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REVIEW ARTICLE

Abattoirs – A Hidden Centre for Livestock Genetic Resources Loss in Nigeria

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Abstract

Nigeria is naturally blessed with wide diversity of native animal genetic resources. Indigenous ruminant livestock such as cattle, camel, donkey, sheep and goat contributes largely in both protein supply, revenue generation and national economy. In Nigeria, these animal resources are mismanaged and undermined through the indiscriminate slaughter of pregnant animals and foetal losses in abattoirs. This unethical practice resulted in the loss of genetic diversity, preferred traits and superior females ruminant animals. The current research focus on reported incidences across abattoirs, which is a centre where such practice is highly occurs within the country. Lack of modern facilities, law enforcement, poor management and animal welfare in abattoirs to protect pregnant animals are among few factors responsible for an increase in incidences. It is unprofitable to continue the tradition of pregnant animal slaughter that causes foetal losses. This is a condition that significantly threatens the animal genetic resources and general livestock industry in Nigeria. This practice must be discard with a proper conservation and documentation of these valuable animal genetic resources. Both long and short terms conservation programs must aim for substantial benefits of these resources. Laws must be enforced with strict penalties to those involved in pregnant animal slaughter. Genetic resources of these species and meat industry future could be safe with proper implementation of these laws and conservation measures.

Keywords: Abattoirs, Conservation, Foetal loss, Livestock, Pregnant animals

Introduction

Animal genetic resources are generally relates to the entire animal species, types, strains and breeds of any economic, cultural value and scientific interests that play a significant role in

sustainable livestock production in agriculture and food security (Santoze and Gicheha, 2019). Animal genetic resources are the principal biological capital for the development of livestock (Chrenek et al., 2019). Their sustainable usage, advancement, protection and conservation is necessary for the food and agricultural production as well as environmental and rural development (FAO, 2015). Over forty species of domestic animals are recorded worldwide with direct contribution on production of fibre and food, and indirectly to other roles like draft, transport, manure and assets (Herrero et al., 2013). Generally, cattle, camels, donkeys, horses, sheep, goats, pigs, rabbits and chicken are normally reared worldwide, depending on region, culture and religion (Herrero et al., 2013; Naah and Braun, 2019). The livestock development focuses on few number of breeds in the 20th century worldwide mostly, while neglecting the fact that the survival, production and reproduction ability of these animals are affected by local production culture (Chrenek et al., 2019). These genetic resources are continuously affected by the global drivers such as climate change, population growth and income generation (Paiva et al., 2016).

Nigeria covers a total land of 923,768 km^2 in West Africa, a highest populous country in Africa and 7th in the world with a total population of almost 200 million (Okorie- Kanu et al., 2018; Nigeria Population Commission, 2019). The country has a wide variety of domesticated animal species, ranging from ruminants such as camel, cattle, donkey, horses, goats and sheep, to poultry species like chicken, duck, turkey, guinea fowl and quails (Okpeku et al., 2019). Indigenous animal breeds constitutes the majority of livestock industry in Nigeria that differs across agro-ecological regions and locally adapted to different zones of the country. Indigenous livestock species bears a distinct genotypes, which also defined the people's needs and desire towards their production (Okpeku et al., 2019). Livestock sector plays a significant role in the national economy development in Nigeria, contributing the domestic agricultural product (GDP) of about one-third of the economy (Ekpo, 2012). Additionally, livestock play a key role in religious services and festivities which includes weddings, naming celebrations and traditional spiritual events (Adefenwa et al., 2013). Despite the benefits, these animal resources are not well understood which lead to the negligence in their management and contributed in a dramatic loss of their genetic diversity. This is a phenomenon which is bound to intensify with the quick changes affecting the livestock industry in response to high increases demand in livestock products (Leroy et al., 2017). Moreover, the maximum potential of animal genetic resources in Nigeria is not currently being realized, and urgent responses are needed to improve the use and advancement which will address the current sudden erosion (Bolatito and Aladele, 2019).

