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Diagnostic survey on utilization of *Kanwa* by ruminant livestock farmers in Sokoto state, Nigeria

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Abstract

This study examined the utilization of hydrated sodium carbonate (Kanwa) by farmers in Sokoto state. A survey was conducted in the three ADP zones of Sokoto state, each represented by three Local Government Areas to assess farmers' utilization of Kanwa on livestock production. The data collected in experiment were analysed using simple descriptive statistics. The result of the survey shows that 94.17% of the respondents offer Kanwa to their animals. Majority use Balma (32.74%), other types of Kanwa used by the respondents include Burunguzu (9.73%), table salt (19.47%), Hogga (5.3%) and Jan gishiri (0.88%).

Keywords: Kanwa, farmers, survey, sampling

Enquête diagnostique sur l'utilisation du Kanwa par les éleveurs de ruminants dans l'état de Sokoto, Nigeria

Résumé

Cette étude a examiné l'utilisation du carbonate de sodium hydraté (Kanwa) par les agriculteurs de l'État de Sokoto. Une enquête a été menée dans les trois zones ADP de l'État de Sokoto, chacune représentée par trois zones de gouvernement local pour évaluer l'utilisation par les agriculteurs de la production animale de Kanwa. Les données recueillies dans l'expérience ont été analysées à l'aide de statistiques descriptives simples. Le résultat de l'enquête montre que 94,17% des répondants offrent le Kanwa à leurs animaux. La majorité utilise le Balma (32,74 %), les autres types de Kanwa utilisés par les répondants incluent le Burunguzu (9,73 %), le sel de table (19,47 %), le Hogga (5,3 %) et le Jan gishiri (0,88 %).

Mots-clés : Kanwa, agriculteurs, enquête, échantillonnage

Introduction

The mineral status of the animal has effects on every phase of the reproductive cycle (Bedwal and Bahuguna, 1994; Smith and Akinbamijo, 2000; Robinson *et al*., 2006). For instance, during gestation, both dam and foetus are very susceptible to imbalances in micronutrients in the diet during the time of rapid growth and cell differentiation (McArdle and Ashworth, 1999; Gürdoğan *et al*., 2006; Ghany-Hefnawy *et al*., 2007). Additionally, weight of offspring weaned per female may be affected by both trace mineral supplementation and source (Ahola *et al*., 2004). However, the mechanisms of action by which these micronutrients affect reproduction in sheep and goat are not completely understood, mainly due to the complexity in the mode of action of the metallo-biomolecules and the neuro-hormonal relationship (Bedwal and Bahuguna, 1994; Smith and Akinbamijo, 2000). Mineral supplementation in livestock reared under intensive system of production is recommended because of the

high degree of dietary standardization and the relatively high security margins for most minerals in most domestic species. In addition, intoxication associated with mineral supplementation are relatively rare. In spite of the roles played by mineral elements in the animal nutrition and health, special consideration should be given to hepatic chronic accumulation in ruminants, because of the difficulty to establish safe levels of the mineral elements in these species and the low capacity of these animal for billiary excretion. In addition, the incremental accumulation of heavy metal content of some mineral supplements compared to other feedstuffs and their interactions with some essential minerals (especially for Cadmium) can lead to toxic effects on animals (Blanco- Penedo *et al*., 2006).

Offering of *Kanwa* either on free-access or incorporated in the diet of animals to supplement mineral needs has been in used for long, however, there is little or no scientifically-published work on the effect of feeding *Kanwa*-based mineral block to ruminant animals in this ecological zone. This study investigated and documented the existing knowledge among farmers on the utilization of different sources of*Kanwa*in feeding sheep.

Materials and methods

Description of the experimental site

This study was conducted in Sokoto state which falls within the S*uda*n Savannah vegetation zone and on 350m altitude (Singh, 2004). The climate is characterised by two distinct seasons (wet and dry). The wet season starts in May/June and end in September/October while the dry season covers from October to April/May. Mean annual rainfall varies from 500 to 700mm with a wider inter annual variations. Relative humidity is moderate to high (51—79%) during the rainy season and very low (10—25%) during the dry season. Mean monthly temperatures vary widely; from 14^{o}C in December/ January to about 41^{o}C in April with annual mean of 29^{o}C (Mamman *et al*., 2000).

