salud pública sobre la situación de los mataderos municipales y la urgente necesidad de mejorar el sacrificio y transporte de animales, con miras a la salud de la población. Como propuesta alternativa, trae la regionalización de los mataderos, cuyas estructuras puedan atender las especificaciones y normas del Sistema Federal de Inspección - SIF, reduciendo los índices zoonóticos; eliminación de vectores de contaminación; no hay liberación de residuos al aire libre; mejora en el sacrificio y procesamiento de animales, además de impactos positivos en el medio ambiente, como la eficiencia en el tratamiento de efluentes; control de emisiones atmosféricas; reducción de plagas y vectores de contaminación; eliminación de fuentes de contaminación de las fuentes de agua y, sobre todo, el reciclaje del agua, un activo importante en el semiárido brasileño. Se trata de un estudio descriptivo, cuyo abordaje fue de carácter cuantitativo-cualitativo, abarcando revisión bibliográfica, visita de campo y entrevista semiestructurada. El muestreo fue no probabilístico por conveniencia, involucrando 58 agentes del APL - Arreglo Productivo de Caprinovinocultura.

Resumée— Cet article traite des résultats de la recherche sur l'état de l'art de l'élevage caprin et ovin dans l'État de Pernambuco, dans les municipalités appartenant à la microrégion Sertão do São Francisco, Afranio, Dormentes, Lagoa Grande, Petrolina, Santa Maria da Boa Vista et Orocó, soulignant l'absence de politiques de santé publique concernant la situation des abattoirs municipaux et la nécessité urgente d'améliorer l'abattage et le transport des animaux, en vue de la santé de la population. Comme proposition alternative, il apporte la régionalisation des abattoirs, dont les structures peuvent répondre aux spécifications et normes du Système fédéral d'inspection - SIF, réduisant les taux zoonotiques ; élimination des vecteurs de contamination ; pas de rejet de déchets à l'air libre ; l'amélioration de l'abattage et de la transformation des animaux, en plus des impacts positifs sur l'environnement, comme l'efficacité du traitement des effluents ; contrôle des émissions atmosphériques ; réduction des ravageurs et des vecteurs de contamination ; l'élimination des sources de pollution des sources d'eau et, surtout, le recyclage de l'eau, un atout important dans la région semi-aride brésilienne. Il s'agit d'une étude descriptive, dont l'approche était de nature quantitative-qualitative, comprenant une revue bibliographique, une visite de terrain et un entretien semi-directif. L'échantillonnage a été non probabiliste par commodité, impliquant 58 agents de l'APL - Arrangement Productif de Caprinovinocultura.

I. INTRODUCTION

In 2018, on the eve of the majority election, the newspaper Folha de São Paulo published a public notice in defense of a liberal manifesto in which it proposed a temperance of neoliberal politicians in the excessive defense of the project of reducing the size of the State and its presence in life. of society. The publication asserted that the world situation indicated the need to promote a

movement of social considerations, hence the need to design a state that was “neither maximum nor minimum, as this is a false dilemma” (FOLHA, 2018), but essentially present and efficient. The editorial resumed the questions raised by Professor Oliveira (1988) and, in particular, the question of Kasznar (2000): “Is there an optimal size for the State?” (KASZNAR, 2000).

After more than two decades, what can be observed is that the economist's perquisitiveness persists looking for an answer, especially after two years of a global crisis caused by the Covid-19 pandemic, an infectious disease caused by the Sars-CoV-2 virus (FURLANETO et al. 2020, p. 03) - severe acute respiratory syndrome - Coronavirus 2 - (DA SILVA et al. 2020, p. 3764), which affected life in society, demanding the presence of the State in mitigating the repercussions through projects social.

Oliveira (1998), argues that "there is no optimal state size, neither maximum nor minimum" (OLIVEIRA, 1998, p. 56), regional idiosyncrasies are the parameters that determine what the State should do. in society. In the midst of this uncertainty regarding the role of the State, some sectors bring greater consensus, as most scholars on the subject agree that the privatization processes of the telephony and mining sectors were successful examples. On the other hand, Health, Education and Public Security, cause greater criticism when the transfer of State responsibility to the private sector.

