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Dietary Supplementation of Ruminant Animals By Agro-Pastoralists in Semi-arid, Nigeria

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Abstract

A survey was conducted in 4 local government areas (Dambatta, Kobo, Bunkure and Wudil) in the semi-arid Kano, Nigeria. The objective of the study was to assess the utilization of inorganic minerals as dietary supplement by livestock owners in the study area. Structured questionnaires were developed and administered. Respondents were captured using purposive sampling procedure based on involvement in livestock production. The data collected were analyzed using simple descriptive statistics of frequency and percentages. The results obtained revealed that majority of the respondents owned combination of sheep and goats (59%). The flock size of the respondents varied from 1 to above 90, with majority owning 11 to 30 (56%). Majority (88%) of the respondents supplemented their animals to improve the performance of their animals. Supplementation of the livestock by the respondents was after grazing (73.12%). (66.91%) of the respondents offered supplements to all categories of animals. Most of the supplementation was during late dry season (76.77%). The respondents were not aware of any form of supplement in the form of wafers. Most of the respondents (98.86%) supplement with iodide sodium chloride and energy sources yet not as an integral component of a compounded diet. In conclusion, findings from the present study revealed the client driven base line data generated signified agro-pastoral herders are not aware of dietary mineral wafers for supplementation but willing to per take. It is therefore advocated that in semi-arid regions, dietary mineral based supplements be explored to produce diet in the form of wafers where inorganic mineral such N, P and Ca can be incorporated. Furthermore, it may be easier accepted by the agro-pastoral herders when introduced in the late dry season in semi-arid regions.

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Nijerya'nın Yarı Kurak Bölgelerinde Ruminant Hayvanlarda Diyet Takviyesi

Makale bilgileri

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Kırsal tarım, diyet besin, mineral takviyesi, yarı kurak

Öz

Nijerya'nın yarı kurak Kano bölgesindeki, 4 yerel yönetim bölgesinde (Dambatta, Kobo, Bunkure ve Wudil) bir anket yapıldı. Çalışmanın amacı, çalışma alanındaki hayvan sahipleri tarafından besin takviyesi olarak inorganik minerallerin kullanımını değerlendirmektir. Yapılandırılmış anketler geliştirildi ve uygulandı. Katılımcılar, hayvancılık üretimine katılıma dayalı amaçlı örnekleme prosedürü kullanılarak belirlendi. Toplanan veriler, basit tanımlayıcı istatistikler olan frekans ve yüzdeler kullanılarak analiz edildi. Elde edilen sonuçlar, ankete katılanların çoğunluğunun koyun ve keçi kombinasyonuna (%59) sahip olduğunu ortaya koymuştur. Ankete katılanların sürü büyüklüğü 1 ila 90 arasında değişmekte olup, çoğunluk 11-30 (% 56) arasında değişen hayvana sahiptirler. Ankete katılanların çoğunluğu (%88) hayvanlarının performansını artırmak için hayvanlarını besin takviyesi ile destekledi. Katılımcıların besi hayvanı desteği otlatma sonrası olmuştur (%73.12). Ankete katılanların yüzde % 66.91'i tüm hayvan kategorilerine gıda takviyesi yaptı. Takviyenin çoğu geç kuru mevsimde (%76.77) yapıldı. Ankete katılanlar, preslenmiş şekilde olan herhangi bir takviyenin farkında değildi. Ankete katılanların çoğu (%98.86), iyodür sodyum klorür ve enerji kaynakları ile takviye yapıyor, ancak birleşik bir diyetin ayrılmaz bir bileşeni olarak değil. Sonuç olarak, bu nedenle, yarı kurak bölgelerde, N, P ve Ca gibi inorganik minerallerin dahil edilebileceği gıfret formunda gıda takviyesi üretmek için diyet minerali bazlı takviyelerin araştırılması gerekmektedir. Ayrıca, yarı kurak bölgelerde geç kuru mevsimde ürünlerin tanıtılması tarımsal-kırsal çobanlar tarafından daha kolay kabul edilebilir.

