FUDMA Journal of Agriculture and Agricultural Technology
ISSN: 2504-9496
Vol. 8 No. 2, December 2022: Pp. 67-73.

Doi: https://doi.org/10.33003/jaat.2022.0802.09

A SURVEY ON CAMEL (*CAMELUS DROMEDARIUS*) PRODUCTION UNDER PASTORAL MANAGEMENT SYSTEM IN NORTH–WEST, NIGERIA

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ABSTRACT

Camel is one of the most important livestock kept by few pastoralists of North–West, Nigeria. In order to come up with a report that will guide intending research fellows in the areas of feeding, water economy and management aspect, a survey was conduct in order to identify the immediate challenges of keeping camels in the study area. This involved the use of 241 randomly selected camel herders in four States (Jigawa, Katsina, Zamfara and Sokoto) of North–West, Nigeria. Therefore, the main aim of the study was to provide information on camel production systems and their contribution to different activities of the pastoralists and to identify the problems and constraints in camel feeding and management. Biodata of the respondents; camel management system, camel feeding strategy, water consumption and economy sources and availability of water were among the detailed information collected during the study. Conclusively, the report came up with guided information that will help to improve the productivity, an opening to research opportunities and to exploit the potentials of camels.

Key words: Feeding Strategy, Management, Water, Research opportunities

INTRODUCTION

Feed is one of the major components in livestock production. Generally, camels browse leaves, young twig/shoots, fruits, flowers and pods. Naturally, camels spend much time grazing. It is very difficult to supplement camels under pastoral production systems Tenets *et al.,* (2001). Camels trek long distance selecting diet from one plant to another and utilizing most succulent parts. Camels do not spend much time on a particular plant and the foraging habit is mostly on the taller plant species (Wardeh and Farid, 1990). Water consumption in camels is an interesting aspect because of its natural water economy and physiological management of dehydration and thirst (Mustapha *et al.,* 2006). Camels spend days without drinking water depending on season, type of work, feed availability, temperature and physiological status. Pastoralists scheduled time of watering camels based on seasons, availability and closer to the source of water. The level of water requirements in camel production and management could only be environmental–friendly Dioli *et al.,* (1992). In the traditional pastoral production system, camel herders keep their animals under traditional system of management where there is no guarantee of availability of adequate feed and water and medication (Al–Ani, 2004 and Ghude *et al.,* 2013). This study was, however, conducted with the aim to identify the feeding strategy and management aspect along with water economy of camels under traditional system of management across the seasons of the year.

MATERIAL AND METHODS

Sampling technique/questionnaire administration

Purposive sampling technique was used to select Local Government Areas with high population of camel in four States of the North Western Nigeria for questionnaire administration. The selection was based on the previous information on the availability of camel herders in the selected Local Government Areas as shown in Table 1. A total of two hundred and forty-one (241) structured questionnaires were administered. Information collected include demographic information of the respondents, performance of one humped camel, feeding strategy and seasonal water intake.

Table 1: Summary of the Sampling

States	LGAs	No. of Villages	No. of Respondents	Total
Sokoto	Gada	5	42	
	Illela	3	25	
	Tangaza	2	15	
	Gudu	2	11	93
Zamfara	Zurmi	4	43	
	Bungudu	3	20	
	Kaura Namoda	1	5	68
Katsina	Mashi	2	21	
	Daura	1	11	
	Mani	1	7	39
Jigawa	Maigatari	4	21	
	Kazaure	3	9	
	Gwiwa	2	6	
	Yankwashi	2	5	41
Total				**241**

Statistical analysis and result presentation

Statistical Package for Social Sciences (SPSS) version 16.0 was used to analyze the data obtained for simple descriptive statistics of frequency and percentages and clustered columns chat.