In the mainstay of this debate, there is a growing share of those who consider the trend towards the extinction of the traditional "public slaughterhouse" to be irreversible, a common instrument in all Pernambuco cities, which in the last 30 years, with the increase in sanitary and environmental requirements, ceased to be unanimous and became a problem for municipal managers.

Recognized by surveys by the Brazilian Institute of Geography and Statistics (IBGE), as the holder of one of the three largest herds of goats in the country (NETO et al., 2018, p. 37), the State of Pernambuco has been facing great difficulties in the chain of goat and sheep farming, in particular, with regard to the transport and slaughter structure.

With this perception, a study was developed to diagnose the current stage of the infrastructure that involves the segment's production chain, in particular, the municipal slaughterhouse facilities, and to what extent the regionalization of structures capable of meeting the specifications and standards of the System of Federal Inspection (SIF), can contribute to the development of the Sertão do São Francisco micro-region (NETO et al., 2018, p. 41).

The etymology of the study started from the conception that the implementation of structures of slaughterhouses divided by regional poles, would make it possible to reduce economic and socio-environmental costs, representing a gain for all agents involved in the chain of the Local Productive Arrangement (APL) of goat farming, in particular, producers and consumers in the cities that are

most deprived of resources to maintain a public structure capable of meeting current health regulations.

Considering public health issues, it is clear that the vast majority of slaughterhouses visited in the region are, to a greater or lesser extent, outside the minimum specifications established by Federal Legislation. Therefore, the installation of a regionalized slaughterhouse will mean the reduction of zoonoses indices, the elimination of contamination vectors, the elimination of waste disposal in the open, a substantial improvement in matters of productive and personal hygiene, in addition to adequate facilities for the slaughter and processing of animals.

As a result of the studies, it was possible to observe that there will be gains from the environmental point of view, since a regionalized slaughterhouse will represent an efficiency gain in the treatment of effluents; the control of atmospheric emissions; the control of pests and contamination vectors; the elimination of sources of pollution from water sources and, potentially, allow the recycling of water.

In addition to the gains in terms of public and environmental health, it is important to highlight the gains from a socioeconomic point of view, such as, for example, the insertion of the family farmer in the formal market; reducing its dependence on middlemen; the improvement in the quality of the product, which could represent gains in commercialization and greater profitability of the productive activity of goats and sheep; the best use of all products available from slaughter; preventive and corrective maintenance of the facilities; in addition to gains derived from better quality management and certainly productivity gains.

II. METHODOLOGY

The production of the study was carried out through a qualitative-quantitative approach (MARCONI and LAKATOS, 2010), of the adversities faced by the productive chain of goat and sheep farming in the Pernambuco micro-region of Sertão do São Francisco. Therefore, the processes of cognition and interpretation of the phenomena identified during the research were developed in a compartmentalized way, in order to facilitate the characterization and analysis of the processes that involve the activity. Regarding the procedure used, according to Martins (2000), it can be classified as a bibliographic review, considering that, although there were a series of field visits, the explanation and discussion of the study problem took place based on in theoretical references published in scientific journals; books; academic texts; news in newspapers and other wide-reaching and fast-spreading online media.

Regarding the delineation of the study objectives, in accordance with the teachings of Gil (2008), a descriptive research was developed, considering that the main objective of the research was to describe the characteristics of the support infrastructure of goat and sheep farming existing in the municipalities of the micro-region of Sertão do São Francisco, using standardized data collection techniques (GIL, 2008).

