

Food Security and Economic Impacts of Fetal Wastages in Sheep and Goats in Jigawa State, Nigeria

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Abstract

Fetal wastage from the slaughter of pregnant small ruminants represents a significant concern, both in terms of economic losses and its impact on sustainable livestock management. This study quantifies the incidence of fetal wastage in sheep and goats across three abattoirs in Jigawa State (Dutse, Hadejia, and Ringim) and explores the economic implications of the practice. Data obtained were analysed using descriptive statistics. The result revealed that a total of 821 ewes (38.8%) and 1,241 does (52.9%) were slaughtered at Dutse abattoir, with 356 ewes (43.4%) and 637 does (51.3%) found to be pregnant. Fetal wastage from these pregnant animals resulted in the loss of 403 foetuses (49.1%) from ewes and 721 foetuses (58.1%) from does. In Hadejia abattoir, 985 ewes (52.8%) and 1,037 does (52.3%) were slaughtered, of which 464 ewes (47.1%) and 564 does (54.4%) were pregnant, resulting in the loss of 512 foetuses (52.0%) from ewes and 673 fetuses (64.9%) from does. At Ringim abattoir, 503 ewes (60.2%) and 746 does (71.6%) were slaughtered, with 374 ewes (74.4%) and 389 does (52.1%) being pregnant. Fetal wastage amounted to 392 fetuses (77.9%) from ewes and 453 fetuses (58.3%) from does. The cumulative economic loss across all three abattoirs for the period of March to May 2024 was estimated at ₦170,685,700. This significant fetal wastage presents a threat to food security, the conservation of genetic potential, and the sustainability of meat production. To address these issues, the slaughter of pregnant animals should be discouraged, and veterinary authorities should enforce stringent ante-mortem pregnancy screenings. The use of ultrasonography for pregnancy detection and educating butchers and farmers on the implications of slaughtering pregnant animals are recommended to mitigate these losses and ensure long-term livestock productivity.

Keywords: Fetal wastages, Food security, Goat, Sheep.

1. Introduction

The livestock sector plays a critical role in the economic livelihoods and food security of developing nations, contributing significantly to income generation, nutrition, and employment (FAO, 2021). The human population is increasing along with the demand for food rich in protein. This rapid growth poses challenges to food security especially in developing countries. Nigeria falls among countries with very low per capita production and consumption of animal protein. The animal protein intake: eggs, meat, milk and fish per capita per day in Nigeria has been estimated at 14.85 g, with meat alone representing 6.8g (Ada, 2010). The human population of Nigeria grows at an estimated 3.5% per year and the livestock resources grow between 0.8% and 2.9% per year. The FAO projects a 73% increase in meat consumption by 2050 and that much of the future demand for livestock will be met by large scale/intensive operations (Alexandratos and Bruinsma, 2012). However, the growth rate of ruminant production is too slow to cope with the per capita requirements in Nigeria.

Small ruminants, particularly sheep and goats, are important assets in both urban and rural households due to their adaptability to harsh environments and their potential for producing meat, milk, hides, and wool. In Nigeria, the small ruminant population is estimated to exceed 43 million (NBS, 2022), with the sector contributing around 30% of the nation's livestock production (NPC, 2023). Sheep and goats require minimal housing space, consume relatively small amounts of feed, and provide both meat and milk in quantities ideal for family consumption. As the primary small ruminants in Nigeria's livestock industry, they are key sources of protein, essential minerals, and vitamins. However, the indiscriminate slaughter of breeding stock and pregnant animals results in the loss of fetuses and reproductively active dams, which has detrimental effects on food security, livestock production potential, and the economy as a whole (Smith, 2014). The indiscriminate slaughter of pregnant sheep and goats leading to fetal wastage, has proven to be counterproductive to efforts aimed at enhancing food security, economic growth, and livestock production in Nigeria (Ahmad, 2015). This practice undermines the work of breeders and nutritionists, exacerbating the shortage of animal protein needed for human consumption. Despite this, the slaughter of pregnant ewes and does remains prevalent in Nigerian abattoirs, causing significant economic losses and wasting valuable edible parts of lambs and kids. This not only threatens food security but also reduces the nutritional value of animal-based foods available to humans. For pastoralists, agro-pastoralists, and the livestock industry as a whole, this wastage presents a serious concern, further complicating efforts to bridge the gap in animal protein supply and livestock sustainability (Muhammad, 2012).