Survey on utilization of Kanwa by ruminant livestock farmers

A diagnostic Survey was conducted in nine Local Government Areas (LGAs) from the twenty-three (23) LGAs of Sokoto state on farmer's utilization of *Kanwa* in Sheep production. Three LGAs from each of the three ADP zone within the state were selected.

Sampling

Stratified sampling was used to select three LGAs from each ADP zone while simple random sampling was used to select three wards from each of the selected LGA. Ten respondents were purposively identified from each ward.

Data collection and analysis

Data were collected using a semi-structured questionnaire that was issued to farmers to collect information on the utilization of *Kanwa* in sheep production. Data generated in survey were analysed using descriptive statistics.

Results

Socio-demographic characteristics of sheep farmers in the study area

The result on socio-demographic characteristics of sheep farmers in the study area is shown in Table1. The socio-demographic information of the survey farmers include age, tribe, occupation, herd size, type of management system adopted, feed supplementation, provision of water time of watering and watering source and housing system. The result showed 85% of the respondents were within the age bracket of 20-40 years while 15% above 60 years. All the respondents were Hausa/Fulani by tribe; 91.67% of the respondents considered crop/livestock farming as their occupation, only 0.83% were civil servant.

The result also showed that 49.17% of the respondents had animal stock in the range of 1-10 animals; only 2.5% of the sampled population had more than 50 animals. Semi-intensive system of production was the most (72.5%) adopted means of production by the respondents, of which 29.7% supplement their animals with wheat offal or cowpea husk, 21.43% with cereal stalk and 6.02% with either sorghum grain or *Kasari*. From the result, 53.33% of the respondents watered their animals twice a day,where 85.45% of them watered the animals during morning and evening hours. 48.28% of the respondents sourced their water from well while 12.07% from tap. In terms of housing, 39.17% of the respondents do not housed their animals while 31.67% and 29.17% provide housing in form of shed and hut, respectively.

Information on the usage of Kanwa by farmers in the study area

Table 2 presents the result of information on *Kanwa* utilization by the respondents. 94.17% of the respondents reported that they offer *Kanwa* to their animals and majority of the respondents used *Balma* (32.74%), other types of *Kanwa* they used include *Burunguzu* (9.73%), Table salt (19.47%), *Hogga* (5.3%) and *Jan Gishiri* (0.88%). All the respondents sourced their *Kanwa* from market and majority (64.6%) said *Kanwa* can be used for cattle, sheep and goats. The result showed that 81.42% of the respondents said *Kanwa* can be offered to animals irrespective of physiological state while 15.93% said it cannot be offered to pregnant animals. Approximately,46.9% of the respondents supplemented *Kanwa* on weekly basis, 68% of the respondents offered *Kanwa* in drinking water and most (97.35%) said season does not affect *Kanwa* supplementation. The result showed that *Kanwa* does not affect the animals as suggested by majority (94.69%) of the respondents while 5.31% said they faced some challenges as a result of using *Kanwa*. Also,66.67% of the respondents experienced purging while 33.33% experienced abortion in pregnant animals. Some respondents (33.33%) faced some challenges as a result of offering *Kanwa* and stopped using it while 66.67% used baobab leaves to suppress its effect; however, 70.83% of the respondents reported an increased feed and water intake as a result of using *Kanwa*.

