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ASSESSMENT OF NUTRITIONAL POTENTIALS OF KITCHEN WASTE WATER IN SMALL RUMINANT PRODUCTION IN WARAWA LOCAL GOVERNMENT AREA OF KANO STATE, NIGERIA

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ABSTRACT
The study was conducted to assess the nutritional potentials of Kitchen waste water (KWW) in small ruminant production in Warawa Local Government Area of Kano State, Nigeria. One hundred (100) small ruminant producers were randomly selected through multi-stage sampling techniques in a ratio of 50:50 (male: female) and information were solicited using structured questionnaire. The results indicate that majority (61%) fall within the active age of 18-40 years, similarly majority (59%) of the respondents were married and predominantly engaged in business (47%) and farming (41%) as their primary occupations. The respondents had small to medium flock/herd size with rearing experience of 1-10 years as reported by majority (59%) and they manage their small ruminants under semi intensive system of farming as reported by (56%) of the respondents. The predominant KWW used was fermented water from soy beans. The KWW used were domestically sourced after kitchen activities. The result further revealed that on the average, an animal consumed 4.4 litres of KWW daily as reported by majority (67.9%) of the respondents with sheep consuming more compared to goats. It was concluded that KWW is safe and nutritious for small ruminant production. Therefore, its utilization by small ruminants should be encouraged for improved performance.
Keywords: Goats, kitchen, nutrition, sheep, waste water

INTRODUCTION
Water from foodstuffs is an important source for the animals (Ajauro*et al.,* 2010). This additional water supply is more important to the animals reared in regions with little access to drinking water, as sheep and goat in the northern part of Nigeria. Succulent feed with high water and laundry matter contents, such as legumes, forage, watermelon and silage, constitute important source of water for goats and sheep reared in this region. Fresh water is a daily necessity for small ruminant production. The water can be sourced from tap, wells, rivers and kitchen waste water (KWW) etc. KWW is drinkable water for animal production which is found as a result of washing, steaming, soaking, preservation and processing of various feedstuffs e.g. maize, soybeans, millet, rice etc. for human consumption.Wilms*et al.* (2002) evaluated three sources of water supply for animals thus; fresh water from river, stream or wells, water captured in tank or water fountains, provided in drinking troughs, and direct access of the animals to collection tanks. The authors therefore observed higher water intake of animals that received clean and fresh water from rivers, streams and ponds, followed by the water captured and provided in troughs and finally the water ingested directly at the collection tank, but information on KWW was not captured. Therefore, this study was conducted to assess small ruminant farmers' perception on the use of KWW in the study area and to identify the most predominantly used KWW for small ruminant production in the study area.

MATERIALS AND METHOD
Study Area
The study was conducted in Warawa Local Government Area which is situated in Kano State, North-West geopolitical zone of Nigeria with headquarters of the Local Government Area domiciled in the town of Warawa. It comprises of several villages that include Danlassan, Yangizo, Yamagu, Warawa, Imawa, Garin

Da'u, Tangar and Madarin Mata. Kano lies on longitude 9º30' and 12º30' North and latitude 9o30' and 8o42' East on an elevation 468m (NiMet,2014).

Data Collection and Analysis Procedure

Multi-stage sampling techniques was employed in selecting the respondents. The first stage involved random selection of ten (10) communities. In the second stage, ten (10) respondents in a ratio of 50:50 (male and female) were selected randomly from each village making a total of one hundred (100) respondents and interviewed using structured questionnaires. The data collected were analyzed using statistical package for social sciences (SPSS) software version 16.0 (SPSS, 2001).

RESULTS AND DISCUSSION

Small Ruminant Ownership, Flock/Herd Size, Management System and Rearing Experience of the Respondents

The results indicated that 22% of the respondents' produced goat, 35% produced sheep and 43% produced both (Table 1). The rearing of both sheep and goat as reported by 43% of the farmers may be attributed to the fact that they share similar characteristics in term of feeding habit and also serve as security. The results also revealed the system of rearing these small ruminants practiced by the farmers in which majority (56%) practiced semi intensive system, 24% practiced intensive system while 20% practiced extensive system.