Nigeria's human population is growing at an estimated rate of 3.5% annually with 0.8–2.9% growth rate in livestock resources per year, which is too slow to compete with per capita requirements in the country (Alhaji and Odetokun, 2013). This rise in demand has attracted intensive profits in the meat industry, but attributed to inappropriate slaughtering of pregnant animals and breeding stocks. This approach causes losses of many foetuses, active reproductive females and has a deleterious effect on reproduction capacity of livestock growth (Fayemi and Muchenje, 2013). Incidences of slaughtering pregnant animals and foetal loss is common in Nigeria, but the intensity is higher in abattoirs. An abattoir is a specialised facility centre established and certified to receive, store, slaughter and inspect animals and meat products before release and distribute for public consumption (Bakari et al., 2015; Barde et al., 2019; Zailani et al., 2019). Negligence from Inspectors in abattoirs is responsible for the foetal wastage recorded in pregnant animals slaughtered which could lead to loss of genetic resources of these species. The loss of livestock genetic resources is related not only to the extinction of native breeds, but also for the losses of the best and excellent breeds with high genetic diversity, whose genes and gene configurations contents might be useful for the future of agriculture (Belew et al., 2016).

The conservation of livestock genetic resources is an essential issue for sustaining domestic biodiversity and adapting animal species to environmental changes, epidemics or breeding accidents (Joost et al., 2015; Thélie et al., 2019). Therefore, current review focused on cumulative incidences of foetal loss reported in Nigerian abattoir to evaluate its danger on livestock genetic

resources loss, genetic diversity loss and effects on indigenous livestock species future existence. All relevant data on foetal losses and pregnant animal slaughter used for this review were obtained from published articles in reputable journals.

Ruminant Animals Slaughter in Nigerian Abattoir

Ruminant animals are very beneficial to humans because of their ability to subsist on non-arable land vegetation. The prominent ruminant animals slaughter in Nigerian abattoirs are cattle, sheep and goats with a population of about 13.9, 22.1, and 34.5 million respectively (Bamigboye et al., 2018). Others are Camels and donkeys that have small population (< 1 million both) and concentrated in Northern Nigeria only (John et al., 2017; Salisu et al., 2018; Kyari et al., 2019). According to Gwaza and Momoh (2016), 11 breeds of indigenous cattle are recognised in Nigeria, which include Bunaji, Azawak, Adamawa gudali, Wadara, Rahaji, and Sokoto gudali (*Bos indicus*), and N'dama, Keteku, Biu cattle, Muturu and Kuri (Bos tuarus).

There are 3 main breeds of goats "Sahel, Sokoto red and West African Dwarf" (Ogah, 2016), 4 breeds of sheep "Balami, Yankasa, Uda and West African Dwarf" (Ngere et al., 1979; Bourn et al., 1994; Popoola and Oseni, 2018; Henry et al., 2019), 4 breeds of donkeys "Auraki, Duni, Idabari and Fari" (Blench et al., 1990; John et al., 2017), and 4 camel breeds "grey-white, sand-brown, dark-brown, and pied ecotype" (Mohammed, 2000; Abdussamad et al., 2015; Jaji et al., 2017). Northern part of the Nigeria dominates the total production and distribution of all ruminant animals in the country.

Incidences of Slaughtering Pregnant Animals and Foetal Losses in Nigeria

The rise in the world population over years has not only caused an increase in daily consumption rate of animal protein such as milk, meat and eggs, but also a subsequent increased demand for natural resources from related livestock industry (FAO, 2014). Consequently, these increasing demands for animal protein created a significant increase in livestock production practices and lead to the inappropriate practices such as pregnant animals slaughter and foetal losses from the stakeholders. Ngbede et al., (2012) reported that livestock production in sub-Saharan Africa is declined by 20-25% due to the pregnant animals slaughter and foetal losses. A comprehensive summary on past reports from unethical slaughter of pregnant and foetal losses among ruminant animals in Nigerian abattoir is summarised in Table 1. Because no ante mortem inspection is performed in most Nigerian abattoirs, the proportions of foetal losses obtained in this study represents a significant loss of animal protein. The future of national herds will be more alarming if related incidents are known from all abattoirs in remaining states of the country.