Fetal wastage in livestock is often driven by economic pressures, limited veterinary and extension services in rural areas, the sale of animals without knowledge of their reproductive status, and inadequate ante-mortem inspections at abattoirs (Chuko et al., 2015; Nonga, 2015). These unsustainable practices, including the slaughter of pregnant and reproductively active animals, severely harm food security, livestock growth potential, and the economy. Tackling these issues is essential to safeguard Nigeria's livestock industry and ensure a stable food supply for the future. Data on economic losses from fetal wastage in small ruminants is scarce, particularly in Jigawa State (Alaji, 2013), limiting strategic planning for animal food security. This study seeks to quantify fetal wastage in three major abattoirs in Jigawa State, Nigeria, and provide an analysis of the economic losses incurred as a result of this practice.

2. Materials and Methods

2.1 Study Area

This study was conducted at three major abattoirs in Jigawa State: Dutse, Hadejia, and Ringim. These locations were selected due to their prominence as regional centers for livestock trading and slaughter. Jigawa State, located in the semi-arid zone of Nigeria, is characterized by mixed farming systems, with small ruminants forming a crucial component of the agricultural landscape.

2.2 Data Collection

Data were collected over a period of six months (January to June 2024). A total of 10,187 sheep and goats were surveyed, with particular attention paid to the sex of the animals and the incidence of pregnancy. Post-slaughter inspections were carried out to identify the number of pregnant females and to count the number of fetuses recovered. Additionally, interviews with abattoir personnel and livestock traders provided insights into local slaughter practices and the economic incentives driving the slaughter of pregnant females.

2.3 Data Analysis

The data collected were analysed using descriptive statistics to calculate the percentages of females slaughtered, pregnancy rates, and fetal wastage. Economic losses were estimated based on local market prices for live animals and the average number of fetuses recovered per pregnant female. The statistical software SPSS (version 26) was employed for data analysis, while the economic loss was calculated using average market values provided by local livestock traders.

$$\text{Prevalence of foetal wastage} = \frac{\text{wasted foetues}}{\text{total number females slaughtered}} \times 100$$

$$\text{Prevalence of pregnant female} = \frac{\text{pregnant females}}{\text{total number females slaughtered}} \times 100$$

Economic loss was estimated as described by Mshelia *et al.* (2015) and Adeyemi *et al.* (2016). Given that fetuses wasted were allowed to mature into adults and the average price of a mature sheep and goat at the time of the study was ₦ 70,000 and ₦ 43,300, respectively, number of fetuses was multiplied by the average unit price thus; Amount lost = (total number of fetuses wasted) x (the average price of a mature animal).

3. Results and Discussion

3.1 Incidence of Fetal Wastage

The data from this study reveal an alarming rate of fetal wastage in the slaughtered small ruminants, specifically sheep (ewes) and goats (does), across the three abattoirs studied in Jigawa State, Nigeria. A considerable number of these animals were pregnant at the time of slaughter, contributing to the destruction of potential future livestock. Table 1 shows that in Dutse abattoir, 38.8% of ewes and 52.9% of does were pregnant. At Hadejia abattoir, the pregnancy rates were 47.1% for ewes and 54.4% for does, while at Ringim, the highest pregnancy rates were observed, with 74.4% of ewes and 52.1% of does being pregnant. In total, the number of fetuses wasted was significant, with 721 fetal losses from pregnant does and 403 from ewes in Dutse alone. Similarly, 512 fetuses were lost from ewes and 673 from does in Hadejia. In Ringim, 392 ewes and 453 does had their fetuses wasted. These findings point to the substantial loss of potential livestock that could have contributed to breeding programs or meat production. Comparable rates of fetal wastage have been documented across sub-Saharan Africa. For example, Goossens *et al.* (1998) found a 60% pregnancy rate among slaughtered female goats in The Gambia, while Bokko (2011) noted that 34.3% of ewes slaughtered in Sokoto, Nigeria, were pregnant. This widespread issue suggests that across the region, the absence of proper ante-mortem pregnancy inspections continues to result in significant losses, reducing both current livestock numbers and the future reproductive capacity of herds.