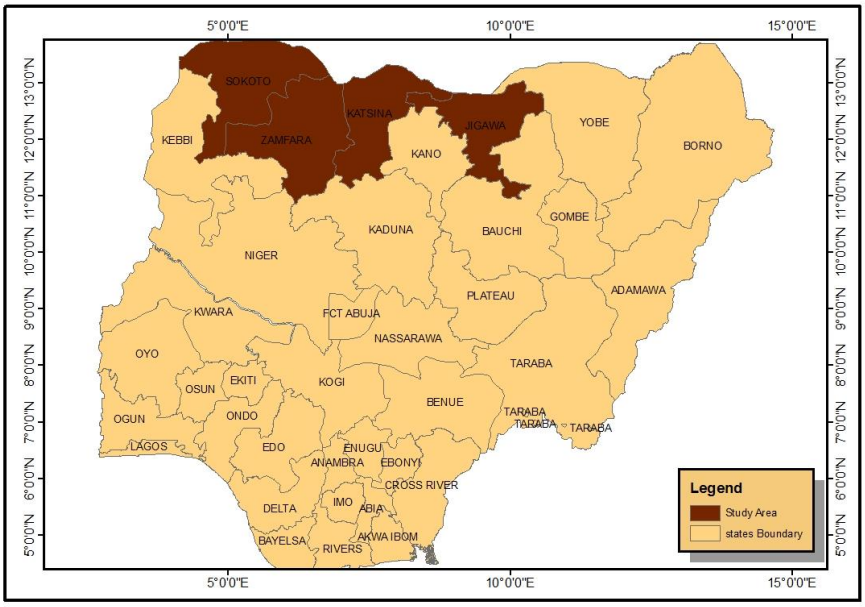

Figure 1: Map of Nigeria indicating the experimental locations (Jigawa, Katsina, Zamfara and Sokoto States)

RESULTS

Biodata of the respondents from North-Western, Nigeria

Figure 2 presents the result obtained from the respondents' personal information. From the Figure, majority (51.80%) of the respondents were between the ages of 41–50 years. This is followed by 32.40% whose ages were above 50 years while only 12.90% ranged between 31-40 years of age. The entire respondents interviewed were married males. Majority (63.00%) of the camel owners attended Qur'anic school while 15.80% attended mass literacy education. However, primary education represents 13.30%, secondary school education 4.20% and tertiary education 3.70%.