The sampling used in this study was non-probabilistic for convenience (SAMPAIO, 1998), considering that, during this process, field visits were carried out; questionnaire and interview with 58 important agents involved with the APL of goat and sheep farming in the municipalities of Pernambuco: Petrolina, Dormentes, Afrânio, Lagoa Grande, Santa Maria da Boa Vista and Orocó. In this process, the municipality of Cabrobó was not the object of study, which despite having a herd of goats and sheep, as well as a municipal slaughterhouse located at the coordinates of Universal Transverse Mercator Projection (UTM): Zone 24, E 462668.89 m; S 9060212.43 m, in accordance with data provided by local authorities, the plant does not slaughter goats and sheep, dedicating itself only to work with cattle, slaughtering an average of 50 animals per week.

It is important to highlight that the choice of municipalities was due to the fact that they form the Sertão do São Francisco micro-region, which, according to the Ministry of Regional Development - MDR (2021), are part of the Sertão do São Francisco pole on the Rota do Cordeiro, whose purpose is to promote innovation, differentiation, competitiveness and profitability of associated enterprises" (MDR, 2017, p. 15).

The second part of the research consisted of identifying the existing slaughterhouses in the region; in collecting primary information from operators of these slaughterhouses on different aspects related to the number of animals slaughtered in these municipalities; costs charged to producers to carry out the slaughter; and in the qualitative evaluation of the conditions of these industrial plants, taking as a reference paradigm (benchmark), a slaughterhouse that meets MAPA's SIF norms and specifications.

Data collection to carry out the two stages of the research took place between November 1, 2021 and February 25, 2022. During this period, successive trips to the municipalities were carried out and contact was maintained with municipal secretaries, slaughterhouse managers, breeders and technical professionals related to productive activity. During the field visits, information was collected through semi-structured interviews (RICHARDSON, 2008), and semi-structured interviews

with the agents involved in the region's goat and sheep production chain. Parallel to these stages, a bibliographic review was carried out, which sought to identify and characterize the infrastructure of the productive chain of goat and sheep farming in operation in the municipalities of the Sertão do São Francisco micro-region.

PROFILE OF CAPRINOVINECULTURE IN THE SERTÃO DO SÃO FRANCISCO

In his ethnographic work on the cultural characteristics of goat and sheep farming in the Northeast, Zambrini (2020) highlighted that the activity is practiced in the Northeast from the colonial period to the present day, where it is carried out in a way commonly called by specialists in the field of animal husbandry, veterinary, agricultural and "extensive production mode", in which the animals are raised loose in the caatinga" (ZAMBRINI, 2020, p. 109).

In this process, the management of the animals is carried out in a system in which, predominantly, the creation grazes freely, with no control of the reproductive processes; nutritional quality of the food and, mainly, the lack of sanitary control of the herd.

Sertão Pernambucano, a region marked by its climatic characteristics, belongs to the Caatinga biome and has a climate between arid and semi-arid, but despite the limitations imposed by these environmental particularities, it is marked by being the most populous semi-arid region in the world and by having a vast economic potential based on different financial pillars, including goat and sheep farming, which has been highlighted in the national seminar.

In this portion of the northeastern hinterland, two micro-regions that stand out are the São Francisco and Itaparica regions, inserted in the São Francisco River watershed, more specifically in the São Francisco submiddle. These micro-regions have been gaining prominence with irrigated agriculture, a niche of agribusiness that has a prominent role in the national economy, which together with the production of wines and sparkling wines, represent important generators of wealth for the region.

Another important activity in the region is the raising of small ruminants such as sheep and goats. Data released by the Brazilian Institute of Geography and Statistics (IBGE), for the year 2019, indicate that this economic activity at the national level was composed of a herd of goats of 11,301 million (IBGE, 2020), and of sheep approximately 19,715 million. of animals, according to information presented by the Municipal Livestock Production report (IBGE, 2020).

When analyzed separately, the Northeast region has considerable evidence, considering that it has the largest

sheep herd in the country, with about 63% of the national herd, with 13.4% of this herd being in the State of Pernambuco, which corresponds to the third largest national herd. Also according to the IBGE (2019), the goat herd in Brazil was 9.78 million animals.

Similarly, the Northeast Region stands out with the largest herd of goats in the country, with about 93% of the national herd, while the State of Pernambuco had 2.64 million heads, that is, 25.5% of the total number of goats herd, that is, the second largest Brazilian herd, behind only Bahia (MONTEIRO, 2021, p. 11).

