

Calf Production and Husbandry Practices of Agropastoralists in Peri-urban Centres of Southern Guinea Savannah of Nigeria

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ABSTRACT—A cross-sectional survey was done in four Local Governments Areas of Niger State in southern Guinea savannah of northern Nigeria to determine the calf production and husbandry practices of agropastoralists. The study was conducted using interview and administration of structured questionnaires to 100 randomly selected agropastoralists. Average herd size was 15.6 with more bull calves than heifer calves. The ratio of bull calf to heifer calf was 1:1. Bunaji calves were the dominant breed, while Sokoto Gudali calves were the minority. Whereas average number of suckling bull calves was lower than weaned bull calves, suckling heifer calves were more in number than weaned heifer calves. Overall mortality rate was 5.51% with majority (46.51%) occurring in the first three months of life. Mortality was higher in dry season (68.6%) than in wet season (34.4%) and there were more female deaths (65.12%) than male deaths (34.88%). Diarrhoea (48.86%) and helminthosis (39.77%) were the most prevalent diseases in wet season, while soil eating was the major disease in dry season. Few agropastoralists (23%) utilized veterinary services as against majority (77%) depending on self-medication and local herbs for treating their stock. Calves were maintained on free range grazing, browsing and crop residues without provision for housing. Rangelands were, however, the major source of feed for the calves which were rarely supplemented with concentrate even during the dry season. The most commonly used supplement was browse fodders, and *Daniellia oliveri* was the most lopped browse species for feeding the calves. Feed supplementation was common in dry season (100%) compared to wet season (16.67%). Only 4.5% of the agropastoralists practised castration. Calf husbandry was the exclusive responsible of male children. The age at which calves were separated from their dams overnight, in order to prevent overnight suckling, ranged from 2 to 2.5 months with an average of 2.25 months. Average age of calves at full grazing and weaning were 4.25 months and 9 months respectively. Most farmers (80%) preferred weaning their calves during the wet season. Calf production in the study area is a traditional smallholder affair with little or no input and poor husbandry practices. Improved feeding, and provision of infrastructure, affordable veterinary services and extension services to educate the farmers and assist them in adopting improved husbandry practices will improve the present calf production level.

Keywords—Agropastoralists, calf, feeding methods, herd size, husbandry practices, prevalent diseases

1. INTRODUCTION

There is dearth of animal products in the diet of the average Nigerian. Only 17-18% of the dietary protein intake of Nigerian is of livestock origin [1]. Cattle is one of the major sources of animal protein for the human population in Nigeria and the production has declined from 19.5 heads per 100 persons in 1963 to 15.7 heads per 100 persons in 1991 [1]. Cattle and to a lesser extent sheep and goat production are generally associated with the pastoral Fulani who are reputed to own a substantial percentage of the national herds [2]. Whereas previous studies/surveys centred on the adult cattle production and management pattern in the traditional systems [1, 3, 4], little emphasis has been placed on the calf, the foundation and replacement stock. Most often than not, research efforts are geared towards the parent stock (adult cattle) with little emphasis on the replacement and foundation stock (calf). Adequate attention should be given to young stock (calf) whose high mortality has been identified as one of the major causes of low productivity in livestock production systems [5]. There is paucity of information on the management practices of calf in the traditional systems in the southern Guinea savannah of Nigeria. Due to the central role occupied by calves in cattle production, it becomes imperative to study their management practices in the agropastoral management system. There is, therefore, a need for explicit comprehension of the existing calf management practices of the sedentary Fulani pastoralists with the view of providing baseline information for possible strategic interventions to ensure improved performance of these animals. More so, in order to bridge the ever-increasing gap between supply and demand of protein from cattle products, there is the need to look inward and intensify calf production. The first step in this direction is looking at the present farmers'

management and production systems, identifying the constraints, proffering solutions and the opportunity for its development.

This study was thus designed to investigate the production and management practices of the Fulani agropastoralists in southern Guinea savannah of Nigeria

2. MATERIALS AND METHODS

2.1 Description of the study area

The survey was conducted in the peri-urban areas of Borgu, Ibbi, Nassarawa and Babana Local Government Areas (LGAs) of Niger State in the southern Guinea savannah of northern Nigeria. Presently, the last two LGAs are now defunct. A peri-urban area is taken as the area lying within a circle of maximum of 25 km radius from the outskirts of the specified urban centre [6]. The areas have a tropical humid climate with a rainy season between May and October and a dry season from November to April. The mean annual rainfall is about 1044.5 mm with mean temperature and relative humidity of 34 °C and 60%, respectively.

