Rovedar

Farm Animal Health and Nutrition. 2026; 5(2): 24-29.

DOI: 10.58803/fahn.v5i2.126

http://fahn.rovedar.com/

Research Article

Caesarean Section Cases in Different Animal Species Due to Dystocia in Sokoto, Nigeria: A Retrospective Study

Hassan A. Bodinga*, and Bashir Adamu

Department of Veterinary Surgery and Radiology, Usmanu Danfodiyo University Sokoto, Nigeria

* ***Corresponding author:*** Hassan A. Bodinga, Department of Veterinary Surgery and Radiology, Usmanu Danfodiyo University Sokoto, Nigeria

Email: Hassan.bodinga@udusok.edu.ng

ARTICLE INFO

Article History:
Received: 09/04/2026
Revised: 30/04/2026
Accepted: 26/05/2026
Published: 28/06/2026

check for updates

Keywords:
Caesarean section
Dystocia
Fetal maldisposition
Ruminant

ABSTRACT

Introduction: Caesarean section is an emergency surgical procedure involving laparohysterectomy for delivery of the fetus in order to improve the dam and fetal survival. This study aimed to determine the prevalence and pattern of caesarean section in all animal species presented with dystocia requiring caesarean section at the State Veterinary Clinic, Aliyu Jedo Area, Sokoto, Nigeria.

Materials and Methods: A retrospective review of caesarean section cases was conducted using clinical records of 69,500 animals with different species over a five-year period (2016 to 2020). Information extracted included species, breed, indications for surgery, year of occurrence, and seasonal distribution. Diagnosis of dystocia was made based on history, physical examination, and ultrasonographic evaluation.

Results: Out of 69,500 cases presented, 1,625 (2.33%) were surgically managed, of which 586 (36.06%) were caesarean sections, giving an overall prevalence of 0.84%. Ovine (52.90%) and caprine (44.70%) species accounted for the majority of cases, while feline (2.06%) and bovine (0.34%) had minimal occurrence. Mixed breeds in ovine (41.29%) and Red Sokoto goats (44.65%) predominated. Incomplete cervical dilatation (30.71%) and fetal maldisposition (28.33%) were the leading indications. The highest yearly occurrence was recorded in 2017 (24.91%), with greater case distribution in the first quarter (28.61%) and peak monthly occurrence in December (12.79%).

Conclusion: The overall prevalence of caesarean sections was low, with the procedure predominantly performed in small ruminants (ovine and caprine). Incomplete cervical dilatation and fetal maldisposition were the leading indications for surgical intervention.

1. Introduction

Caesarean section is an emergency surgical procedure involving laparohysterotomy for delivery of the fetus[1]. Caesarean section focuses on the correction of abnormalities that are not possible through vaginal delivery in order to improve dam and fetal survival[2]. The primary indications for a caesarean section typically arise from maternal factors, fetal factors, or a combination of both. Various techniques for caesarean section in different animal species have been described[3]. Most available reports focus on single species, particularly small ruminants or cattle, leaving a gap in multi-species comparative information within routine veterinary clinical settings. This baseline knowledge gap is critical given that peer-reviewed livestock surveys published between 2022 and 2025 demonstrate that the cumulative incidence of dystocia in sheep and goats varies drastically globally, spanning a range from 3% to as high as 50% based on management systems, maternal parity, and underlying genetics[4]. Within the sub-Saharan African livestock ecosystem, recent clinical surveillance data highlight highly pronounced breed-specific distributions for veterinary obstetric emergencies. For instance, among bovine dystocia presentations in northern Nigerian clinical settings, the Sokoto Gudali breed accounting for the highest vulnerability at 78.6% of cattle presentations, compared to a significantly lower prevalence in the White Fulani breed at 21.4%[5]. In ovine cohorts, which routinely represent the vast majority of all

Cite this paper as: Bodinga HA, and Adamu B. Caesarean Section Cases in Different Animal Species Due to Dystocia in Sokoto, Nigeria: A Retrospective Study. 2026; 5(2): 24-29. DOI: 10.58803/fahn.v5i2.126

small ruminant obstetric caseloads, the Yankasa breed exhibits the highest standalone prevalence of dystocia at 40.0%, followed by the Balami at 25.3%, and the Oudah (Uda) breed at 24.7%[5]. Conversely, standalone caprine breed presentations for dystocia are historically lower, though maternal risks elevate sharply when indigenous breeds are subjected to accidental underage mating, seasonal nutritional restriction, or indiscriminate crossing with heavy exotic meat lines[6].