When the cut is made in relation to the municipalities of Pernambuco, the cities of Dormentes, Petrolina and Afrânio have the largest herds of sheep in the State, and Dormentes/PE with its herd consisting of 252,000 thousand heads is the fifth largest in Brazil. Regarding the goat herd, Petrolina and Dormentes remain among the five largest herds in Pernambuco, and this time the highlight is Petrolina/PE, with its herd of 264,000 heads (IBGE, 2020).

As for the profile of the producers, data resulting from the field collection indicate that most of the interviewees were male producers, who represent 88% of the creators. Regarding the education topic, it was identified that approximately 75% of the interviewed producers indicated they had only four years of schooling, which means a limiting factor for the development of the activity more effectively, impacting the level of participation in associations and cooperatives. However, an important factor is that 72% of respondents live in rural areas on the property, having agricultural activities as income-generating activities, valuing their living and working space.

The remaining 28% took care of trade derived from livestock and also agriculture. Regarding this part of the research, it is important to highlight that there was no questioning about the most important activity carried out, but about other activities carried out on the property. Regarding the profile of the properties and the forms of management and production carried out, it was observed that 51% of the producers diversify the animal species, in a combination of practices that involve herds of cattle, goats, pigs and chickens, both for consumption and for commercialization.

In this scenario, considering the percentage of producers who work with only a single species, 26% raise only sheep; 13% raise goats; 10% raise cattle and 2% pigs. Considering these percentages, it can be concluded that the creation of a single herd is carried out by almost half of the producers in the Sertão do São Francisco micro-region, where the sheep herd is the one that appears most frequently, being created by 68% of the producers. ,

followed by goats, by 48% of those surveyed and, finally, cattle and swine, which reached 28% and 15%.



Fig.1 Herds of goats and sheep in the Sertão do São Francisco region.

Source: CODEVASF(2020); BESERRA (2021)



Fig.2 – Herds of goats and sheep in the Sertão do São Francisco region.

Source: CODEVASF(2020); BESERRA (2021)

It is important to note that the information presented above describes the profile of the surveyed producers according to the existence of goat, sheep, cattle and swine herds in the region. Regarding the size of the properties, the studies carried out identified that those with up to 40 hectares correspond to approximately 45% of the total properties surveyed, while properties above 140 ha corresponded to 17%, with the approximate average size of 50 hectares.

Still referring to the profiling process of the surveyed properties, when the time of activity in the practice of livestock activity is taken into account, most of the interviewed producers revealed to have up to 15 years of experience, however, considering those with more than 20 years in the activity productive, cattle and goat farmers have a higher proportion of producers in this range than in the case of sheep and swine farmers. In part, this result reflects the fact that goat farming is the most traditional livestock activity in the Sertão do São Francisco micro-region, even surpassing cattle farming, which stands out in the Sertão do Araripe regions and, in particular, in the Pernambuco countryside.

SLAUGHTER STRUCTURE IN THE SERTÃO DO SÃO

FRANCISCO REGION

Data from the Prodetec Agency (2018), indicate that the Northeast has areas dedicated to beef cattle, despite the marked differences in soil and climate in relation to the main beef cattle regions in Brazil. Its population, whose rising average income in recent years represents a reasonable consumption market. This could be a great opportunity for goat and sheep farming, however, studies by BNB-Etene indicate that one of the main problems of goat and sheep meat in the Northeast is the lack of standardization of the carcass, mainly motivated by the predominance of the extensive system of rearing, variation in slaughter age and breed diversity.

In the region, the slaughtering and processing of goat and sheep meat generated around eight thousand direct jobs in 2008, with a concentration in the states of Bahia, Maranhão and Pernambuco. In the same period, 393 factories were registered in the region, of which 138 in the States of Bahia, 58 in Pernambuco, 46 in Maranhão and 24 in Ceará.