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Introduction

The relevance of ruminant livestock and livelihood of the dwellers of the semi-arid environment (Muhamad et al., 2007). Similarly, the nutritional challenges facing ruminant livestock due the fluctuating nature of feed between wet and dry seasons interferes with the production potential of livestock in the seasonally dried tropics (Takele et al., 2014). Amongst the nutritional requirements of ruminant animals such as minerals manifest is an essential contribution is important as an energy, protein, vitamins and water (Mc Dowell 1992; Banerjee, 2008; Khan et al., 2005; Mc Dowell, 1996). In the dry season mineral is equally critical resulting in ruminant livestock licking urinary spot which Muhammad (2008) attributed to symptom of mineral deficiency. An earlier report by Muhammad et al, (1999) stated that animals to be offered *Sorghum alnum* fodder in semi-arid and sub humid zones of Nigeria would respond positively to mineral (Ca, P Mg, and Na) supplementation. Mineral supplementation improves the productivity and reduces the reproductive problem of grazing ruminants (Mc Dowell, 1996). Animals supplemented with minerals hardly come down with wasting diseases (Mc Dowel et al., 1993).

The objective of this study was to assess the preponderance of utilization of inorganic mineral as a supplement by livestock owners in semi-arid, Nigeria. It is hoped that the results of this study will trigger more research in the development of alternative methods of supplementing minerals in the diets of ruminant livestock in conserved forms as wafers.

Material and methods

Description of study area

The study was conducted in Kano state, Nigeria. Kano lies between longitude 9° 30' and 12° 30' North and latitude 9° 30' and 8° 42' East. It is characterized by tropical wet and dry climate (Ahmed, 1998). Annual rainfall and temperature ranges between 787 and 960 mm and 21 – 39 °C, respectively (KNARDA, 2001). Commonly crops grown in the region include millet, sorghum, cowpea and groundnut while cattle, sheep, goats and poultry are the predominant livestock species reared.