2.2 Selection of agropastoralists and data collection

Twenty-five agropastoralists were selected from each of the four selected LGAs to give a total of 100 farmers. Data were collected using observations, interviews and a combination of multiple visits informal and formal surveys approach. Primary data were collected by the administration of both open-ended and close-ended structured questionnaires to the sampled agropastoralists.

2.3 Data analysis

Descriptive statistics were computed using the Statistical Package for Social Scientists (SPSS) 11.0 for Windows [7].

3. RESULTS AND DISCUSSION

From Table 1, the average herd size of calves owned by the peri-urban agropastoralists was about 15.6 with Babana having the highest average size of 5.4, which accounted for 34.6% of the total herd. The generally low average herd size typifies a smallholder production system. The overall herd size was higher than the average size of 11 reported in northern Guinea savannah [8] and 5 in the derived savannah of Oyo State [9]. Lower average herd sizes of New Busa and Ibbi may be attributed to the presence of National Park, which prohibits any kind of human activities particularly poaching, grazing, deforestation, etc in the two LGAs. The herd composition of the agropastoralists was different from that reported in the derived savannah of Oyo State. This is probably due to the fact that trypanosomosis, which poses a big challenge in the derived savannah, does not pose much problem in the study areas. Thus trypanosusceptible breed like Sokoto Gudali was kept by the agropastoralists while trypanotolerant breed like N'Dama was absolutely absent in the herd. Bunaji calves, accounting for about 51%, were the most dominant breed in the agropastoral herd with a higher percentage being kept in Babana. Sokoto Gudali was the breed least (2.45%) reared by agropastoralists. Generally, Bunaji was the most prominent breed of cattle in Nigeria. According to Waters-Bayer [10], Fulani pastoralists have preference for Bunaji cattle because of their reputation for higher milk production, faster growth rate, large body size and good temperament.

Table 1. Breeds of calf reared by the agropastoralists

Breed	Average size	Borgu	Nassarawa	Babana	Ibbi
Bunaji	7.91	1.68	2.38	2.57	1.28
Keteku	5.24	1.27	1.74	1.75	0.48
Sokoto Gudali	2.45	0.61	0.26	1.08	0.51
Total	15.6	3.56	4.38	5.40	2.17

Table 2 shows that the average number of suckling bull calf was lower than suckling heifer calf, whereas weaned bull calf was higher in number than weaned heifer calf. However, in general, the ratio of bull calf to heifer calf was approximately 1:1. The result which is in tandem with those of Okoruwa et al. [11] is slightly at variance with that of Olafadehan and Adewumi [3] who indicated bull calf to heifer calf ratio of 1:2 in the derived savannah.

Table 2. Calf herd size and structure

Breed	Average size	Male calf		Female calf	
		Suckling	Weaned	Suckling	Weaned
Bunaji	7.91	2.13	1.90	2.44	1.43
Keteku	5.24	1.09	1.50	1.62	1.03
Sokoto Gudali	2.45	0.57	0.76	0.74	0.38
Total	15.6	3.79	4.16	4.80	2.84

Table 3 shows calf mortality in the study areas. The low stillbirth, which is similar to the stillbirth of 7.33% indicated by Olafadehan and Adewumi [3], suggests that majority of the pregnant cows dropped their calves alive. Highest mortality rate (46.5%) from birth to three months of age indicates that this period was the most critical stage in the life of the calves. This perhaps is the most delicate stage when young animals are still tender and vulnerable. It is noteworthy that mortality rate declined along the life line, thus least mortality rate (20.9%) was recorded at weaning. Earlier reports by Olafadehan and Adewumi [3] indicated highest calf mortality rate in the first week of birth, while Olanite et al. [9] reported highest calf mortality rate between 4 and 6 months after birth. Despite the poor management of the calves, the low overall mortality rate of 5.51% was quite impressive and connotes high weaned calf crop. This is a reflection of the hardiness of the animals. Nigerian indigenous cattle breeds have been reported [12] to possess exceptional combinations of productivity and hardiness, have a high degree of heat tolerance and ability to survive long periods of feed and water shortages under hostile and poor management practices. The mortality rate is within the range of 5 to 35% reported for traditionally-managed calves in tropical Africa [13]. Highest mortality rate in dry season, when native pastures are senescence and available standing hays are fibrous and lignified, relative to wet season, when the prevailing conditions are favourable for proliferation of pathogens and parasites, seems to suggest that nutritional stress is perhaps the major challenge of the calves. The available pastures during the dry season confer little or no nutritional benefit on animals. Therefore, poor nutrition rather than health problem is the major limiting factor affecting the performance of the calves in the smallholder traditional management systems under study. Elsewhere in Cambodia, farmers rated feed availability as the most important constraint to cattle production, followed by diseases [14]. It is a known fact that poor nutrition lowers animals' immunity and predisposes them to infection. The result contradicts previous reports [3, 4] where mortality was higher in wet season than dry season. Mortality by sex shows that there were more male deaths than female deaths.