Discussion

Socio-demographic information of the sampled population in the study area

The study revealed that 85% of the respondents are within the age bracket of 20-40 years and majority (87%) of them reported crop and livestock production as their main source of livelihood. This was corroborated by the report of Charry *et al.* (1992).The study shows that 49.17% of the respondents keep animals in the range of1-10; this could be as a result of the economic status of the respondents as fewer number of animals can be managed. Musa *et al*. (2016) speculated that the small flock size was largely due to the fact that ownership is fragmented into smaller number owned by members of the household. Most of the respondents (72.5%) practice semi intensive system of production where most of them are crop farmers, hence they normally used the crop residues from their farms to supplement feeding after grazing during off season while during rainy season, the animals are kept away from crops thus offered cut and carry and other feed materials. From the findings of the survey, respondents usually supplement their animals with wheat offal, sorghum grains, stalk and *Kasari (mixed leftover of processed grains)* because they are readily available. The respondents normally offered water to their animals twice a day – before and after grazing – where (48.28%) of them sourced the water from well. The study also revealed that 39.17% of the

Table 1: Socio-Economic and Demographic Information of the Sampled Population in the Study Area

Parameters	Frequency	Percentage
Socio-demographic information		
1. Age		
20 – 40	58	48.33
41 – 60	47	39.17
61 – 80	15	12.5
Total	120	100
2. Tribe		
Hausa/Fulani	120	100
Gobirawa	0	0
Total	120	100
3. Occupation		
Livestock header/farmer	110	91.67
Civil servant	7	0.83
Fisher man	1	1.67
Businessman	2	5.83
Total	120	100
Information on livestock management		
4. Number of Animals		
1 – 10	59	49.17
11 – 20	22	18.33
21 – 30	14	11.67
31 – 40	22	18.33
50 – 100	3	2.5
Total	120	100
5. Management system		
Intensive	25	20.83
Semi intensive	87	72.5
Extensive	8	6.67
Total	40	100
6. Type of Supplementation		
Wheat offal	79	29.7
Cowpea husk	19	7.14
Stalk	57	21.43
Cowpea hay	79	29.7
Kasari	16	6.02
Sorghum grain	16	6.02
Total	266*	100
7. Watering		
Anytime	17	14.17
Once Daily	9	7.5
Twice Daily	64	53.33
Three times daily	30	25
Total	120	100
8. Time of Watering		
Morning	7	6.36
Morning and Evening	94	85.45
Evening	9	8.18
Total	110	100
9. Source of Water		
Bore hole	13	11.21
Open dug well	56	48.28
River/stream/pond	33	28.45
Pipe bone	14	12.07
Total	116	100
10. **Housing**		
No form of housing	47	39.17
Shed	38	31.67
Hut	35	29.17
Total	120	100

Table 2: Information on the utilization of *Kanwa* of the sampled population in the study area

Parameters	Frequency	Percentage
Utilisation of *Trona* and Salt		
1. Are you using *Kanwa*		
Yes	113	94.17
No	7	5.83
Total	120	100
2. Type used		
Kanwa (Burunguzu)	11	9.73
Salt	22	19.47
Balma	37	32.74
Mixture (*Balma* and Salt)	6	5.31
Salt, *Balma* and *Kanwa* (miture)	4	3.54
Salt and *Kanwa*	20	17.7
Hogga	6	5.3
Jan gishiri	1	0.88
*Kanwa*n baibai	6	5.31
Total	113	100
3. Source		
Market	113	100
Others	0	0
Total	113	100
4. Animals supplemented		
Sheep	16	14.16
Cattle	13	11.5
Goat	11	9.7
All of the above	73	64.6
Total	113	100
5. Category of Animals offered to		
Mature male		
Mature female	2	1.77
Pregnant animal	1	0.88
Young animal	0	0
All of the above	0	0
i, ii and iv	92	81.42
Total	18	15.93
	113	100
6. Time of supplementation		
Daily		
Weekly	10	8.85
Monthly	53	46.9
Quarterly	28	24.78
Others	10	8.85
Total	12	10.62
	113	100
7. Quantity offered (kg)		
0 – 1	102	90.27
1 – 2	6	5.31
2 – 3	5	4.42
Total	113	100
8. Mode of supplementation		
In feed		
In drinking water	7	6.19
Sole	77	68.14
Total	29	25.66
	113	100

Table 3: Information on the utilization of *Kanwa* of the sampled population in the study area cont.d'