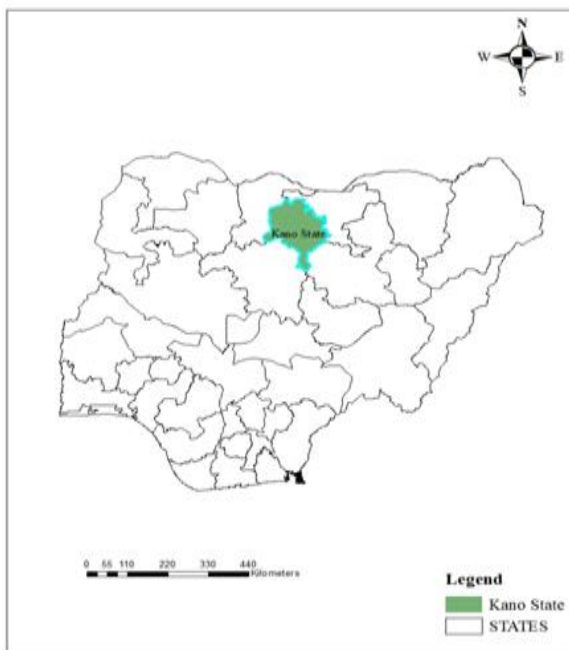


Figure 1. Kano stae

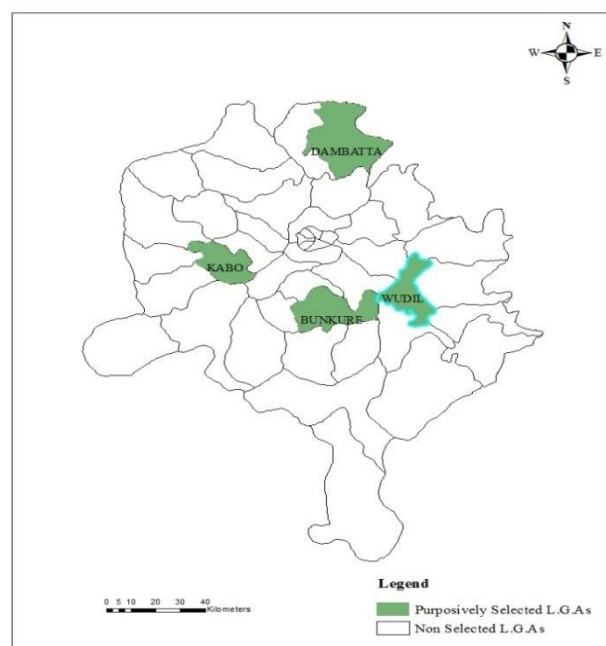


Figure 2. Local of study areas in kano state

Diagnostic survey

A diagnostic survey was conducted as benchmark information in four local government areas (LGA) (Dambatta, Kabo, Bunkure and Wudil) all in the semiarid, Kano state (Figure1 & 2) to assess the use of minerals as a supplement in livestock husbandry. The selection of the LGA, villages and respondents were purposefully based on availability of a large number of agro-pastoralists. Similarly, five (5) villages were purposively selected from each of the LGAs based on the high concentration of agro-pastoralists in the area. Five (5) households of agro-pastoralists were randomly selected out of the enlisted households within each of the selected villages, giving a total sample size of one hundred (100). The questionnaire comprised of questions on respondents, categories of livestock reared, sources, types and reasons of supplements, frequency, season and time of supplementation.

Statistical analysis

The data generated from the questionnaire were entered into Microsoft excel (2007) and analyzed using simple descriptive statistics of frequency and percentages. Statistical Analysis System (SAS, 2002) was used for data analysis.

Results

Ownership of livestock species by agro pastoralist is presented in Table1. The majority of the respondents owned the composition of sheep, goats (59%), followed by those that owned sheep goat and cattle (35%). Sheep and cattle alone are less than 5%, whereas rearing goat alone was not reported. The respondents examined vary in their flock size from 1 to above 90, with the majority being within the flock size of 11 to 30 (56%). Those within the flock size of 1-10 (20%) and 31-50 were (18%).

Table1: Livestock species owned by the respondents in semi arid, Nigeria

Variable	Frequency	%
Livestock species		
Sheep	3	3.00
Goats	0	0.00
Cattle	1	1.00
Sheep and Goats	59	59.00
Sheep and Cattle	2	2.00
Sheep, Goats and Cattle	35	35.00
Flock Size		
1-10	20	20.00
11-30	56	56.00
31-50	18	18.00
51-70	3	3.00
71-90	2	2.00
>90	1	1.00

Management of sheep by respondents that use minerals as a supplement in sheep management in semi-arid, Nigeria is presented in Table 2. All farmers practiced semi-intensive system with forty one percent (41%) of them practicing the semi-intensive system because it is tradition.

However, 25% of them reported it is traditional, cheaper and convenient. While only (21%) found it convenient. Respondents seek attention for veterinary services when the need arose (98%), while others seek once in three months (2%). All respondents reported no provision of housing for their animals (100%).

Table 2. Livestock Management by agro-pastoralists that use mineral as supplement in semi-arid, Nigeria

Variable	Frequency	%
Management System		
Intensive	0	0.00
Semi-intensive	100	100.0
Extensive	0	0.00
Choice of Management system		
Convenience	21	21.00
Cheaper	13	13.00
Tradition	41	41.00
All	25	25.00
Health Care Services		
Once in three Months	2	2.00
Only when the need arise	98	98.00

Provision of minerals as supplements to agro-pastoralist in semi-arid, Nigeria is presented in Table 3. Eighty eight (88%) of the respondents supplemented their animals while (12%) do not offer any form of supplements. Most (96%) of the respondents reported that they use supplements to improve the performance of their animals. Most respondents (98.86%) used minerals and energy as a supplement for their animals. The majority of them offered supplements after grazing (73.12%) while those who offered before and after grazing were (19.35%). A large proportion (65.91%) of the respondents offered supplements to all categories of animal. Those who only supplemented for fattening were (26.14%). Seasons of offering supplementations by agro-pastoralists are presented in figure1: Most of the respondents supplemented during late dry season (76.77%).

Table 3: Provision of mineral as supplements to livestock by farmers in semi-arid, Nigeria

Variable	Frequency	%
Offering supplements		
Supplementation	88	88.00
Not supplementation	12	12.00
Reasons for Supplementation		
Pasture is poor	1	1.00
Improve the performance	86	86.00
Pasture is poor & improve performance	1	1.00
Types of Supplementation		
Protein	0	0.00
Energy	1	1.4
Minerals	0	0.00
Energy and minerals(NaCl)	87	98.86
Desire to use wafer		
Desire	100	100
Do not desire	0.00	0.00
Time of offering supplements		
Before grazing	7	7.53
After grazing	64	73.12
Before and after grazing	17	19.35
Animal categories supplemented		
Pregnant	4	4.55
Lactating	2	2.27
Open dry animals	1	1.14
Fattening	23	26.14
All	58	65.91

There was, however, some level of supplementation in early, dry and late dry seasons (20%), whereas none of the respondent supplemented during either early dry or early wet season.