Information collected from the Goat and Sheep Market Intelligence Center (CIM) and disclosed by the researcher from the Brazilian Agricultural Research Corporation (EMBRAPA), highlights that despite the existence of inspected slaughterhouses in all Brazilian geographic regions, they are still in number insufficient and disproportionately distributed in relation to the concentrations of goat and sheep herds in producing States. Data from this research indicate that of the 149 slaughterhouses surveyed, only 15.54% are located in the Northeast Region, which holds 92.82% of the goat herd and 65.59% of the national sheep herd. The South Region, which owns 1.85% of the goat herd and 24.0% of the Brazilian sheep herd, has 68.91% of the slaughterhouses inspected.

Slaughterhouses should not be confused with the municipal slaughterhouses that exist in most Northeastern cities, as the former is based on self-sustainability, organize the slaughter chain in an integrated manner with municipal and state agencies, guaranteeing meat quality, while Slaughterhouses are structures that do not comply with current legal and environmental standards, do not have adequate infrastructure from a sanitary point of view and workers are exploited, without the labor rights provided for by law, especially Ordinance No. 365, of July 16, 2021, which regulates pre-slaughter and humane slaughter management and the stunning methods authorized by MAPA for slaughterhouses (MAPA, 2021).

The regulation of this process is far from occurring in all municipalities and depends on joint actions by inspection bodies, involving transport, packaging and marketing of

meat and its derivatives, as well as the implementation of strategies aimed at revitalizing livestock production in the region as for example, increased funding for genetic improvement and the infrastructure of properties and actions that aim to improve technical assistance, increasing the use of production and management technologies that provide the profitability of the activity of beef goats and sheep, the productive activity most ingrained in the culture of the region.

One of the possibilities that presents itself as a viable alternative is the installation of regionalized slaughterhouses with capacity to export meat produced in the region, however, the closing of municipal slaughterhouses will certainly bring unemployment, which intimidates managers, highlights this entrepreneur:

“the clandestine slaughterhouses generate income for the people who work with the viscera, mainly with the washing part. Without this income, they will be unprotected, and this situation is not comfortable for the mayor” (Verbal statement on January 12, 2022).

The recommendation, therefore, is that, in parallel with the closure of the slaughterhouses, requalification actions be implemented for the people who currently depend on the slaughterhouses, so that it is possible to train them in other activities. Training actions for the general population are necessary, showing the importance and need to consume only meat that has had the proper treatment. This is undoubtedly an important challenge for local authorities, but it is essential to ensure public health.



Fig.3: Clandestine slaughterhouse in the Sertão Pernambuco

Source: DATAMETRIC (2015)

On the other hand, it seems evident that actions to close slaughterhouses have to come from the Public Ministry or even from state agencies, such as the Pernambuco State Agricultural Defense and Inspection Agency (ADAGRO). As for anonymity, some municipal managers confided that they would like to get rid of the problem, which are expensive structures, as long as the

initiative is not theirs. One manager even said “I don’t close it myself, but if ADAGRO and the Public Ministry close, I think it’s good” (Verbal statement on November 4, 2021). It is clear, however, that maintaining a slaughterhouse consumes a significant part of the municipal budget, which discourages action.

Data from the Department of Agriculture and Agrarian Reform (SARA) of the state of Pernambuco indicate that the Zona da Mata region of Pernambuco has eight slaughterhouses that operate in a regionalized manner, with a total slaughter capacity of 14,800 animals per month and 20 meat warehouses, across the region. Some lessons are drawn from the experiences of these industrial plants, which can contribute to the implementation of a refrigerated slaughterhouse system in the Sertão do São Francisco micro-region.

The concentration of animal slaughter was extremely important for the municipalities and for the Zona da Mata region, since this form of management of the production chain values economic development and the improvement of the production process, allowing quality management in the processes involving slaughter.