Table 1: Small ruminant ownership, flock/herd size, management system and rearing experience of the respondents

Variable	Frequency	Percentage
Type of small ruminants reared		
Goat	22	22
Sheep	35	35
Both	43	43
Total	100	100
Flock/hard size		
Small	49	49
Medium	33	33
Large	15	15
Extra large	3	3
Total	100	100
Years of rearing experience		
1-10	59	59
11-20	28	28
21-30	10	10
31-40	3	3
Total	100	100
System of Rearing		
Extensive	20	20
Semi-intensive	56	56
Intensive	24	24
Total	100	100

Knowledge on the Use of KWW by Respondents

Table 2 presents the respondents knowledge on kitchen waste in the study areas where it was found that 83% of the respondents feed kitchen waste water (KWW) to their small ruminants. The most common form of the KWW used by the farmers in order of ascending were parboiled rice water (25.3%), fermented water

from soaked millet (24.1%), parboiled beans water (22.8%), soya beans (16.7%) and cowpea dumplings water (11.1%) as reported by the respondents. Additionally, farmers used the form of waste water because of its availability (35.2%), nutritive content (24.3%) and improvement in growth performance (16.9%) of the animals. It was also deduced from the findings that none of the respondents in the study area have encountered any problems in using any form of KWW in feeding his animals.

Table 2: Knowledge on the use of kitchen waste water (KWW)

Variables	Frequency	Percentage
Livestock fed with KWW		
Fed	83	83.0
Not fed	17	17.0
Total	100	100
Form of KWW fed to animal		
Fermented water from soya beans	27	16.7
Cowpea Dumplings water	18	11.1
Fermented water from soak millet	39	24.1
Per-boiled Beans water	37	22.8
Per-boiled Rice water	41	25.3
Total	162	100.0
Reasons for using KWW		
Availability	58	35.2
Nutrition	40	24.3
Make Animals Consume more feed	16	9.7
Make Animals healthy	17	10.3
Improve Growth Performance	28	16.9
Make Animals stay longer without need of another water	6	3.6
Total	165	100.0
Problems faced with any form of KWW		
Encountered	00	00.0
Not encountered	100	100.0
Total	100	100.0

Sources of kitchen waste water (KWW)and its Utilization

Table 3 presents source of kitchen waste water (KWW) and utilization in the study area. Half (50%) of the respondents sourced KWW from homes after kitchen activities, followed by 27.3% who purchased from food sellers, while 22.7% of the respondents obtained it from neighbors. It was also revealed that 48% of the respondents reported that their animals consume KWW more compared to fresh plain water, however, this KWW makes their animals to consume more food as compared when they drink fresh plain water alone, especially when the animals are fed with soy beans husks and rice straw. The result further revealed that the small ruminants consumed 4.4litres of KWW as reported by majority (67.9%) of the respondents which was administered through mixing the kitchen waste with fresh water.

Small ruminant (Sheep and goats) in traditional farming are kept and reared together because of their short incomes during emergencies (Tangka *et al.*, 2000). This warranted the reasons why most of the respondents in the study area kept (rear) sheep and goats together. Majority of the

producers' (83%) fed their animals with KWW because of its nutritional value to the animals (24.3%), also there was no any problem regarding the feeding of KWW as stated by all the respondents (100%). Water from feedstuffs is an important source of nutrient to the animals, it contains some minerals, vitamins, proteins etc. as reported by Ajauro*et al*. (2009). The practice of keeping small ruminants under semi-

intensive system of management could be associated with less input to invest and high availability of waste and processing by-products as a supplement after scavenging the range land as reported by (Garba and Muhammad, 2008).

Table 3: Sources of kitchen waste water (KWW) and utilization

Variable	Frequency	Percentage
Source of KWW		
Domestic (after kitchen activities)	64	50
Gift from neighbors	29	22.7
Purchase from food sellers	35	27.3
Total	128	100
Form of water cherish more by animals		
Normal water	32	31.4
KWW	49	48.0
Treated KWW	21	20.6
Total	102	100
Quantity of KWW drunk by animals		
4.40 litre/day	70	67.9
5.25 litre/day	26	25.2
5.75litre/day	5	4.9
10.00 litre/day	2	1.9
Total	102	100
Type of small ruminant that drunk more KWW		
Sheep	76	76
Goat	24	24
Total	100	100
Mode of presenting KWW to the animals		
Using fresh water mixed with KWW	60	60
Other means	40	40
Total	100	100

CONCLUSION

The result of this study showed that kitchen waste water is palatable anduseful (being nutritious and safe) for feeding small ruminants. Therefore, its utilization by small ruminants should be encouraged for improved performance.

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