

A survey on current milk production and pricing in Sokoto state, Nigeria

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Abstract

A questionnaire survey to analyse the current milk production and pricing was conducted among 273 small and large-scale dairy farms in Sokoto State of north-western Nigeria. On breeds of cattle kept, based on farm numbers, it was found that 69.07% kept Sokoto Gudali, 18.32% kept White Fulani and 12.61% kept others. Both the husbandry system and milking method were 100% semi-intensive and hand milking, respectively. Out of the total cow number of 3967 (64.59%), there were 2175 (35.41%) milking cows. Data on milk production showed the average length of lactation as 10.26+1.86months, the average milk yield per day as 23.78+24.03 litres, the average milk yield per lactation as 7815.30+8442.01 litres, and the average calving interval of 11.80+2.67 months. On the milk sell, 266 (97.44%) farms sell milk, whereas only 7(2.56%) did not. Out of these, 57.67% sell milk at home, and 42.33% sell milk at local market. The pattern of milk consumption showed that 39.25% of farms analysed consume <2 litres, 49.81% consume 2-4 litres, and 10.94% consume >4 litres. 100% of farms could not quantify the amount of milk offered to calves. The products made from milk and data for each included Nono (45.45%), Manshanu (42.36%) and Kindirmo (12.19%). On the responses for production/processing constraints, 68.33% showed no facilities, 25.42% showed no knowledge, 6.25% showed not cultural/traditional, 79.39% showed inadequate feed/water, 7.09% showed inefficient milking methods, 9.12% showed lack of efficient marketing system, 4.05% showed lack of static milk pricing and 0.34% showed power failure.

Key words: Milk, Production, Pricing.

Introduction

A superficial examination of the distribution of the regions reputed for dairying across the globe shows that none is situated in the tropics. The principal milk producing countries from where the specialized milk breeds originate, are all in the temperate zones, with mild oceanic climate – Holland, Denmark and a host of others. The average amount of milk produced per person per year in developing tropical countries is 34 liters as compared to 311 liters in developed countries (FAO, 1990). The consumption in the developing world varies widely between, and within countries as a result of variation in income, food customs, livestock ownership, and nutritional knowledge (Payne, 1990). The annual milk production in most

developing countries has been increasing at the rate of 2.8%, while the annual demand is increasing at the rate of 3.6% (FAO, 1990),

With few countries like India, Kenya, Northern Australia and Zimbabwe, responding to the needs and opportunities for dairy development in the tropics and have already possessed sizeable dairy industries. Others with no tradition of dairying like Malaysia and Philippines are gradually increasing their production with overseas assistance. In the year 2004, total cow milk production in Africa was 21,244,474 tons produced from a total of 46 million dairy cows giving an average milk yield of 461kg milk per cow over the year, which is only one fifth of the world average yield (FAOSTAT, 2006).

The top five African milk-producing countries in terms of milk volume are Sudan, Egypt, Kenya, South Africa and Algeria. Meanwhile, the first four Countries alone produce 52% of the total African milk. Geographically; the production volume is higher in Countries at the Eastern side of Africa than by those in the North. Although there is a slow overall growth in milk production in Africa, individual countries have witnessed different growth and reduction rates. Between the years 1999 and 2004, remarkable increase trends (>5 %/year) were noticed in countries like Egypt, Ethiopia Uganda and Namibia. A considerably annual decreasing trend in milk production (between -5 to -2.5%) was found in Eritrea, meanwhile Burundi, Congo, Senegal, and Zimbabwe noticed smaller annual decreases (of -2.5 to -0.5%). The other Countries either, had a small increase or an almost constant production (FAOSTAT, 2006). Generally, there has been an increasing trend in milk production in Africa over the years (FAO, 1990).

Between the years 1990 and 2004, the demand for milk and dairy products in Africa was growing at an average rate of 4.0% per annum; meanwhile, production only grew at a rate of 3.1%. Growth in consumption was pushed both by a growth in population (of 2.8% per annum) and a small growth in per capita milk consumption (of 0.8% per annum), between 1990 and 2004 (FAOSTAT, 2006; Hemme *et al.*, 2006). In Nigeria, with Sokoto as a case study, the state was rated second to Borno State, in terms of leading producers of cattle in the country. And with the effort made by the government to develop both rural and urban dairy production in the state, as it allocated NGN 2.0 million for the promotion of dairy farming in the fourth National Development Plan (1981 to 1985) (Hassan and Mohammed, 2001). For example, one should expect a translation of that into a considerable improvement, of the dairy production in the state.