Forms or methods of supplementation by respondents in semi-arid, Nigeria is presented in Figure 2. Mixture with feed was the major medium of offering supplements (48.13%) while those who offered the supplement in both water and mixed with feed were (37.93%). Those who offered the supplements in the blocks were (8.04%) and those who offer water were (6.9%). None of the respondents offered his supplement in the form of wafers.

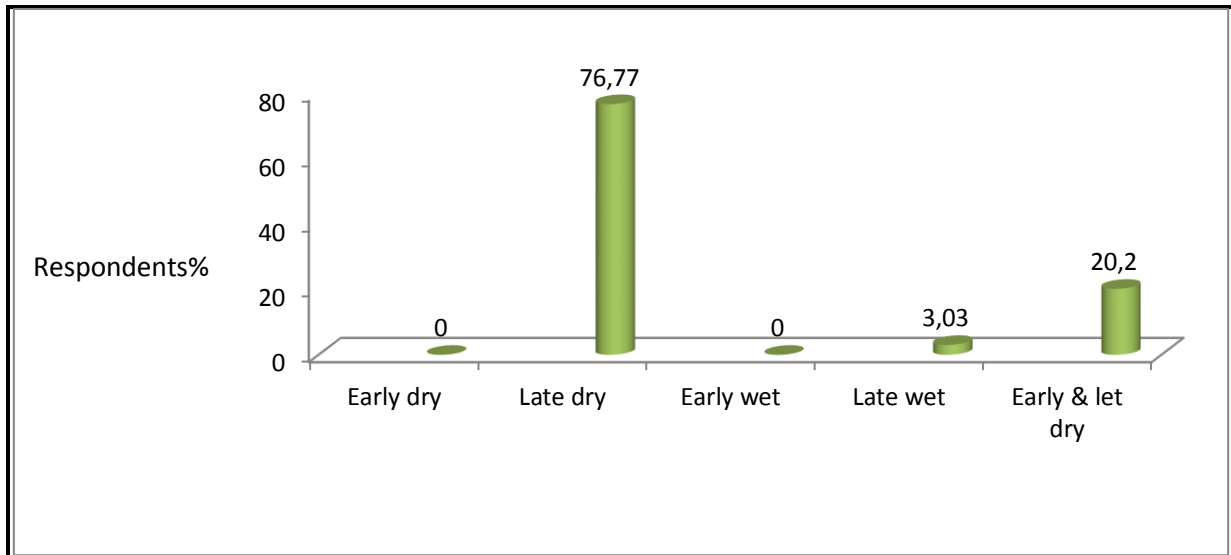


Figure 2. Seasons of supplement by respondents in semi arid , Nigeria

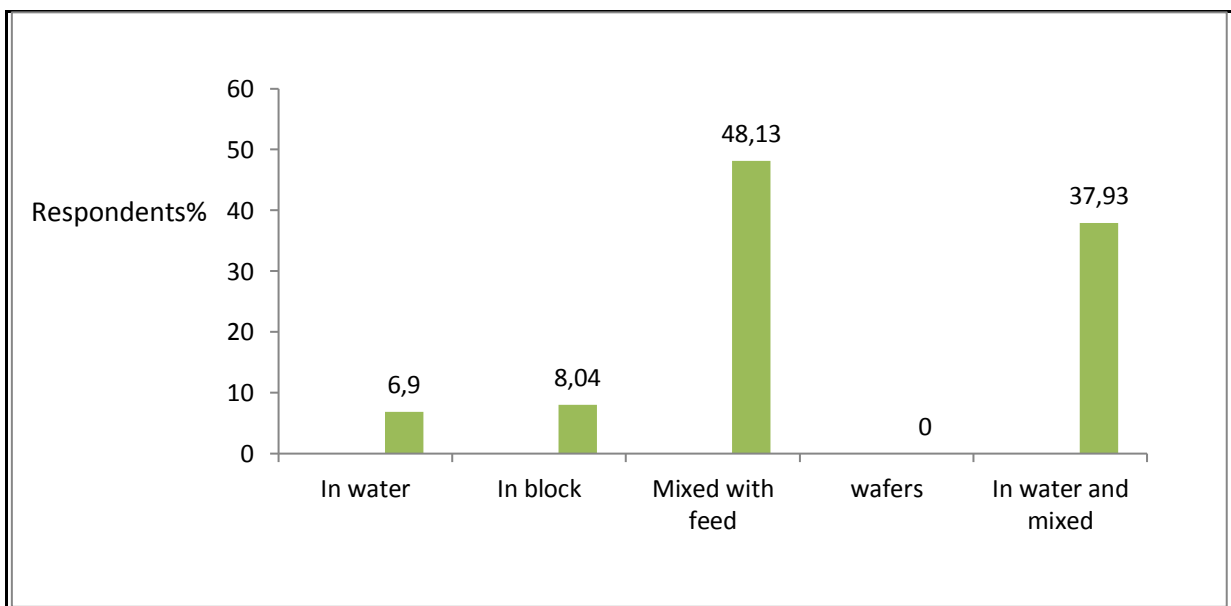


Figure 3. Form of offering supplementation by respondents in semi-arid, Nigeria

Discussion

The fact that the majority of the respondents in the present study keeping the small ruminant species could be due to ease of disposal targeted at the festive seasons in the study area of proficiency of the species. This is in agreement with earlier reports by Gurba et al. (2015). who reported same. These species of animals (cattle, sheep and goats) are mainly indigenous to the country and the environment of the study area, thus adapted to the vagaries of climatic and feed scarcity (Muhammad, 2008).

The majority of the respondents in this study being within the flock size of 11 to 30 combinations of sheep and goats. This indicates that they are a small holder (Muhammad et al. 2015). All respondents reported practicing semi-intensive system as a management system. This is because the respondents practice some crop farming beside livestock rearing, so it is an opportunity to provide their animals with a supplement from their cultivated crops. While majority of them reported it is traditional. This revealed that they are aware of the need for supplementation. Most respondents reported the services provided by veterinarian were either drugs and advisory services or only drugs. From the findings health care problem is not a challenge, because they have an established approach to solve this problem.