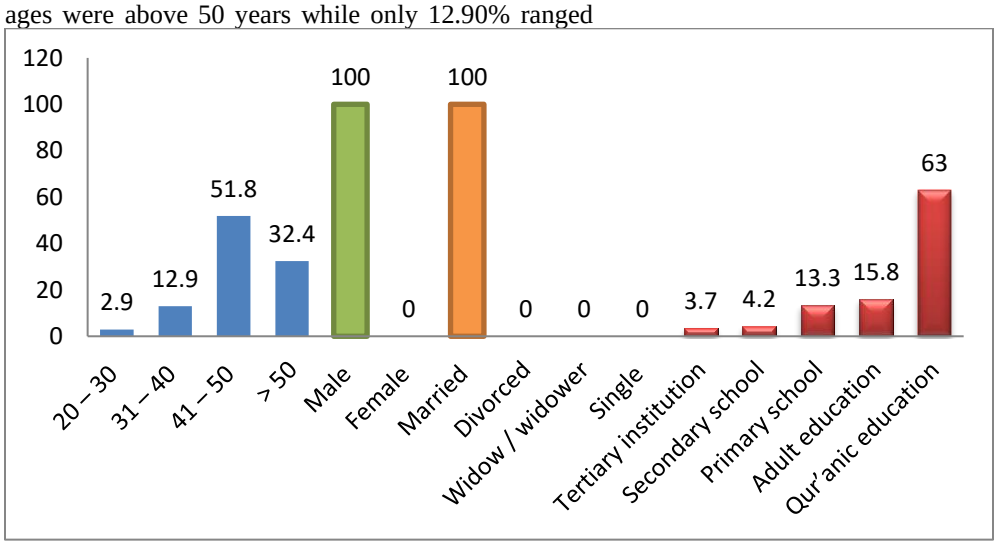

Figure 2: Bio-Data of the Respondents from North-West, Nigeria N=241

Management and performance of camels in selected areas

Figure 3 presented the results of camel management and performance. Majority (97.90%) of the respondents engaged the practice of extensive/free range system of management while only 2.10% practice semi-intensive with none of them practicing intensive system. During wet season, majority (88.40%) are facing problem of grazing area due to of cultivation of crop on the available land. In cold dry season, all of them indicated grazing area as the major problem. Majority (80.10%) of the respondents also indicated watering point as the major problem in hot dry season. Camels grow faster in wet season as indicated by the majority (99.60%). Majority (96.70%) of the respondents revealed normal growth in cold dry season. However, in hot dry season, majority (72.60%) also indicated normal growth.

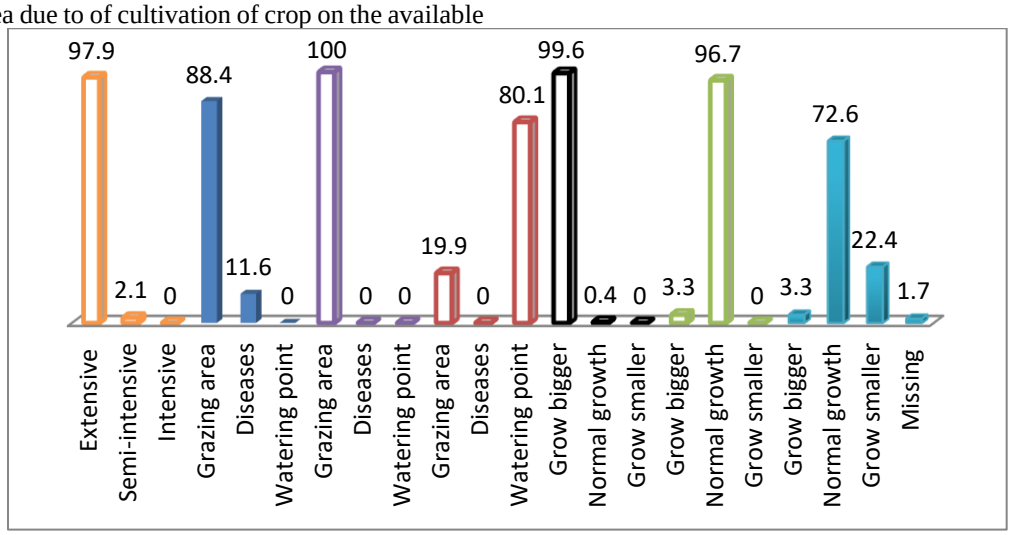

Figure 3: Management and performance of camels

Feeding strategy

Results in Figure 4 revealed feeding strategy as practiced by the respondents. Majority (97.10%) of the respondents are feeding their camels through grazing in wet season. During the period of cold dry season, 95.00% of the camel owners indicated grazing as the means of feeding their camels. Majority (90.90%) indicated grazing during hot dry season while only (9.10%) offer supplement. Those who offered supplementary feed are: provide guinea corn stalk 4.10%, cowpea hay 2.90% and ground nut haulms 2.10%. Majority (54.30%) of the respondents who did not provide supplementary feed to their camels was because they could not afford it. Meanwhile, (44.00%) who believed that camels can survive without supplementary feed and only 1.7% of them indicated unavailability of the feed. None of them indicated problem of feed during wet season. Majority (75.90%) indicated feed scarcity in cold dry season while only 24.10% are of the opinion that there is limited problem of feed. During hot dry season, majority (74.70%) indicated feed scarcity followed by 22.40% who revealed none availability meaning they have to source for the feed from the neighboring available grazing areas and only 2.90% are of the opinion that there was no feeding problem.