Detailed discussions about Table 1 is not prioritized as reported abattoirs listed might represent not >25% of the overall abattoirs in the country with surveys from many abattoirs yet to be reported. The data also exclude those animals slaughtered from slaughter slabs, slaughterhouses and meat shops. Therefore, the data generated is just a glance and overview to highlight the actual damages committed in the abattoirs. In addition, information obtained from abattoirs are reported to be uncompleted and underestimated due to the poor recording of such cases (Tembo and Nonga, 2015; Dunka et al., 2017). Moreover, despite data scarcity from various abattoirs in Nigeria, current study revealed that pregnant animals mostly affected are cattle (55.2%), sheep (22.85%), goats (21.95%), with less percentages in donkeys (0.10%) and camels (0.07%) as shown in Fig. 1. Similarly, higher cases of foetal losses were observed in cattle (43.32%), sheep (18.62%), goats (37.93%), donkeys (0.08%) and camels (0.05%). High percentages in cattle, sheep and goats is due to the high consumption rate, acceptability, availability of their meat compare to camels (less in number) and donkeys (with attached cultural and religious taboos). Previous studies discovered that majority of foetuses are recovered at third trimester of pregnancy and foetal development (Figure 2).

**Table 1:** Record of pregnant animals slaughtered and foetal losses from different abattoirs in Nigeria

Species/Abattoir	Year	TAS	TFS	TPS	FL	Reference
Cattle						
Makurdi 2, Benue	1997-2002	45,742	–	1,508	1,508	Abdulkadir et al. 2008
Ebonyi	2000-2005	9,780	4,690	429	429	Nwakpu and Osakwe, 2007
Minna Central, Niger	2001-2012	260,849	–	5,929	5,929	Alhaji et al., 2015
Random sampling	2003-2008	–	–	–	4,867	Ngbede et al., 2012
Oko-oba, Lagos	2004-2007	1,170,492	392,062	7,406	7,406	Ademóla, 2010
Maiduguri, Borno	2005-5months	8,566	4,453	1,336	1,336	Iliyasu et al., 2015
Lagos/Ogun	2005-2007	321,448	–	16,092	16,092	Cadmus and Adesokan, 2009
Abak, Akwa Ibom	2005-2008	4,695	1,620	349	349	Uduak and Samuel, 2014
Kano, Kano	2005-2014	910,212	520,805	13,563	13,563	Bakari, 2016
Lafenwa, Abeokuta	2008-4months	15,112	11,591	1,617	1,617	Oduguwa et al., 2013
B/Kebbi, Kebbi	2009-2010	3,953	225	15	15	Garba et al., 2011
Minna, Niger	2010-3months	5,010	3,106	120	120	Adama et al., 2011
Minna 2, Niger	2011-2015	2,114,475	1,132,070	52,234	52,234	Alhaji et al., 2017
Maiduguri 2, Borno	2012-2months	562	–	188	188	Mshelia et al., 2015
Makurdi 1, Benue	2012-3months	424	247	06	06	Adeyemi et al., 2016
Wurukum, Benue	2012-4months	1,467	644	66	66	Odeh et al., 2015
Bodija, Ibadan	2012-2014	319,440	156,576	58,528	58,528	Ogunbodede et al., 2016
Jos, Plateau	2012-2016	–	26,248	1,346	1,346	Dunka et al., 2017
Bodija 2, Ibadan	2014-6months	71,898	28,067	10,078	10,078	Ogunbodede and Oladele, 2016
Oja-tuntun, Oyo	2014-2016	11,903	3,421	244	244	Anyaku et al., 2019
	Total	*5,015,179*	*2,285,825*	*165,125*	*169,992*	
Camel						
Sokoto	2007-5months	1,174	592	137	137	Bello et al., 2008
B/Kebbi, Kebbi	2009-1010	303	39	02	02	Garba et al., 2011
Kano	2017-3months	1,947	1,121	17	17	Abdullahi et al., 2017
Katsina	2017-6months	738	456	64	64	Sabo, 2018
	Total	*4,162*	*2,208*	*220*	*220*	
Donkey						
Ebonyi	2000-2005	1,183	500	321	321	Nwakpu and Osakwe, 2007
	Total	*1,183*	*500*	*321*	*321*	
Sheep						
Sahel, Northeast	1998-2009	440,917	–	69,523	73,231	Bokko, 2011
Ebonyi	2000-2005	876	409	169	180	Nwakpu and Osakwe, 2007
Minna, Niger	2001-2010	6,812	3,508	581	609	Alhaji and Odetokun, 2013