Table 3. Seasonal calf mortality in the study area

Parameter	Total	Percentage
Total birth	1560	
Born alive	1435	91.99
Still birth	125	8.01
Mortality in the first 3 months	40	46.51
Mortality between 4 and 6 months	28	32.56
Mortality between 7 - 9 months (weaning)	18	2.093
Overall mortality	86	5.51
Seasonal mortality		
Wet season	27	31.4
Dry season	59	68.6
Mortality by sex		
Male	30	34.88
Female	56	65.12

The most prevalent diseases in wet season (Table 4) were diarrhoea and helminthosis (worm infestation) with highest occurrence in Babana. Few farmers, however, reported low incidences of foot and mouth diseases and contagious bovine pleuropneumonia. Olanite et al. [9] previously reported heminthosis and diarrhoea as predominant diseases of calf in their study areas. In dry season, soil eating, otherwise known as geophagy, was the major disease of calf reported by the smallholder pastoralists. Soil eating could be due to poor nutrition especially mineral imbalance or deficiency [15]. Inadequacy of phosphorus and cobalt is known to result in depraved appetite also called pica, a disease condition in which animals, particularly cattle, eat virtually everything. The exact cause of soil eating is not known but the deficiency of iron in the body could lead to depraved appetite also called "pica" in which cattle eat wood, soil and other objects around. Proper feeding and provision of subsidized salt licks could help to mitigate this problem. The findings here concur with previous submissions [6, 15]. Majority (77%) of the agropastoralists were using local herbs and self-medication for treating their animals, as against 23% that engaged the services of the veterinarians. Provision of veterinary services in the study was inadequate and even where they were available, the farmers were unwillingly to part

with their money to treat sick animals. Smallholding livestock farming is generally characterised by low on input. Parallel observations have been reported [4, 6].

Table 4. Prevalent diseases affecting calf herd and medication methods

Item	Location				
	All (%)	Borgu	Nassarawa	Babana	Ibbi
Wet season					
Diarrhoea	48.86	28.79	51.27	80.0	35.65
Helminthosis	39.77	22.1	42.68	68.76	25.54
Foot and mouth	2.69	1.05	3.17	4.94	1.60
CBPP	8.06	3.44	10.68	13.29	4.83
Dry season					
Soil eating	100	100	100	100	100
Means of treatment					
Veterinary services	23	10	4	2	7
Self-medication + local herbs	77	18	19	19	11

Table 5. Feeding methods, commonly used supplements and season of supplementation

Parameter	Location				
	All (%)	Borgu	Nassarawa	Babana	Ibbi
Feeding methods					
Grazing + browsing only	30.23	29.3	32.56	31.63	27.9
Grazing + crop residue only	23.26	18.61	26.05	27.91	20.47
Grazing + browsing + crop residue	37.21	40.17	36.76	33.98	38.08
Grazing + browsing + concentrate	9.30	13.6	5.4	6.23	12.07
Commonly used supplement					
Grain	3.85	5.01	3.08	3.08	4.23
Salt	30.77	28.85	32.69	27.69	33.85
Browse	38.46	38.46	38.46	38.46	38.46
Crop residue	26.92	27.69	26.15	25.0	28.84
Browse species used as supplement					
<i>Azelia africana</i>	28.07	27.37	28.77	30.88	25.26
<i>Daniellia oliveri</i>	35.09	35.09	35.09	35.09	35.09
<i>Pterocarpus erinaceus</i>	22.81	19.65	24.21	23.86	20.0
<i>Gmelina arborea</i>	14.04	8.78	19.31	17.55	10.53
Season of supplementation					
Wet season only	16.67	25.01	12.50	8.34	20.84
Dry season only	100	100	100	100	100