However, the slaughterhouses currently in operation, including those in the Zona da Mata of Pernambuco implemented through the PROMATA program, have been facing difficulties in the management of structures, due to the high maintenance costs. A clear example of this condition was identified in the city of Cabrobó/PE, which has a slaughterhouse maintained by the city, where an average of 50 animals are slaughtered weekly, all bovines, at a rate of R\$ 70.00 (seventy reais) per animal, insufficient collection to cover the costs of employees and supplies. In the municipality of Paudalho, there is a similar reality. It is an equipment managed by the Pernambuco Supply and Logistics Center - CEASA, where the structure was financed by the State, but even so, it faces difficulties to maintain.

The problem of managing public slaughterhouses is also cultural, as stated by Neto et al (2018, p.37). In his view, the management of slaughterhouses must be carried out by the private sector, which must pay its workers and bear the maintenance costs. However, even in these cases, the collection represents approximately 35% (thirty-five percent) of general expenses, which has forced public managers to complement the operating costs with public resources.

Another point that needs to be worked on is the marketing of meat, because it is useless to carry out the slaughter in a suitable environment and within the techniques regulated by MAPA, if the seller places the meat in a market stall exposed to dust and handling and without

refrigeration. Reforms in public meat markets, with the installation of cold chambers, need to be done in order to ensure the quality of the meat.

PICTURE OF MARKETING

The research also sought to identify aspects related to the commercialization of animals. The most interesting and, at the same time, worrying result is the destination of the animals. As can be seen, the results show a great dependence of producers in the region on middlemen. The extent to which a regionalized slaughterhouse will improve livestock activity and the producers' standard of living will, to a certain extent, depend on reducing the role of the middleman in the animal marketing process.



Fig.4: Commercialization of Goats and sheep in the Pernambuco hinterland

Source: BESERRA (2022)

Regarding the average weight of the animals in the herds surveyed, the first aspect considered was the weight at the time of sale. The results show that about 42% of goats are sold weighing up to 20kg, while 46% weigh between 21 and 40kg at the time of sale. The average weight of goats in the region is around 29 kg at the time of sale. In the case of sheep, they are sold with an average weight of 32 kg, which presented higher values than in the case of goats. Almost half of the sheep, ie 49% of the animals, weighed between 21 and 40 kg at the time of sale.

When the question referred to the selling price of the animals at the time of sale, considering the price per kilogram (Kg) at the time of sale in the last semester, 60% of the goat farmers interviewed indicated that they had sold their animals for a price between R\$16.00 to R\$20.00, although an important portion can get prices up to R\$21.00. On average, the kilogram is sold at R\$ 19.00. A similar behavior is observed in the sheep herd, in which 55% of those consulted indicated that they had sold their flocks at prices between R\$16.00 and R\$20.00. Again, an important fraction, equivalent to 39% of producers, obtain prices of up to R\$ 22.00.

Regarding the number of animals sold in the last year, when considering the goat herd, a percentage equivalent to 53% of the surveyed producers indicated that they sold up

to 100 animals in the last year. The average among all goat farmers is 59 heads per year, while the total number of animals sold among the surveyed goat farmers was 8,491 animals. In the case of sheep, a number equivalent to 67% of the interviewed producers indicate having materialized in the range of up to 40 heads per year, with the average number of animals sold per year higher than the goat herd.

Considering the revenue from the annual sale of animals (live and slaughtered), 37% of the producers obtain up to R\$ 8,500.00. The average value among producers is R\$ 11,000.00 per year. Considering the value of the minimum wage of R\$ 1,100.00, this result means that, on average, a producer in the region has an average annual income equivalent to 9 minimum wages. It is important to note that this average income is an average among all producers, considering the different profiles. How much each producer receives depends on the herd combination they own and as producers have the most varied herd combinations, the annual value of the sale of animals therefore differs between them.

An interesting result is that 51% of the interviewed producers stated that they had no other source of income on or off the property other than livestock.

Therefore, for at least 51% of producers, livestock activity is the main source of income, considering all possible activities, whether inside or outside the property. Clearly, these results indicate that any action that aims to increase the average income of livestock in the region will certainly have an important impact on the income and well-being of the families that depend on this activity.