Minna Central, Niger	2001-2012	8,051	–	–	755	Alhaji et al., 2015
B/Kebbi, Kebbi	2009-2010	3,073	1,512	–	450	Garba et al., 2011
Makurdi 1, Benue	2012-3months	138	177	–	27	Adeyemi et al., 2016
Jalingo, Taraba	2017-2months	1,554	–	341	386	Chama et al., 2019
	Total	*461,421*	*5,606*	*70,614*	*75,638*	
Goats						
Sahel, Northeast	1998-2009	826,435	–	60,313	130,621	Bokko, 2011
Ebonyi	2000-2005	6,170	4,320	2,770	5,654	Nwakpu and Osakwe, 2007
Minna, Niger	2001-2010	220,993	101,972	2,862	5,936	Alhaji and Odetokun, 2013
Minna Central, Niger	2001-2012	267,505	–	–	4,740	Alhaji et al., 2015
B/Kebbi, Kebbi	2009-2010	3,924	2,223	–	893	Garba et al., 2011
Maiduguri 2, Borno	2012-2months	3,252	–	1,998	4,123	Mshelia et al., 2015
Makurdi 1, Benue	2012-3months	754	635	–	280	Adeyemi et al., 2016
Jos, Plateau	2012-2016	–	4,612	–	1,044	Dunka et al., 2017
Oja-tuntun, Oyo	2014-2016	1,269	478	–	55	Anyaku et al., 2019
Jalingo, Taraba	2017-2months	3,455	1,417	313	368	Chama et al., 2019
Nnsuka, Enugu	2017-3months	684	617	–	320	Okorie-Kanu et al., 2018
	Total	*1,334,441*	*116,274*	*68,256*	*154,034*	

Where TAS = Total animal slaughtered, TFS = Total female slaughtered, TPS = Total pregnant slaughtered, FL = Foetal loss, – = Missing data
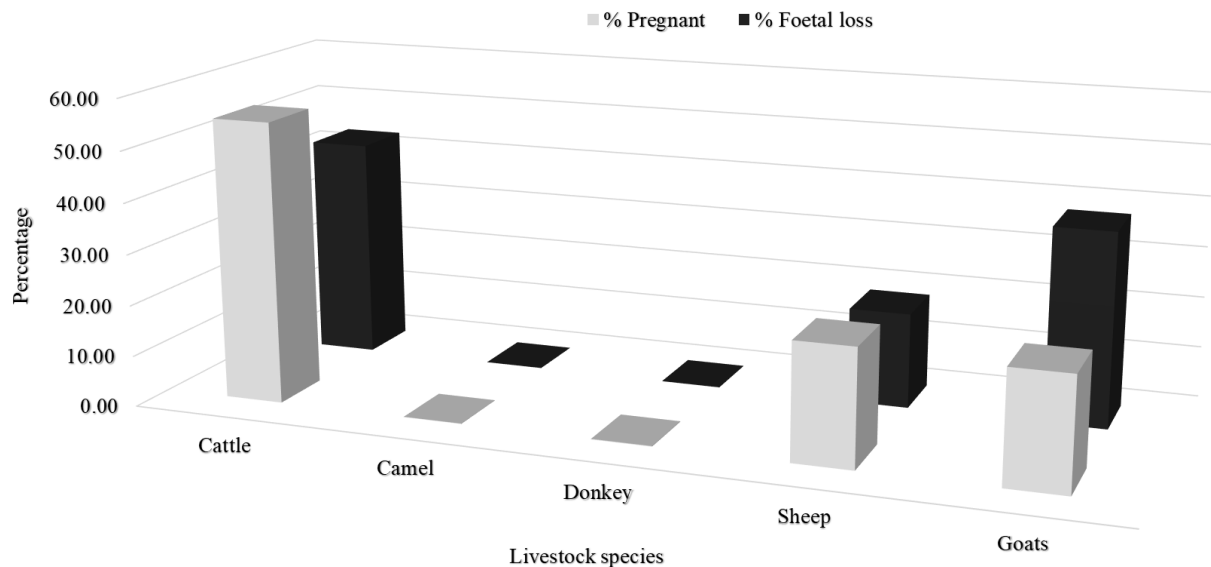
Figure 1: Slaughtered pregnant animal and foetal loss percentages in ruminant animal obtained from Nigerian abattoirs.