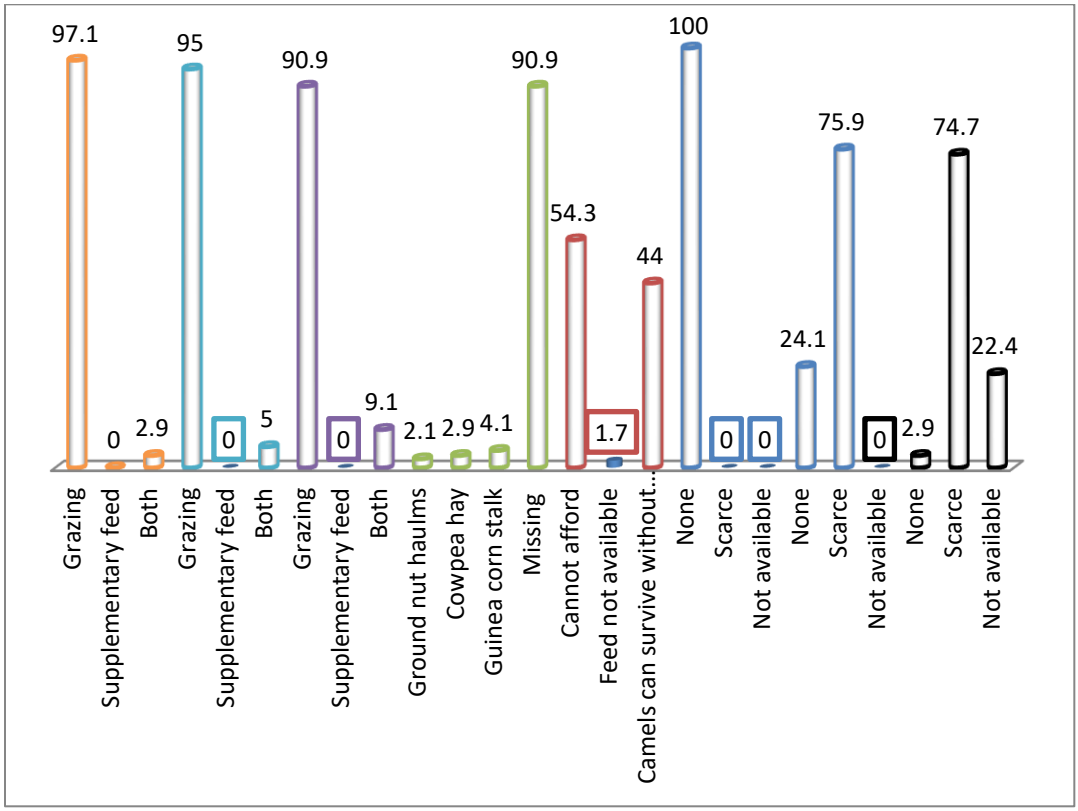

Figure 4: Feeding strategy camels in the study area

Water economy, consumption and watering intervals of camel production in the study area

Figure 5 presented the water economy, consumption and watering intervals of camel production in the selected areas. The frequency of giving water to camels in the area of the study in wet seasons indicated weekly by the majority (61.00%) followed by 20.70% who indicated two weeks and only 18.30% of the respondents indicated two days respectively. In cold dry season, majority (56.00%) indicated two days followed by 33.20% (weekly) and only 10.80% (two days). However, majority (97.10%) were for the period of two days during hot dry season and only 2.90% reported weekly. Stream was the source of water (72.60%) in wet season while tube well accounted for 27.40%. In cold dry season, majority

(98.30%) use tube well as a source of water for their camels. Majority (90.50%) indicated tube well in hot dry season and only 9.50% used borehole water. Camels drink water directly from the source in wet season as revealed by the respondents (84.20%) while only (15.80%) drink water in troughs. In cold dry season, 77.60% of the respondents use water trough and only 22.40% allow their camels to drink from the stream if available and other sources. In hot dry season, majority (81.30%) uses watering trough and only 18.70% allow them to drink from the available sources.