Still within the marketing aspect, the research sought to identify the destination of sales. A very interesting and at the same time worrying result is the destination of the producers' sales. As it will be possible to observe in the interviews carried out, for all herds, most producers sell their animals to middlemen. In the case of the goat herd, for example, about 87% of the animals are sold directly to middlemen and only 13% are destined for slaughterhouses. A similar behavior was observed in the sheep herd, where about 88% of the animals are sold to middlemen, in which case 7% of sales are destined for municipal slaughterhouses and 5% for slaughterhouses in an irregular situation.

In summary, the results show a high percentage of all herds destined for middlemen. From the producer's point of view, the figure of the middleman represents a service, as he ends up being responsible for purchasing the animal, transporting it to the slaughterhouse and then selling it. Since livestock production per producer in the region is relatively small, the cost for the producer in terms of transport and time to use the slaughterhouse, and himself being responsible for marketing is relatively high and ends

up being an impediment. In this sense, when the middleman buys animals from different producers and is responsible for the transport, slaughter and commercialization, he ends up having gains in scale and bargaining power, something that the individual producer would not be able to do.

The problem, obviously, is that when providing the service, the middleman is remunerated for it and this remuneration is partially or totally "paid" by the producer, thus reducing his remuneration. One way to reduce the importance of the middleman and thereby try to increase the gains for producers in the region would be to encourage them to form associations and/or cooperatives, something that is apparently still incipient in the region.

SLAUGHTERHOUSE INFRASTRUCTURE IN THE SERTÃO DO SÃO FRANCISCO REGION

Producers were asked to evaluate the hygienic conditions of the slaughterhouse that is usually used for the slaughter of animals. Interestingly, none of the producers evaluated the hygiene conditions as excellent, and 31% evaluated the conditions as good or regular and 39% as bad or very bad. In fact, the hygienic conditions of the slaughterhouses in the region are quite precarious and this is evident for everyone, including the producers.

The research also sought to identify the determining elements of the choice of the place of slaughter of the animals. Interestingly, 41% of the producers who use slaughterhouses said that the hygienic conditions of the place would be a determining factor. This result is interesting because, as evidenced by visits to municipal slaughterhouses, all of them have unsatisfactory hygiene conditions. In other words, despite the importance of hygiene in determining the place of slaughter, they continue to use slaughterhouses that are considered flawed in this regard. Obviously, the lack of slaughterhouse options that meet hygiene standards leads to this apparently contradictory result. The other factors consisted of the cost of the slaughter fee, the cost of transport, proximity to the place of sale and distance to the slaughterhouse. In particular, the latter three partially explain why many producers prefer to sell their animals to middlemen.

The hygiene aspect becomes even more worrying, because the survey identified that the vast majority of producers (76%) do not know the hygienic-sanitary norms and standards established by the Federal Inspection Service. Therefore, it is likely that based on a better knowledge of such norms and standards, the assessment of the hygiene standards currently used in slaughterhouses in the region would be even worse. Naturally, the installation of a slaughterhouse that meets the norms of the Federal Inspection Service, even when such norms are not known,

is seen by most producers (98%) as something very positive. Among the reasons given for the positive evaluation, 68% of the producers stated that the installation of a slaughterhouse would increase the producer's chances of commercialization.

This result is interesting because, as previously demonstrated, a significant percentage of producers sell their production to middlemen. The second most important reason for the positive evaluation was the decrease in the intake of contaminated meat, which in turn is related to the hygiene of the place where the animals are slaughtered. However, in the view of the producers, the installation of a slaughterhouse that meets the federal inspection standards would alleviate two problems faced by producers, the first reducing the dependence on middlemen and the second improving the quality of the product, which in turn could mean the possibility of obtaining better sales prices and also, from the point of view of consumers in the region, would mean a gain in well-being.