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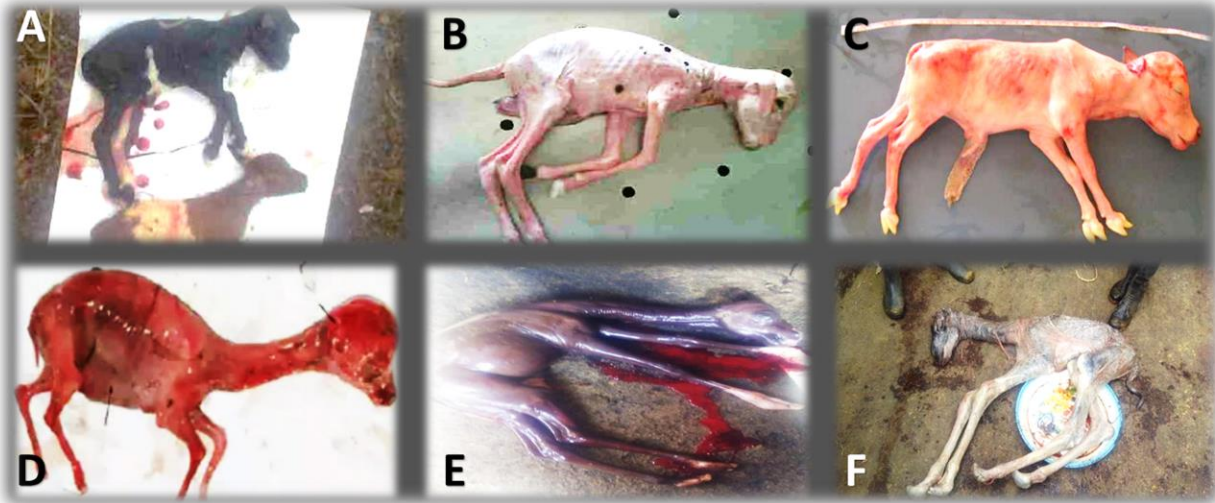
Figure 2: Few images showing foetal losses recovered from slaughtered female animals species in Nigerian abattoirs. **A.** Kids foetuses at 3rd trimester **B.** Lamb foetuses at 3rd trimester **C.** Calf foetus at 1st trimester **D.** Camel calf foetus at 1st trimester **E.** Camel calf foetus at 2nd trimester **F.** Camel calf foetus at 3rd trimester.

Photo credit A, B (Adeyemi et al., 2016); C (Mshelia et al., 2015); D, E and F (Abdullahi et al., 2017)

Factors Encourages Pregnant Animal Slaughter and Foetal Loss

In developing countries, the livelihood of poor families depends largely on small/large ruminants for meat, milk and wool (Ahmad et al., 2019; Oguejiofor, 2019). The browsing habit and grazing ability of ruminant animals are suitable features that make them easy to manage by poor people as feeding cost minimises to the lowest rate. Season of the year (rainy season) was reported to be a factor contributing the high slaughter rate of pregnant animals (Raimi et al., 2017). During rainy period, there is an abundance pasture which coincides with breeding season and high pregnancy rates in most livestock species. Also, urgent cash needs by seasonal farmers to purchase some farm inputs (fertilizers, seeds, pesticides, etc.) and pay labour work in rainy season farming, which forces them to sold their assets including pregnant animals (Ngbede et al., 2012; Dunka et al., 2017). In addition, high demand and insufficient supplies of ruminant animals during Eid Akbar, Christmas and New Year for religious sacrifices and celebrations results in mass slaughter of pregnant animals in Nigeria (Ngbede et al., 2012). Napari et al. (2014) reported that pregnant animal attracts higher market price due to their excellent body condition score. This pushes many livestock keepers to sell them out to gain higher profits.

Increased human population in Nigeria and high demand of meat from animals contributes largely in promoting this exercise (Alhaji and Odetokun, 2013). Livestock owner's financial problems, cash needs and disasters such as accident, disease outbreak or physical injuries in pregnant animals also results in their disposal and final butchered (Dunka et al., 2017; Alhaji et al., 2017). In agricultural industry, silk refer to body of foetus removed from a slaughtered female animal in an abattoir. The silk was reported to be consume as a meat and use in the production of high quality leather items (Mowson, 2018). Moreover, conventional pastoral and sedentary rural husbandry methods are the prominent systems of ruminant livestock production with very less modern intensive system in Nigeria. Most individuals involved are not well aware about the impacts of slaughtering pregnant animals. Addass et al. (2010) added that inadequate meat inspection practices in abattoirs is also responsible for pregnant animal slaughter.