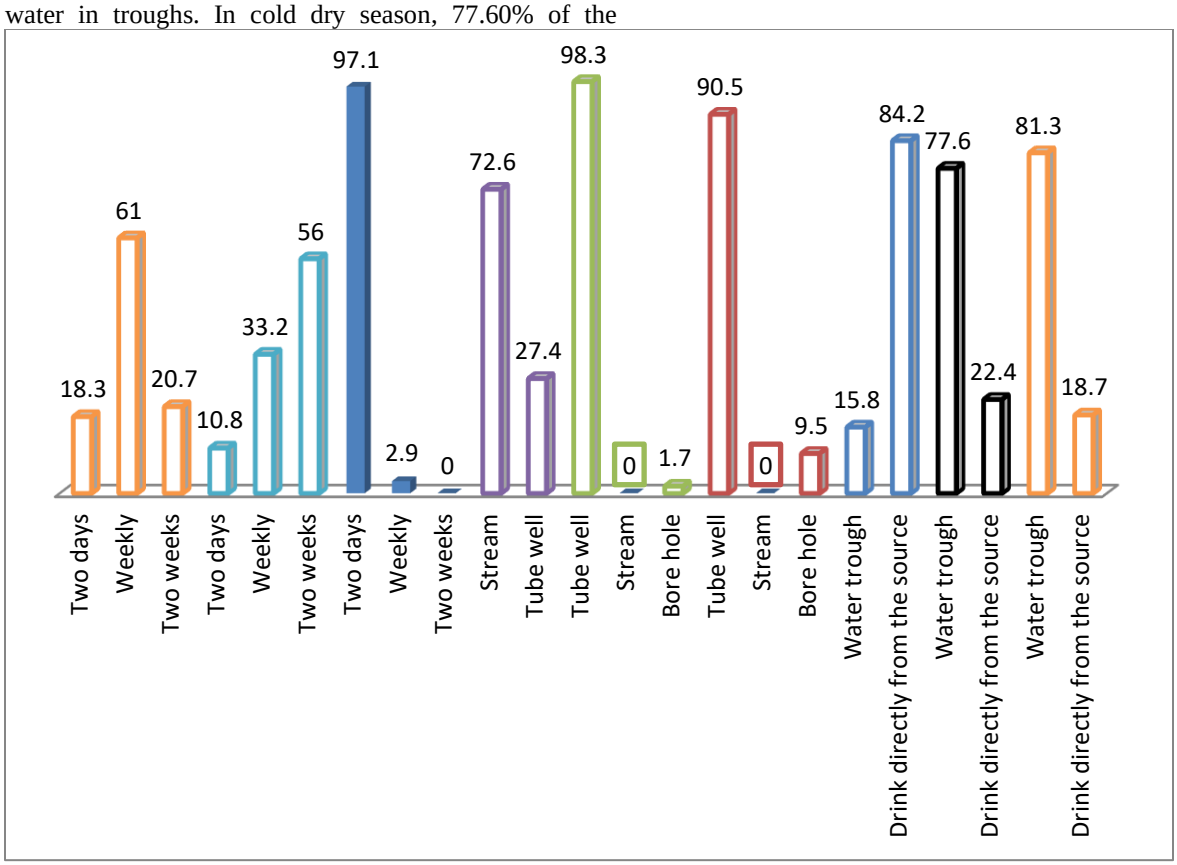

Figure 5: Water economy

DISCUSSION

Management and performance of camels

Management of camels in the study area was solely extensive/free range system. Camels are traditionally reared under pastoral system, usually in communally owned rangelands, mainly by subsistence pastoralists. This is in line with the report of Farah *et al.* (2004) and Guliye *et al.* (2007). Socio-economic importance of camel is closely associated with existed production systems. These systems are largely determined by seasonal variations, vegetation, water sources among others. Camel production systems may be nomadic, transhumant and sedentary depending on the region, geographical and natural setting (Aujla *et al.*, 1998 and Mahmood, 1995). During wet season, majority of the respondents are facing problem of grazing area because of crop cultivation on most of the available grazing land. This necessitated the camel owners to migrate to an area where there is grazing land suitable for camels and not cultivable. Also, in cold dry season, grazing area is the major problem because of the irrigation farming practiced by the inhabitants in most of the areas where camels are kept. The green plants grown during the season attract the camels to graze on and this encompasses the destruction of the fence hence damaging the crops. As such, the normal tradition of allowing camels to go for grazing on their own is not possible. A herder must follow the camels throughout the day to control them from damaging the irrigated crops. Watering point is another problem in hot dry season. This is because of the arid nature of the study area (Ghude, 2017). During hot dry season, streams, tube-wells and other sources of water are drying-off. This is in agreement with the reports of Hashi *et al.* (1995) who reported that livestock farmers are facing water difficulties in hot dry seasons in arid and semi-arid zones

of the tropics as a result of the drying-off of the available sources of water. Camel performance across the seasons does not have many problems. The shortage of feed and water does not drastically affect its production and performance. In wet season as revealed by the majority, camel grow bigger followed by cold dry season while in hot dry season normal growth were observed respectively.

Feeding strategy

Feeding of camels in the study area was through grazing while very few offered supplementary feeding in hot dry season when there is scarcity of feed. This is in agreement with the reports of Dioli, (1992) who reported that camels owned by nomads are not offered with supplementary feed except the calves, fattening bulls and cows at early lactating stage in some areas of the Tropics. This is in harmony with the reports of Wardeh and Farid (1990) and Farid (1995). Camel herders believed that camels can survive without supplementary