However, information regarding the prevalence and pattern of caesarean section due to dystocia across multiple animal species remains limited. Therefore, this study aimed to determine the prevalence and pattern of caesarean section due to dystocia across multiple animal species presented to the Sokoto Veterinary Clinic, with the aim of providing baseline data for clinical planning, obstetrical management, and veterinary manpower development.

2. Materials and methods

2.1. Ethical approval

This study was conducted according to guidelines of Department of Veterinary Surgery and Radiology, Usmanu Danfodiyo University Sokoto, Nigeria.

2.2. Study location

The study was conducted at the State Veterinary Clinic, Aliyu Jedo Area Sokoto which serves as the primary animal healthcare delivery facility and referral training center for the North-Western region of Nigeria. The clinic is located at Aliyu Jedo Road, Sokoto State, sitting on latitude 10°–14°N and longitude 3°–7°E. The region features a high density of domestic livestock managed under varied extensive and semi-intensive production systems.

2.3. Study design and data source

This study was a retrospective, descriptive review of veterinary caesarean section cases presented to the Sokoto Veterinary Clinic over a five-year period from January 2016 to December 2020. Purposive census sampling was employed to screen all available clinical archives managed within this timeframe. Case files and surgical logs were physically retrieved from the records unit, drawing data from both the small and large animal operating theatres to ensure a comprehensive multi-species capture. Out of a total hospital caseload of 69,500 animal presentations, a subpopulation of 1,625 surgically managed cases was identified and reviewed for this study.

2.4. Data extraction, inclusion and exclusion criteria

Data extraction was executed manually by the investigators using a standardized template. Information obtained from each individual patient file included, species, breed, approximate age (where recorded), primary etiology/indication for surgery, year of occurrence, and month of presentation. Diagnoses of dystocia requiring surgical intervention had been established by attending clinicians based on historical complaints, physical and obstetrical examinations, and ultrasonographic evaluations. Inclusion criteria were any complete patient record of a domestic animal species presented to the clinic between 2016 and 2020 with a confirmed diagnosis of dystocia that was definitively managed via laparohysterotomy. Exclusion criteria were case files with completely missing or illegible surgical outcomes, dystocia successfully resolved via manual mutation or medical management (ecbolics) alone, and caesarean sections performed for non-dystocia indications (e.g., elective procedures or termination of pregnancy).

2.5 Statistical analysis

The extracted clinical data were compiled and arranged into Microsoft Excel (2007) before being imported into the SPSS statistical software package (version 20) for descriptive analysis. Given that this study aimed to establish the baseline epidemiological profile of the clinic's total emergency workload, descriptive statistics comprising absolute frequencies (n), cumulative percentages (%), and cross-tabulations were utilized to map out the distribution of caesarean sections across species, breeds, and specific maternal or fetal indications. To track seasonal variations, the timeline of case presentations was grouped and compared quarterly including first quarter (January to March), second quarter (April to June), third quarter (July to September), and fourth quarter (October to December). No inferential hypothesis testing or comparative statistical modeling was performed due to the descriptive nature of the population census data.

3. Results

A total of 69,500 cases were presented to the Sokoto Veterinary Clinic during the study period, of which 1,625 (2.33%) were managed surgically. Of these, 586 cases (36.06%) were managed through caesarean section, giving a prevalence of 0.84%. No caesarean section was recorded in equine, Canine and porcine species. Bovine species had the lowest occurrence (0.34%), followed by feline (2. 06%), and caprine (44.70%), while Ovine species accounted for the highest proportion of cases (52.90%, Table 1).

Based on breeds distribution, in Ovine; Sudanese breed had the lowest occurrence (2.26 %) followed by Oudah (7.74 %), Balami (15.81%), Yankasa (32.90%) and ovine mixed breeds (41.29%). In caprine, the West African dwarf had the lowest case of caesarean section 4.21%, followed by the Sahel goat with 12.21 %, crossed breeds with 38.93% and the Red Sokoto Goat had the highest prevalence of caesarean section 44.65 %. For bovine and feline breeds, Sokoto Gudali cattle and local cats were the only breeds presented and accounted for 100% each.

Based on the indications, incomplete cervical dilatation accounted for (30.71%) followed by fetal maldisposition (28.33%), uterine inertia (18.77%), malnutrition (14.50%), fetal death (2.90%), narrow pelvis (1.71%), fetal abnormalities

(1.71%) and uterine torsion (1.37%).