Implication of foetal loss on genetic resources

A very large number of breeds have been produced and dissolved globally in the animal breeding history. In the past centuries, studies documented that the inflated rate of livestock breeds extinction has always exceeds formation rate of the new ones (Belew et al., 2016). Good conservation management of these resources are among the priorities of the global sustainable development strategy (Kolosov et al., 2012). In many developing nations especially in Sub-Saharan Africa, there is a widespread of indiscriminate pregnant animal slaughter that is against welfare of animals and leads to the provision of poor quality meat to consumers (Nonga, 2015).

Developed countries (e.g. Germany) reported with less percentages of foetal loss and slaughter of pregnant animal (Maurer et al., 2016). The impacts of these high pregnant animal slaughter and foetal losses could harm the breeds of livestock available in Nigeria by causing genetic erosion and possible extinction. The practice will also jeopardize the development of the livestock population and the supply of meat in Nigeria, where the total production rate is far lower than present consumption rate.

Loss of Genetic Diversity

Conservation of animal genetic resource is one of the key aspect aimed at conserving biodiversity, especially when indigenous breeds are declining at an incredible rate (Ljubodrag et al., 2015; Ahmad-Syazni et al., 2017). Significant decrease in population size can result in high inbreeding rates, inbreeding depression with a high risk of breed extinction (Ljubodrag et al., 2015; Khaleel et al., 2019). The loss of genetic diversity in domestic populations is particularly significant in potentially unsustainable species such as donkeys, causing the simultaneous loss of essential functional traits (Navas et al., 2017).

Populations of donkey breeds are decreasing globally and susceptible to extinction as mechanization decreasing their economic value (Quaresma et al., 2013). Recently, increasing demand for donkey hides from China for the production of medicine (*ejiao*) has also causes the global donkey population decline (Matlhola and Chen, 2020). In Nigeria, the donkey-hide trading was seen as a profitable industry with the ability to make fast money. As a result large number of donkeys are slaughtered including the pregnant and breeding females. The conservation of threatened indigenous breeds is more than genetics, but also involves social and cultural activities for proper management (Alderson, 2018).

In 2012, microsatellite DNA and morphological study showed that genetic diversity among Nigerian sheep breeds is higher within-breed than between-breeds (Agaviezor et al., 2012). The authors added that, higher genetic diversity in Yankasa sheep breed indicates the existence of specific ancestral alleles, showing the presence of some functional genes that may lead to their good ability to adapt in different agro-ecological regions of Nigeria. West African dwarf goat and sheep breeds are trypano-tolerant and thrive well in humid region of Southern Nigeria. This survival feature is characterized by their genetic diversity from other breeds that allow them to adapt to such environment. However, slaughtering pregnant females may cause a rapid decrease in their genetic variation as there is no criteria for identifying such breeds with high genetic diversity before slaughter. Improvement of traits will be successful in future only if genetic diversity of traits combinations and important traits are maintain in the populations (Hill, 2016).

Loss of Preference Traits and Breeds

Trait preferences and information are believed to be useful for making decisions in animal breeding (Bett and Bebe, 2017). Native livestock species are under pressure from various forces threatening their future survival and existence. Many exotic breeds are now introduced and continues to dominate the indigenous breeds which encourages the loss of indigenous livestock genetic resources (Traoré et al., 2017). In Nigeria, livestock keepers selected animals based on

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certain traits or breed qualities. Foetal losses and slaughter of pregnant animals will aids in promoting the chances of preferred traits to reduce or disappear.

Muturu cattle breed is characterised by a compacted body with a good meat quality is now listed as endangered breed (Adebambo, 2001; Gwaza and Momoh, 2016). Other cattle breeds such as Kuri and Biu are also considered as endangered and rare breeds respectively (Gwaza and Momoh, 2016). Despite these facts, the slaughter of these breeds is still going on in various abattoir without taking a heed. Similarly, with less population of donkeys and camels in the country, this exercise will further reduce their population size and lead to the expirtation of rare breeds among them. Muhammad et al. (2007) discovered that one out of four small ruminant animals slaughtered are pregnant in Kano central abattoir. The authors added that the practice is continuously occur daily with the state which is a highest populous state in Nigeria and Africa.

Loss of Superior Breeding Female
The performance of indigenous breed populations improves overtime through effective management, feeding strategies and the use of genetically superior animals for genetic improvement (Yakubu et al., 2012). In every livestock species, there are few individuals with superior traits such as early maturity (Oyéniran et al., 2017; Desire et al., 2018), short gestation period, short generation interval (Mandefro et al, 2017) and multiple ovulation (Szelényi et al, 2018; Csapó et al., 2019) that aid in rapid proliferation and increases production rates. Unfortunately, such qualitative breeding females are wasted in our abattoirs together with their offspring that can carry similar traits to the future generation.