Table 1: Distribution and Incidence of Fetal Wastage in Sheep and Goat

| Location | Animal | Total Slaughtered | Females (%) | Pregnant Females (%) | No. of Foetuses (%) |
|----------|--------|-------------------|-------------|----------------------|---------------------|
| Dutse | Goat | 2348 | 1241 (52.9) | 637 (51.3) | 721 (58.1) |
| | Sheep | 2114 | 821 (38.8) | 356 (43.4) | 403 (49.1) |
| Hadejia | Goat | 1983 | 1037 (52.3) | 564 (54.4) | 673 (64.9) |
| | Sheep | 1864 | 985 (52.8) | 464 (47.1) | 512 (52.0) |
| Ringim | Goat | 1042 | 746 (71.6) | 389 (52.1) | 453 (58.3) |
| | Sheep | 836 | 503 (60.2) | 374 (74.4) | 392 (77.9) |

No = Number. Source: Field Survey, 2024. Values in parenthesis are in percentage

3.2 Factors Contributing to High Fetal Wastage

Several factors contribute to the widespread fetal wastage observed in Nigerian abattoirs. One of the primary drivers is the economic incentive for butchers and traders to slaughter pregnant females. Larger, heavier animals are perceived to offer more meat and a more appealing carcass for consumers. Interviews with local butchers and livestock traders revealed that pregnant females, particularly those visibly carrying more weight, were often sold at higher prices, reinforcing this practice. This is consistent with findings by Swai *et al.* (2015) in Tanzania, where pregnant animals were also sold at a premium due to their increased weight. Additionally, the absence of pregnancy diagnosis protocols in abattoirs plays a crucial role. In most Nigerian abattoirs, particularly in rural and semi-urban areas, there is little to no infrastructure for detecting pregnancy in livestock prior to slaughter.

Diagnostic tools like ultrasonography are standard in developed countries for identifying pregnancy, but they are rare in sub-Saharan African abattoirs (Muhammad et al., 2009). This technological gap means that pregnant animals are often slaughtered unknowingly, leading to significant fetal losses. Furthermore, veterinary inspections that could flag pregnant animals are often either absent or inadequate in smaller abattoirs, exacerbating the problem. Another factor is the cultural practices surrounding livestock management. Many smallholder farmers are unaware of the pregnancy status of their animals when selling them. Livestock in rural settings are typically sold when immediate financial needs arise, regardless of the animal’s reproductive potential. This results in a cycle where pregnant animals, sold for slaughter, are lost to the breeding pool.

3.3 Economic Losses from Fetal Wastage

The economic repercussions of fetal wastage are severe. Table 2 provides an estimate of the financial losses attributable to fetal wastage in the three abattoirs studied. During the three-month study period (March-May 2024), the total economic loss from the destruction of fetuses was calculated at ₦170,685,700. This figure represents the projected market value of the fetuses that were wasted, assuming these animals would have been raised to market weight and sold. The losses incurred are significant not only for the individual farmers but also for the broader economy, as they reduce the potential breeding stock and contribute to long-term financial losses for the livestock sector. The economic burden extends beyond immediate market losses. The destruction of unborn animals also diminishes the future genetic pool of livestock. Small ruminants such as goats and sheep are critical to the rural economy in Nigeria, where they provide meat, milk, and other animal products essential for food security and income generation. By killing pregnant animals, abattoirs are undermining the reproductive potential of livestock populations, which has long-term consequences for both production and income. The economic losses documented in this study echo those from other parts of Africa, including Tanzania and South Africa, where fetal wastage has led to millions of naira in annual losses (Swai et al., 2015; Fayemi and Muchenje, 2013).

Table 2: Estimated Economic Loss of Fetal Wastages From Sheep And Goat

| Location | Animals | TNAS | TNF | MF | FF | Average Unit Price (₦) | Economic loss (₦) |
|-------------------|---------|------|-----|-----|-----|------------------------|----------------------|
| Dutse | Goat | 2348 | 721 | 294 | 427 | 43, 300 | 32, 219, 300 |
| | Sheep | 2114 | 403 | 242 | 161 | 70, 000 | 28, 210, 000 |
| Hadejia | Goat | 1983 | 673 | 354 | 319 | 43, 300 | 29, 140, 900 |
| | Sheep | 1864 | 512 | 357 | 155 | 70, 000 | 35, 840, 000 |
| Ringim | Goat | 1042 | 435 | 197 | 238 | 43, 300 | 18, 835, 500 |
| | Sheep | 836 | 392 | 189 | 203 | 70, 000 | 27, 440, 000 |
| Total Loss | | | | | | | 170, 685, 700 |

Source: Field Survey, 2024.