Among the caesarean section cases presented at the Sokoto Veterinary Clinic, the highest proportion was recorded in 2017 (24.91%), followed by 2016 (20.14%), while the lowest was in 2018 (15.87%, Table 2).

Table 1. Percentage distribution of caesarean section cases based on species presented at Sokoto Veterinary clinic, Sokoto state from 2016-2020

No.	Species	Occurrence	Percentage
1.	Ovine	310	52.90
2.	Caprine	262	44.70
3.	Bovine	2	0.34
4.	Feline	12	2.06
5.	Canine	0	0.00

No: Number

Table 2. Distribution of caesarean section cases by years presented at Sokoto Veterinary clinic, Sokoto state from 2016-2020

No.	No. of cases	Years	Percentage
1	118	2016	20.14
2	146	2017	24.91
3	96	2018	15.87
4	113	2019	19.28
5	116	2020	19.80

No: Number

3.1. Quarterly distribution

The trend of quarterly distribution of caesarean section cases was first quarter (Jan- march, 28.61%), second quarter (April- June, 27.40%), third quarter (July- Sept, 25.44%) and fourth quarter (October –December, 18.54%).

3.2. Monthly distribution

Most cases were recorded in the month of December 75 (12.79%) and the least was in September 31(5.29%, Figure 1).

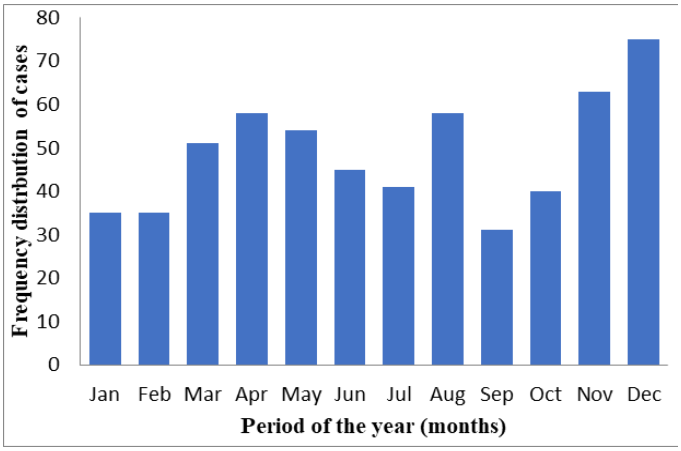

Figure 1. Monthly frequency distribution of caesarean section cases presented at Sokoto Veterinary clinic (2016-2020).

4. Discussion

Review of clinical case records is an important tool for evaluating disease trends, assessing service utilization, and planning veterinary manpower and infrastructure[7,8]. In the present retrospective study, 2.33% of all cases presented to the Sokoto Veterinary Clinic were managed surgically, underscoring the clinical relevance of surgical conditions in routine veterinary practice.

This proportion is comparable to findings from other referral veterinary hospitals in West Africa and South Asia[9,10]. Specifically, retrospective data from a regional veterinary clinic in Kumasi, Ghana, demonstrated that surgical cases constituted a relatively small fraction of total clinical presentations but imposed a significant clinical workload due to the requirement for specialized expertise, anesthesia, and intensive postoperative management[9]. Similarly, observations from an academic referral hospital in Jammu and Kashmir, India, confirmed that surgical conditions particularly obstetrical emergencies required significantly more intensive clinical attention and longer hospitalization periods compared to routine medical cases[10]. Furthermore, retrospective evaluation of dystocia cases in small ruminants highlighted that obstetrical surgical interventions demanded substantial clinical resources and skilled personnel[11]. These comparable reports support the present findings and reinforce the need for adequate surgical facilities, trained personnel, and efficient medical record systems to improve clinical outcomes and enhance training opportunities in veterinary practice.

The overall prevalence of caesarean section recorded in this study indicates that dystocia cases requiring surgical intervention constitute a considerable proportion of obstetrical emergencies in veterinary practice. Comparable findings have been reported in sheep and goats where caesarean section is frequently indicated following unsuccessful manual correction of dystocia[3]. In contrast, the extremely low representation of bovine cases (0.34%) indicates that cattle follow a completely different clinical presentation pattern in this region. In cattle, field-based manual correction by pastoralists or ambulatory veterinarians is heavily prioritized, and due to massive transportation challenges and animal handling difficulties, bovine dystocias are rarely referred to urban clinics unless all field interventions have failed. However, for the small ruminant cases that did present, the relatively low overall prevalence among all clinical clinic entries may reflect early recognition of dystocia and timely veterinary intervention by some urban livestock owners, thereby preventing progression to complicated cases that require emergency laparohysterotomy.