All respondents reported that no provision of housing for their animals in the area of the study. The majority of the respondents reported that they supplemented their animals, while few of them did not supplement. This may be the reason why pasture alone in the area of the study could not meet all the requirements of the animals which required supplementation. Smith (1992). reported that lack of adequate year-round feed resources is probably the most important factor to lower animal production. Majority of the respondents reported they used supplementation to increase the performance of their animals. Farmers claimed that supplementation increase the performance of their animals, however their claim could be attributed to good nutritional status and their animals which support high fecundity. While most of them reported energy and minerals were the main source of supplementation in the area of the study may be due to low quality of native pasture in semi arid areas. The finding is in agreement with Ben Salem (2010) who reported that sheep and goats raised under this condition are generally grazing on degraded range land or offered low fibrous feed stuff like cereal straw. Nutrients contents of these feed resources are so low and unbalanced that the provision of complements is necessarily for livestock maintenance and production. Mixed with feed was the major medium of feeding supplementation by most of the respondents. The wisdom behind that is that farmers do not sort animals into categories as such dissolving the minerals into drinking water avails all the animals to take. None of the respondents used supplementation in the form of wafers. This may be due to lack of knowledge. The majority of the respondents offered supplement after grazing. Most of them supplemented during late dry season, while there was however some level of supplementation in early and late dry season.

Conclusion

It can be concluded from the result of this study that inorganic mineral supplementation is used in the form of iodide sodium chloride (table salt). The respondents were not aware of any form of supplement in the form of wafers. Most of the respondents (98.86%) supplement with iodide sodium chloride and energy sources yet not as an integral component of a compounded diet herders are not aware of dietary mineral wafers for supplementation but willing to per take. It is hoped that the results of this study will trigger more research in the development of alternative methods of supplementing mineral in the diets of ruminant livestock in conserved forms as wafers.

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