When asked if they would be willing to pay a higher price for the slaughter of animals, if the slaughterhouse met federal inspection standards, 87% of producers responded positively. However, despite the willingness of producers to pay a higher slaughter fee, this does not necessarily mean that they will use such a slaughterhouse and this for some reasons that stand out in the research results. First, there is the issue of distance, because unless one slaughterhouse is installed per municipality, this will be a problem to be faced by the producer in the municipality not served by him.

This was confirmed when the research sought to know the reasons that would lead producers to use a slaughterhouse that met federal inspection standards. Added to the answers related to the question of distance/transport of animals, 34% of the producers expressed that such reasons would be decisive in the use of the slaughterhouse.

Second, despite their willingness to pay more, the survey did not identify how much more they would be willing to pay. 16% of producers stated that they would use the slaughterhouse if the slaughter fee was equal to the amount currently paid by them. Therefore, this aspect represents a restrictive factor to be considered before the installation of a new slaughterhouse in the region that meets the federal inspection norms, since, naturally, the amount charged for the slaughter fee will tend to increase, if the intention is that the slaughterhouse is maintained with its own resources. An interesting aspect is also the role of inspection bodies, since 12% of respondents stated that they would use the slaughterhouse only if they had to.

CHALLENGES OF BREEDING IN THE SERTÃO

DO SÃO FRANCISCO

The survey also sought to identify the main problems faced by producers in raising animals and 34% of them stated the lack of water as the biggest challenge; 23% considered diseases; 15% marketing and 17% food shortages. The lack of technological support was also pointed out by 8% of the producers.

When we tried to identify the actions developed by the government and the Installation, the action of private initiative was verified, as is the case of the Petrolina/PE slaughterhouse, which since 2020 has been managed by a company, and in these two years of operation has been resuming the actions of the enterprise that had its activities suspended by the MPPE.

Also worthy of note is the case of the Agricultural Cooperative of Integrated Rural Producers of Goats and Sheep of the Northeast (CAPRICON), which in 2017 started to manage the goat and sheep slaughterhouse of Rajada, in the Rural Area of Petrolina/PE, as well as the slaughterhouse refrigerator built by the Companhia de Desenvolvimento dos Vales do São Francisco e Parnaíba (CODEVASF) in the Rural Area of Dormentes/PE, completed in early 2022.

Despite these success stories, structural problems still persist, such as the lack of potable water and tributary treatment plants in some of the municipalities in the region, promotion of the use of technology for the genetic improvement of the herd, access to bank credit and direct financing for the structuring of the production chain.

III. FINAL CONSIDERATIONS

Regarding the proctive activity of goat and sheep farming, the Sertão do São Francisco micro-region in Pernambuco can be a paradigm for an analysis of the other regions of the Pernambuco hinterland. Part of the State, without a shadow of a doubt, needs investments in the qualification of the production chain, especially in the genetic improvement of the herd, qualification of slaughterhouses and in the commercialization points of public fairs, existing in the region.

During the period of the research, the precariousness of the vast majority of existing municipal slaughterhouses was observed, both with regard to hygiene issues and infrastructure and equipment, with emphasis on the fact that many of the equipment currently in operation in the municipalities, in the past, they had already been through such precarious situations that the MPPE had to defend the interdiction and closure of some of them.

It was also evident, given the size of the municipalities that make up the region under study, that

hardly a municipality alone will have the financial conditions to maintain a slaughterhouse respecting the necessary standards to obtain the SIF with MAPA, as well as to carry out a production in scale and sanitary quality standard that can justify its implementation. In this sense, a possible solution is the implementation of regionalized slaughterhouses, whose management is carried out by the private sector, allowing the resources available in the municipalities to be directed to areas where the presence of the State is more urgent, such as health and basic education, public security and surveillance. health of production activities, with the potential to cause damage to health and the environment.

To this end, many challenges will be faced and the participation of supervisory bodies effectively in the process is essential. Finally, it is worth noting that although the installation of a slaughterhouse in the region is well regarded by producers, there are other structuring demands that need to be met, among which the need for greater technological and financial support for the improvement of the herd stands out. since goat farming in the region is still of low technological intensity, which, as explained above, reduces productivity and inhibits its development.

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