The inclusion of multiple animal species in this study demonstrates that dystocia requiring caesarean section is not restricted to small ruminants but occurs across different species, although with varying frequency (Table I). Despite this multi-species involvement, small ruminants, particularly ovine and caprine species, accounted for the majority of cases. This predominance may reflect the livestock population structure in north-western Nigeria, where sheep and goats are kept due to their adaptability, relatively low maintenance cost, and socio-cultural importance. Comparable findings have been reported in retrospective obstetrical studies in sheep and goats, where small ruminants constituted the largest proportion of dystocia cases requiring surgical intervention[3,12]. Additionally,

it has been reported that sheep account for a large proportion of dystocia cases presented to veterinary clinics in regions practicing extensive management systems[13]. The higher presentation of small ruminants in the present study may therefore reflect both population density and management-related risk factors. This further supports the influence of regional livestock demographics on clinical case presentation patterns.

The yearly distribution of caesarean section cases showed fluctuations without a consistent upward trend (Figure I). Such variation may be influenced by livestock population dynamics, seasonal breeding patterns, accessibility to veterinary services, and level of awareness among livestock owners. It has been suggested that veterinary hospital caseloads may vary depending on geographical location, availability of skilled personnel, and referral patterns[9]. The Sokoto Veterinary Clinic serves as a major referral and training center, which may explain the relatively sustained but fluctuating caseload observed during the study period.

The low occurrence of caesarean section in bovine species observed in this study agrees with reports from similar settings where cattle are less frequently presented to urban veterinary clinics due to transportation challenges and handling difficulties. Most cattle in northern Nigeria are managed under extensive pastoral systems, and dystocia cases are often handled in the field rather than presented to clinics. The small number of feline cases (2.06%) and the complete absence of canine cases may be attributed to the limited veterinary medical attention generally given to companion animals in these communities, a trend previously reported in local clinical surveys[14]. In north-western Nigeria, dogs and cats are frequently kept for utilitarian purposes (such as security, hunting, or pest control) rather than strictly as companion pets. Consequently, peri-parturient management is rarely prioritized by owners, and dystocia cases in these animals may go unpresented to the clinic, resulting in unreported home mortalities or resolving without surgical intervention.

Breed distribution showed that mixed breeds of sheep accounted for the highest proportion of caesarean section cases (table 1). This finding may be associated with indiscriminate breeding practices leading to fetomaternal disproportion, a recognized cause of dystocia in small ruminants[3]. Similarly, the predominance of Red Sokoto goats among caprine cases likely reflects the breed's high population density within the study area rather than inherent predisposition. Breed-related dystocia has previously been linked to genetic selection, fetal size, and pelvic conformation[12].

Regarding the etiologies of dystocia, incomplete cervical dilatation (30.71%) and fetal maldisposition (28.33%) were the leading indications for caesarean section in the present study. These findings are consistent with recent retrospective studies in small ruminants where fetal maldisposition and cervical non-dilatation were identified as the most common fetal and maternal causes of dystocia, respectively[11,15]. Abnormal fetal disposition, including head deviation, breech presentation, and limb flexion, has been associated with multiple pregnancies commonly observed in sheep and goats[16]. Additionally, incomplete cervical dilatation may be related to endocrine imbalance, uterine exhaustion, or metabolic disturbances that impair cervical relaxation. Hormonal investigations in sheep and goats with dystocia due to cervical non-dilatation have demonstrated altered reproductive hormone profiles, supporting the physiological basis of this condition[17]. Cervical non-dilatation, often referred to as ring womb, has also been documented as an important maternal cause of dystocia necessitating surgical intervention when medical management fails[18].

The predominance of maternal causes (67.06%) over fetal causes(32.94%) observed in this study is consistent with reports indicating that fetal abnormalities frequently outnumber maternal causes in small ruminants, particularly in animals carrying twins or triplets such as sheep and goats[10,11]. In contrast, bovine dystocia studies often identify maternal causes such as uterine inertia and pelvic inadequacy as major determinants, reflecting species differences in fetal size and reproductive physiology. Sheep and goats typically carry multiple fetuses, increasing the likelihood of malpresentation, whereas cattle usually carry a single larger fetus predisposing to fetomaternal disproportion[11].