Usually, large ruminant such as cattle, camel and donkeys give birth to 1 calf, but superior ones can produce up to 2-3 offspring in single parturition (Csapó et al., 2019). Producing 2 kids/lambs is common in small ruminants, goats sometimes produce triplets and quadruplets kids/kidding (Oyéniran et al., 2017). Previous studies on foetal loss explained how superior pregnant goat slaughtered with 3 foetuses at final trimester in Nigeria (Fig. 3).

Figure 3: Triplets goat foetuses wasted at 3rd trimester recovered from single doe.
Photo credit (Mshelia et al., 2015).

Challenges

In developing countries, the main challenge for the advancement of the livestock industry was lack of infrastructure appropriate for the management and marketing of animal genetic resources (Leroy et al., 2016). In 1968, pregnant animals were protected by the meat inspection act established by World Health Organization (WHO) which forbids their slaughter, but there is no proper execution of this act in Nigeria as foetal loss cases keeps rising (Dunka et al., 2017; Okorie-Kanu et al., 2018). Adama et al. (2011) added that there is an absent of established law from the federal or any state government to stop the practice of pregnant animal slaughter. It could be challenging to control those involved in the act as lack of these laws is like an indirect legalization of the exercise.

Majority of Nigerian state governments have recently partner meat inspection activities at slaughterhouses and abattoirs to private individuals who interested only in revenue generation per head of slaughtered animals than welfare of the animals. In addition, Nigerian abattoirs are mostly not modern in nature that reasonable ante mortem inspection take place. This may aid greatly in reducing or points out undesirable animals. Where these inspections are not conducted strictly, the implication is a high incidence of pregnant animal slaughter. Fulani herdsmen controls majority of livestock in Nigeria with less access to modern facilities and technology advancement. These herdsmen feed animals in the natural pasture of Nigerian forest which makes it difficult to reach and enlighten them regarding any related issue. In fact, animal handling and welfare practices in Nigeria was poor from those involved in the industry to those that monitor the system.

Future plans and strategies
Nigeria is a country blessed with a diverse native animal genetic resources. This is a collection of genetic resources which have evolved over years of persistence effort of evolution, domestication and adaptation. The conservation and proper documentation of these valuable animal genetic resources is a challenging aspect that requires to be given a high priority. It is unprofitable to continue the tradition of pregnant animal slaughter that causes foetal losses. This is a condition that significantly threatens the animal genetic resources and general livestock industry in Nigeria. Both long and short terms conservation programs must aim for substantial benefits of these resources.

These will be on the basis of national, state and local abattoirs survey programs, accompanied by conservation strategies. Livestock keepers, marketers and abattoirs must be up to date and periodically inform regarding proper animal husbandry activities, especially breeding and the consequences of slaughtering pregnant animals. Equipping abattoirs with pregnancy testing kits and scanners for rapid pregnancy diagnosis. This could be available in animals holding posts, veterinary check points and abattoirs. Males and reproductively inactive females should be sold for slaughter not otherwise. Credible report is the foundation of sound management and should serve as the basis on which government policies are formed and priorities for development are establish. Due to the frequent reports from various abattoirs in Nigeria, it is a good time for the government to set a laws, guidelines, monitoring agencies and penalties that will prevent the slaughter of pregnant animals in the country.

Conclusion

The incidence of foetal wastage resulting from indiscriminate slaughter of pregnant animals at abattoirs in Nigeria is very high. The slaughter of pregnant animals allows the loss of productive females which would have effectively provided offspring to the herd and also the destruction of offspring which would have restocked the herd. For Nigeria's future demands on meat supplies and animal genetic resource conservation, it is necessary to completely stop the occurrence of deliberate slaughter of pregnant animals and foetal wastage.

This can be achieved through the enactment and enforcement of strict regulations which prohibit the slaughter of pregnant animals. Rigid penalties and fines must be attached to such practice for both meat handlers, workers and even compromised staffs appointed by the government. A proper implementation of these regulations together with an extensive monitoring and recording of pregnancy wastage at tactical livestock control points and abattoirs, will drastically reduce or even eradicate female animals slaughter and foetal losses in Nigeria.

Acknowledgments

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