feed. Although there is feed scarcity towards the end of cold dry season and throughout hot dry season, however, camels manage the little feed resources available. Also, the report of Wardeh and Farid (1990) is in agreement with these findings that camels like other herbivores grazing arid rangelands are seasonally challenged with feed and water deficiencies, both in quantity and quality. However, the anatomy of camels was found to out-perform other species of ruminant in utilizing nutritionally lower quality or imbalanced diets (Simenew *et al.,* 2013).

Water economy in camel production

The frequency of giving water to camels in hot dry seasons indicated two days by the majority followed by the few of them who reported a maximum of one week respectively. This indicated that camels can drink from the available sources especially from the rain water collected in streams during wet season. This happened only when camels go for grazing around that area where there is availability of water. Although water is an essential part of an animal's diet, the camel can survive long periods without drinking water and would replenish the loss in a very short time. Camels' water requirement varied from season to season and availability. This is in agreement with the reports of (Gihad *et al.,* 1989; Farid *et al.* (1990); Ebsa *et al.,* 2000; Salah *et al.,* 2011 and Ghude, 2017). The source of water in wet season is mostly from the streams contrary to the sources from tube-well in cold dry and hot dry seasons respectively. This confirms the report of Wilson (1989) on watering frequency explaining that environmental factors (thermal environment, level of dehydration, etc) affect the quantity of water intake in camels. However, the report of Mustapha *et al.* (2006) confirmed that during cold dry season streams dry-off and therefore the only sources of water are tube-wells and boreholes. For this reason, together with its particular physiological characteristics (lactation, pregnancy, rutting among others), camels are able to maintain appetite under conditions of dehydration as agreed by Shaby *et al.,* 1999; Tenets *et al.,* 2001; Ltzough *et al.,* 2009 and Salah *et al.,* 2011). Camels drink water directly from the source in wet season as revealed by the majority of the respondents while in cold dry and hot dry seasons they used watering trough respectively.

CONCLUSION

The study concluded that camels utilized available green forage during the wet season and resist water dehydration during hot dry season managed under traditional system respectively. However, the study confirms that there is increase in weight during wet season as a result of feed availability while during hot dry season majority of the pastoralists does not provide supplementary feed hence normal growth is maintained in the dry seasons.

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