The quarterly distribution demonstrated higher occurrence in the first and second quarters of the year. This pattern may correspond with seasonal breeding cycles of small ruminants in northern Nigeria, where parturition often peaks during early months of the year. Seasonal clustering of dystocia has been reported in sheep and goats, with increased cases during lambing and kidding peaks[3]. Nutritional variations associated with seasonal feed availability may also influence fetal growth and uterine contractility, thereby contributing to dystocia. The seasonal variation observed in this study is strongly corroborated by regional veterinary literature which evaluates small ruminant dynamics in Nigeria. The climate in Northern Nigeria is characterized by an extensive dry season and dry, dust-laden Harmattan winds from October to February, which trigger severe nutritional stress and forage scarcity [5,19]. This severe undernourishment in late gestation directly alters maternal uterine environments and impairs energy homeostasis, predisposing dams to metabolic disturbances and reduced uterine activity at term[5,20]. Also, a recent epidemiological survey of reproductive disorders in Nigerian veterinary centers identify dystocia as the single most prevalent obstetric emergency, with occurrence risks heavily influenced by seasonal breeding management and parity distributions[21]. These compounding environmental stress factors and uncontrolled breeding timelines explain why case presentations cluster so heavily during the transition from the dry period into the early months of the year.

Overall, the predominance of maternal causes suggests that early detection and timely obstetrical intervention could reduce the need for surgical management. Training livestock owners on recognition of dystocia signs and prompt referral to

veterinary facilities may therefore improve maternal and neonatal survival rates[3,10]. Improving nutritional management, controlled breeding practices, and periparturient monitoring may also reduce the occurrence of dystocia and the need for caesarean section.

5. Conclusion

The substantial proportion of caesarean sections among surgical cases accounting for 36.06% (n =586) of the 1,625 surgically managed cases indicated that dystocia remained a major obstetrical problem across multiple animal species presented to the Veterinary Clinic, with a clear and overwhelming occurrence in small ruminants, which cumulatively comprised 97.60% of the surgical caseload. The predominance of fetal causes, seasonal variation, and breed distribution observed in this study highlight the importance of improved breeding management, nutritional support, and early veterinary intervention. Strengthening veterinary obstetrical training and increasing awareness among livestock owners is essential to reduce the incidence of dystocia requiring caesarean section and improve reproductive performance in small ruminants.

Declarations

Acknowledgments

The authors acknowledge the Management of Veterinary Clinic, Aliyu Jedo Area, Sokoto, for granting permission to access the hospital records

Availability of data and materials

The data of the current study are available upon a reasonable request from authors.

Authors' contributions

Hassan Abubakar Bodinga conceived the idea, design the study and drafted the manuscript while Bashir Adamu collected the data and analyzed the data. All authors reviewed and approved the final edition of the manuscript before publication.

Competing interests

The authors declare that there is no conflict of interest regarding the publication of this paper

Ethical considerations

The authors declare that this article is based on an original study and has not been submitted before, in part or in full, for publication or assessment elsewhere. All sources of information and data used in this study have been duly acknowledged and referenced according to accepted academic standards. The authors confirmed that no AI was used during the conduct of the present study. The authors accepted all responsibilities about the originality of this manuscript.