Parameters	Frequency	Percentage
1. Does season affect supplementation		
Yes	3	2.65
No	110	97.35
Total	113	100
2. Which season		
Dry season	0	0
Rainy	3	100
Cold season	0	0
Total	3	100
3. Any problem faced		
Yes	6	5.31
No	107	94.69
Total	113	100
4. Problem encounter		
Abortion of early pregnancy	2	33.33
Purging	4	66.67
Total	6	100
5. Mitigating measures		
Avoid giving pregnant animal	2	33.33
Using baobab leaves	4	66.67
Total	6	100
6. Benefit of using *Trona*		
Increase feed and water intake		
Help in muscle deposition/fattening	85	70.83
Increase strength and activeness	15	12.5
Total	20	16.67
	120	100

respondents do not housed their animals, this is in agreement with the reports of Ahmed and Egwu (2014) and Hassan (2000).

Information on the utilization of kanwa by farmers in the study area

Minerals play important roles in nutrient utilization and several biochemical functions concerning production and reproduction. The availability of minerals to Sheep depends upon the production system, feeding practices, and environment (Singh and Bohra, 2005). Productive animals in rural areas largely depend on grazing and crop residues and to a little extent on supplemented concentrates to fulfil their nutritional requirements. These resources rarely provide all the needed mineral requirements of livestock (McDowell, 1985). Animals obtained minerals through the consumption of natural feeds, fodders and supplementation of inorganic salts in the ration. Mineral deficiencies and imbalances have long been held responsible for low production among Cattle fed on crop residues in tropical agro-climatic condition (McDowell, 1985). The present study shows that almost all the respondents (94%) used *Kanwa* in the management of their animals, they used different types of *Kanwa* for different purpose depending on the location and availability; similar observation have been reported by Gbodi and Ikwuegbe (1982), Ikwuegbe *et al*. (1985) wherein they observed that farmers and herdsmen in northern Nigeria use local mineral supplements which they claim to have

nutritive and curative properties as animals placed on such supplements appear healthier and perform better. Some of the notable *Kanwa* used by the respondents include *Balma, Hogga* and *Burunguzu* while others used Table salt (NaCl) in place of *Kanwa*. Some of the respondents used *Kanwa* varieties inform of a mixture, for example, they give *Balma* at the beginning of rainy season while the other salt and *Hogga* during dry season. The study shows that all the respondents (100%) sourced their *Kanwa* in the market; 81.42% of the respondents said *Kanwa* can be given to all categories of animals (irrespective of physiological state), while 15.93% of the respondents said *Kanwa* cannot be given to pregnant animals though these respondents are specifically referring to *Jan Kanwa* and *Ungurnu* which they speculated to cause abortion. Some of the respondents (47%) offer *Kanwa* supplement to their animals on weekly basis, this is because when energy and protein need for maintenance of the ruminant falls in the dry season, multi-nutrient blocks upgrade the energy and ammonia levels in the rumen(Ramchurn *et al.,* 2000). They also offer an attractive possibility because they are cheap and particularly convenient; they are easy to transport, and the blocks readily release their nutrients to the animal. The use of the blocks as feed supplement in the rural areas will ensure that the animals are not just being maintained but can be sustained for productive performance. The ease of preparation and maintenance make the blocks technology practicable for adoption by small-scale farmers (Ramchurn *et al.,* 2000). The study found that 60% of the respondents offer *Kanwa* in drinking water especially for sheep and goat. This was also reported by Ikwuegbe *et al.* (1985) and NRC (1980) for optimum growth, reproduction and other physiological functions. Adequate amounts of sodium need to be supplied through feeds, drinking water and other sources. The respondents (67%) reported that using *Kanwa* in livestock production leads to purging by the animals but this was explained as a way of cleansing the system, especially during the early rainy season when animals graze tender and lush grasses which are consumed along with sand, thus when they offered *Kanwa,* they purge out the sand. The respondents reported that they offered baobab leaves to mitigate the purging when it is severe; with regards to the abortion as a result of feeding *Kanwa*, the respondents desist from using such type of *Kanwa* (*Jar Kanwa* and *Ungurnu*) as a preventive measure.

Conclusion

Majority of the respondents (94.17%) in the study area fed *Kanwa* to their animals and *Balma* was predominantly used.

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