From Table 5, majority of the agropastoralists utilized grazing + browsing + crop residue (37.2%) and grazing + browsing (30.2%) for feeding their animals while only few practised supplementary feeding with concentrate (9.3%). This implies that virtually all the agropastoralists depended on natural feed resources for feeding their animals. As earlier stated, the production system under study is a smallholder system with little or no inputs by the farmers. According to Olafadehan and Adewumi [4, 16], smallholder traditional pastoralists rarely supplemented their animals with concentrate diets. Borgu and Ibbi recorded the lowest percentage of farmers utilizing grazing + browsing + crop residue and grazing + browsing for feeding their animals because of the presence of National Park which prohibits and prosecutes incursion into the park and illegal use of feed resources within the park. The most commonly used supplement was browse, which is abundantly available in the study areas where tree and shrub fodders are predominant. In dry season, the tree and shrub fodders are heavily lopped for feeding the animals when grasses have senesced. The most commonly used browse supplement was *Daniellia oliveri*, which was being utilized by all the sampled agropastoralists. *D. oliveri* is the dominant tree species in the study areas and is the indicator species for the savannah area in Nigeria. The result is at variance with previous findings [9] who reported *Azelia africana* as the most commonly used supplement. All the agropastoralists supplemented their calves in dry season due to poor quality and non-availability or inadequacy of available pastures which are mere straw with low nutrient and energy density that cannot meet the maintenance requirements of animals. This perhaps is responsible to exceptionally high age at first calving of the heifer (48 to 60 months).

As shown in Table 6, the agropastoralists rarely castrated their bull calves even when they were surplus. The result contradicts the reports elsewhere [14]. According to the farmers, castration was a taboo and was therefore discouraged. There is a need for educating the farmers on the benefits of this management practice which can enhance their income.

Under good husbandry practices, surplus bull calves are castrated and finished, particularly during the wet season, when feed resources are abundantly available. Rearing of calf was the exclusive responsibility of male child in the family and they were herded within the vicinity of the homestead, otherwise called “Ruga” until they were old enough to withstand the stress of grazing along with the adults. This is in agreement with previous submissions [9, 17]. In consonance with Otchere [18], unweaned calves were tethered in order; from the youngest to the oldest to a rope called the “Dangwali”, situated near the enclosure for the adults. Calves were allowed to stay with dams and suckle them overnight until the average age of 2.25 months when they were separated to avoid excessive overnight suckling of their dams. This was so because in the production system under study, the agropastoralists depended on milk obtained from the cows to augment their household income, and even for consumption. Mohammed [17] made similar observations. The average age of the calves at full grazing (4.25 months) is within the range of 4-6 months earlier reported [9, 17, 19]. The calves were allowed to suckle their dams until they were weaned at an average age of 9 months. However, when suckling calves followed their dams to grazing, they were prevented from suckling them by means of an indigenous Fulani apparatus, a two pointed Y shaped sticks and ropes, the “Toide” which was tied to the neck of the calf before being released with the dams so as to prevent suckling on the range. Similar findings were reported by Mohammed [17]. Calf weaning was not deliberately practised because farmers depended on the calf to initiate milk let down for milk collection. Therefore, calves weaned themselves when the milk production ceased, in tandem with earlier observations [14]. In consonance with previous studies [17, 18, 20], pastoralists sometimes resorted to artificial weaning when the dam was in advanced stage of pregnancy and the previous calf was still suckling. Artificial weaning was done by smearing the dung of young calves on the dams’ teats every day until the calf stopped suckling. Majority (70%) of the farmers preferred weaning their calves in wet season obviously due to availability of fodders during that period. No housing was provided for the animals; thus, calves were exposed to inclement weather and poorly catered for.

Table 6. Calf husbandry practices of the agropastoralists

Item	Location				
	All	Borgu	Nasarawa	Babanna	Ibbi
Castration, %	4.5	5	3	6	4
Family member rearing calf	Male child				
Age of separation of calf, m	2.25	2.5	2.5	2.0	2.0
Age of calf at full grazing, m	4.25	4.5	4.5	4.0	4.0
Age of calf at weaning, m	9	9	9	9	9
Housing	No	No	No	No	No
Season of weaning					
Dry	20	21	20	19	20
Wet	80	79	80	81	80

4. CONCLUSION

The results of study show that calf production in the study area is a traditional smallholder production system with little or no input. Calves were subjected to rigours of grazing about with adult cattle as early as four months of age and were not given any preferential treatment. Though mortality rate was low, the husbandry practices were abysmally poor due to poor feeding, housing and health management, lack of knowledge on modern day husbandry practices and unwillingness of the farmers to commit their resources to improving the animals’ welfare. There is, therefore, the need for intervention in form of provision of housing, well defined extension services, and supplementary feeds and veterinary services at affordable price to reduce economic losses which will go a long way in improving the productive and reproductive performance of the young stock when they metamorphosed to adult cattle.

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