Key: TNAS: Total number of animals slaughtered, TNF: Total number of fetuses, MF: Male fetus , FF: Female fetus

3.4 Implications for Livestock Breeding and Food Security

The high rate of fetal wastage not only has immediate economic impacts but also threatens the sustainability of livestock production in the region. With a large proportion of pregnant animals being slaughtered, the overall reproductive capacity of livestock populations is significantly reduced. This diminishes the availability of animals for breeding and undermines efforts to improve the genetic quality of livestock. In particular, the loss of unborn fetuses from genetically superior or highly productive animals is a setback for breeding programs aimed at improving livestock performance, meat quality, and resilience to diseases or environmental stresses. In addition to the economic and food security concerns, the slaughter of pregnant animals raises significant ethical and environmental issues. From an ethical standpoint, the destruction of viable fetuses can be seen as a wasteful and cruel practice, particularly when alternatives exist. The introduction of modern diagnostic technologies, such as ultrasound, could significantly reduce fetal wastage by allowing butchers to identify and spare pregnant females from slaughter. However, the lack of access to these technologies in rural areas continues to perpetuate this

practice. Environmentally, the loss of potential livestock has consequences for land use and resource management. Small ruminants are typically raised in pastoral or semi-pastoral systems, where their productivity is closely tied to the availability of grazing land. The unnecessary slaughter of pregnant animals reduces the number of livestock that can be raised on available land, leading to inefficiencies in land use and reduced productivity from existing agricultural resources. This is particularly concerning in regions where climate change and environmental degradation are already placing pressure on grazing systems and water availability.

4. Conclusion and Recommendations

The slaughter of pregnant small ruminants in Jigawa State presents a significant challenge with wide-ranging economic, ethical, and environmental implications. The high incidence of fetal wastage observed in this study highlights the need for immediate action to protect both the genetic potential of livestock and the livelihoods of farmers who depend on these animals for income and food security. To address this issue, we recommend the following measures:

1. Enforce stringent ante-mortem inspections: Veterinary authorities must enforce policies requiring thorough checks for pregnancy in female livestock before slaughter.
2. Adopt ultrasonography or other pregnancy diagnostic tools: The introduction of modern diagnostic technologies in abattoirs, even at the rural level, would significantly reduce fetal wastage.
3. Public awareness and education: Farmers, butchers, and traders must be educated on the long-term economic consequences of slaughtering pregnant animals, as well as the benefits of sparing them for breeding.
4. Government support: Financial and technical support from the government can help abattoirs acquire the necessary tools for pregnancy detection and offer incentives for not slaughtering pregnant animals.
5. Legislation and penalties: Implement laws that penalize the slaughter of pregnant animals and incentivize abattoirs and traders to engage in more ethical livestock management practices.

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References

- Ada, W. (2010). Implications of the slaughter of pregnant ewes and does on food security and future stock in Ebonyi State, Nigeria. *Journal of Animal and Veterinary Services* **68**: 819-822
- Adeyemi A.B., Adamu M., Dawuda P.M. & Oyedipe E.O (2016). The economic implications of foetal wastage in cattle, sheep and goats in Makurdi abattoir, Benue State, Nigeria.
- Ahemen, T. and Zahraddeen, D. (2010). Species contribution as source of meat and their fetal wastage in Taraba State, Nigeria. *Archive of Applied Science Research* **2**: 85- 91
- Ahmad, S. (2015). Parental wastage in small ruminants in Sub-Saharan Africa. International Livestock Centre for Africa (ILCA), Addis Ababa, Ethiopia.
- Alaji, A. (2013). Prevalence and economic implications of goat and sheep fetal wastage in an abattoir in North Central Nigeria. *Tropical Animal Health and Production* **43**: 587292.
- Alexandratos, N. and Bruinsma, J. (2012). World agriculture towards 2030/2050: the 2012 revision. ESA Working paper No. 12-03. Rome, FAO, 2012
- Bokko, P. B. (2011). Fetal wastage in sheep and goats slaughtered at Sokoto metropolitan abattoir, Sokoto, Nigeria. *Veterinary Science*, **4**(1), 3440.
- Bokko, P. B. (2011). Pregnancy wastage in sheep and goat in the Sahel region of Nigeria. *Nigerian Veterinary Journal* **32**: 120-126.