Funding

This study did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

References

1. Darnal N, and Dangal G. Maternal and fetal outcome in emergency versus elective caesarean section. J Nepal Health Res Counc. 2020; 18(47): 186-189. DOI: 10.33314/jnhrc.v18i2.2093
2. Purohit GN, Barolia Y, Shekher C, and Kumar P. Maternal dystocia in cows and buffaloes: A review. Open J Anim Sci. 2011; 1(2): 41-53. DOI: 10.4236/ojas.2011.12006
3. Mobini S, Heath AM, and Pugh DG. Theriogenology of sheep and goats. In: Pugh DG, editor. Sheep and goat medicine. Philadelphia: WB Saunders; 2002. p. 129-186.
4. Windsor P. Abnormalities of development and pregnancy. Veterinary reproduction and obstetrics. 10th ed. Amsterdam: Elsevier Health Sciences; 2018. p. 168-194.
5. Ahmed A, Balarabe AT, Jibril A, Sidi S, Jimoh AA, and Gobe RM. Incidence and causes of dystocia in small ruminants in Sokoto Metropolis, Northwestern, Nigeria. Sch J Agric Vet Sci. 2017; 4(3): 114-118. Available at: https://saspublishers.com/media/articles/SJAVS_43114-118.pdf
6. Bolaji-Alabi FB, Ajani OS, Yusuf A, and Oyeyemi MO. Dystocia in a ten month old West African Dwarf goat sequelae to faulty breeding practice. Anim Res Int. 2022; 19(1): 4377-4381. Available at: https://www.ajol.info/index.php/ari/article/view/225987
7. Friedman CP, Wong AK, and Blumenthal D. Achieving a nationwide learning health system. Sci Transl Med. 2010; 2(57): 1-3. Available at: https://ncvhs.hhs.gov/wp-content/uploads/2014/05/130430b1.pdf
8. Noteboom C, and Qureshi S. Adaptations of electronic health records to activate physicians' knowledge. Health Technol. 2014; 4(1): 59-73. DOI: 10.1007/s12553-013-0072-5
9. Eyarefe OD, and Dickson D. Retrospective study of prevalence and pattern of surgical conditions presented at Ashanti Regional Veterinary Clinic, Kumasi, Ghana. Global Vet. 2014; 13(3): 408-413. Available at: http://www.idosi.org/gv/gv13(3)14/20.pdf
10. Bhattacharyya HK, Fazili MuR, Bhat FA, and Buchoo BA. Prevalence of dystocia in sheep and goats: A study of 70 cases (2004-2011). J Adv Vet Res. 2015; 5(1): 14-20. Available at: https://advetresearch.com/index.php/avr/article/view/40
11. Balasopoulou V, Zablotski Y, Zerbe H, and Voigt K. Retrospective analysis of 302 ovine dystocia cases presented to a veterinary hospital with particular attention to uterine torsion. Vet Med Sci. 2022; 8(4): 1683-1693. DOI: 10.1002/vms3.820
12. Baird AN. Surgery of the uterus in cattle, sheep and goats. In: Wolfe DF, Moll HD, editors. Large animal urogenital surgery. 2nd ed. Baltimore: Williams & Wilkins; 1999. p. 417-420.
13. Thomas JO. Survey of the causes of dystocia in sheep. Vet Rec. 1990; 127(23):574-5. DOI: 10.1136/vr.127.23.574
14. Eyarefe OD, and Oyetayo SN. Prevalence and pattern of small animal orthopaedic conditions at the Veterinary Teaching Hospital, University of Ibadan. Sokoto J Vet Sci. 2016; 14(2): 8-15. DOI: 10.4314/sokjvs.v14i2.2
15. Srilatha B, Rao KP, Manoj K, Haritha GS, Ramesh P, and Kumar BP. Dystocia in small ruminants – A retrospective analysis. Indian Vet J. 2024; 101(1): 30-32. DOI: 10.62757/IVA.2024.101.1.30-32
16. Reshma A, Gudur IH, and Shankare Gowda AJ. A retrospective study of incidence of dystocia in crossbred dairy cows. J Entomol Zool Stud. 2018; 6(4): 660-662. Available at: https://www.entomoljournal.com/archives/2018/vol6issue4/PartL/6-4-48-895.pdf
17. Khamees HA, Abbas SF, and Hussein KA. Hormonal levels associated with dystocia due to failure of cervical dilation in sheep and goats. Egyptian J Vet Sci. 2024; 55(1): 95-103. DOI: 10.21608/ejvs.2024.267549.1823
18. Ali M, Ghaidan T. Retrospective studies on dystocia in ewes: Causes and treatment by cesarean section. Assiut Vet Med J. 2023; 69(178): 45-52. DOI: 10.21608/avmj.2023.220195.1161
19. Sambo U, and Sule B. Impact of climate change on food security in Northern Nigeria. Green Low-Carbon Econo. 2024; 2(1): 49-61.

DOI: 10.47852/bonviewGLCE3202560

20. Bekana K, Liu P, Liu G, Areb E, Wang J, Wang Z, et al. Effects of genetic and environmental factors on reproductive traits, with a focus on gestation length in sheep: Implications for molecular breeding—A review. Agriculture. 2026; 16(10): 1021. DOI: 10.3390/agriculture16101021
21. Ibe CC, Anya KO, and Adenaike EA. Trends in reproductive disorders in animals presented at a veterinary hospital in Enugu State: A 10-year retrospective study. J Sustainable Vet Allied Sci. 2025; 7(1): 18-22. Available at: https://josvasmouau.com/wp-content/uploads/2025/04/4.-Ibe-et-al.-2025.pdf