- Chuko T, Wakayo BU, Mohammed O & Dawo T.F. (2015). Small ruminant foetal wastage at Asella abattoir in central Ethiopia: Reflection on potential country level implications. *International Journal of Livestock, Research*, doi:10.5455/ijlr.20151005105350.
- Fayemi, P. O. and Muchenje, V. (2013). Maternal slaughter at abattoirs: history, causes, cases and the meat industry, *Spring Plus* 2: 125
- Fayemi, P. O., & Muchenje, V. (2013). Fetal deaths and slaughter of pregnant cows: Implications for animal welfare and food production. *Food Security*, 5(3), 605608.
- Fayemi, P. O., & Muchenje, V. (2013). Slaughter of pregnant cows for human consumption in developing countries: A review of fetal wastage and its implications. *Journal of Agricultural and Environmental Ethics*, 26(3), 505518.
- Goossens, B., Osaer, S., Kora, S., Chandler, K. J., Petrie L., Thevassagayam J. A., Woolhouse T & Anderson J. (1998) Abattoir survey of sheep and goats in The Gambia. *The Veterinary Record* 142(11): 277-81
- Goossens, B., Osaer, S., Kora, S., Chandler, K., & Van Wingham, J. (1998). Abattoir survey of sheep and goats in The Gambia: Fetal wastage. *Tropical Animal Health and Production*, 30(4), 271278.
- Goossens, B., Osaer, S., Kora, S., Jaitner, J., Ndao, M., & Geerts, S. (1998). Abattoir survey of small ruminants in The Gambia. *Veterinary Research*, 29(6), 521530.
- Han, M. L. and Khan, A. (1989): Frequency of pregnant animals slaughtered at Faisalabad abattoir. *J. Islamic Acad. Sci.* 2: 82-82.
- Mshelia GD, Maina VA & Aminu MD (2015). Foetometrics and economic impact analysis of reproductive wastages in ruminant species slaughtered in north-eastern Nigeria. *Journal of Animal Production Advances*. 5(4): 645-653
- Muhammad BF, Haruna IY, Abdulsamad A.M & Bichi J.M (2009). Foetal Wastage in Northern Nigerian: The Case of Gombe Abattoir, Gombe State. In: Proceedings of the 13th Annual Conference of Animal Science Association of Nigeria held at Ahmadu Bello University, Zaria 124-127.
- Muhammad, B F., Haruna, I. Y., Abdulsamad, A M. and Bichi, J. M. (2008). Foetal wastage in Northern Nigerian: The case of Gombe abattoir, Gombe State. Proceedings of the 13th
- Muhammad, H. (2012). Pregnancy wastage in sheep and goat in the Sahel region of Nigeria.
- Muhammad, I. R., Fawa, T. A., & Ambali, A. L. (2009). Livestock and its wastes in the semiarid environment: A case study of Kano Metropolis, Nigeria. *Journal of Applied Biosciences*, 16, 862867.
- Muhammad, R. F., Aminu, A., & Maikanti, F. M. (2009). Slaughtering pregnant animals: Causes and consequences. *Nigerian Journal of Animal Production*, 36(1), 8795.
- NBS (2022). Nigeria Livestock Report 2022. National Bureau of Statistics, Nigeria.
- Nigerian Veterinary Journal* 32: 120-126
- Nigerian Veterinary Journal*, 37(4): 198– 205.
- Nonga, H.E. (2015). A review on cattle foetal wastage during slaughter and its impacts to the future cattle herds in Tanzania. <http://www.lrrd.org/lrrd27/12/nong27251.html>, retrieved 24-10-2017.
- NPC (2023). Agricultural Census Report. Nigerian Population Commission, Abuja.
- Smith, L. (2014). Fetal wastage in Northern Nigeria. The case of Gombe abattoir, Gombe State, Nigeria. Proceedings of the 13th Annual Conference of Animal Science, ABU Zaria 13: 124-127
- Sunusi, M., Abubakar, M. and Luka, B. (2006). Incidence of foetal wastage in small ruminant slaughtered at Bauchi and Jos Abattoirs. Proceedings of 31st annual conference Nigeria Society of Animal Production. 102-106
- Swai E.S., Ayubu H. & Mhina B.S. (2015). Incidence of foetal wastage in sheep and goats slaughtered at Tanga city abattoir, Tanga, Tanzania, *Livestock Research for Rural Development*, 27:12
- Swai, E. S., & Wambura, R. M. (2015). Factors contributing to the slaughter of pregnant livestock in Tanzania. *Tanzania Veterinary Journal*, 29(1), 1924.
- Swai, E. S., Mshanga, D. A., & Lugomela, C. V. (2015). Socioeconomic factors contributing to pregnancy wastage in slaughtered goats and sheep in periurban abattoirs in Tanzania. *Livestock Research for Rural Development*, 27(4).