This questionnaire survey was designed to undertake a performance study of current dairy production in small-scale dairy farms in Sokoto State of Nigeria, with a view to discern and quantify production patterns and constraints and proffer some practical solutions, thereby enhancing the sector at state level. The study may also help pave way for further studies on the regional dairy sector performance, with the aim of generating what we might call the Sokoto Dairy Map.

Materials and Methods

The Study Area

The study was carried out in Sokoto State, which is located at the extreme northern zone of Nigeria. Sokoto is situated within the Sudan Savannah and between latitude 40N to 60N and Longitude 110 30 to 13050 east. It is bordered by

the Niger republic to the north; Kebbi State to the south west, and Zamfara state to the east, with a total land area of 25, 648 kilometers (Ministry of Information, 2003).

The Survey Farms

273 small and large-scale dairy farms in 12 local government areas (LGAs) of the Sokoto State were randomly selected and analyzed using a structured questionnaire survey. The LGAs and their respective number of analyzed dairy farms are: Tureta (49), Dangen-shuni (30), Wurno (12), Gudu (30), Sokoto (25), Wammako (27), Gwadabawa (28), Kware (15), Tambuwal (12), Tangaza (14), Yabo (15) and Isa (14).

Data Collection

Data collection spanned for 6 months (between February and August 2007) and included a structured questionnaire administration and retrieval. Information on dairy production was collected from small and large-scale dairy farms, covering several production aspects such as breed of cattle kept, average dairy herd size, husbandry system, lactation performance, milk sell and pricing, pattern of milk consumption, milking processing and products, and milk processing and production constraints. The collected data were analyzed using Microsoft Excel application package. Breeds of cattle were classified as Sokoto Gudali, White Fulani and others. This step became necessary because other breeds occurred with low frequencies.

Results and Discussion

Breeds of Cattle Kept

The total percentages given in the result (Figure 1) were based on farm numbers that kept such particular breeds, not the breeds' population. The breeds of cattle present in the farms were the indigenous Sokoto Gudali (69.07%); White Fulani (18.32%); and others which included Rahaji, Buzuwa, Red Sokoto, Jalli and Holstein/Friesian (12.61%), with Sokoto Gudali constituting about 69% of the total cattle population. The relative better adaptability of Sokoto Gudali in its natural ecological niche partly explains this finding. Though many studies have shown that local African breeds are less productive than exotic breeds (Tambi, 1991; Mwenya, 1993; Bebe *et al.*, 2003), yet the majority of the farms indulged in keeping the indigenous breeds. This is partly, because, exotic breeds are less adapted to African conditions and are hence, more susceptible to endemic diseases and environmental stress (Ahunu *et al.*, 1993, Bebe, *et al.*, 2003, Bayer and Wanyama, 2005), and partly due to additional labor and capital input requirements for exotic breeds which are a major constraints to farmers (Tambi, 1991; Per and

Marc, 2002). Only one single commercial dairy farm and the largest in the state kept Holstein/Friesian which is owned by a big-time entrepreneur who imported them from Britain.

Husbandry Practices

In all the farms surveyed, the husbandry practice being employed was 100% semi-intensive. Animals were kept in the open yards, taken out to the range in the late hours of the morning and returned to the yard in the evening. The animals were led to the streams, rivers or in-house-water source for watering. The 100% semi-intensive system observed will be explained by the expensive nature of the intensive type of management practice of which the farmers in the state (most of which are poor) can not afford to practice, and who in most cases do not have access to credit facilities (Tambi, 1991). This practice tallied with the observation made by Diop and Mazouz, 1995, that it is the most common practice in the peri-urban zones.

Milking and Milk Processing

It was observed that 100% of farms, including the highly integrated one, employed hand milking and milking is done either in the morning or evening or two times in a day as the case may be. The processing of milk is virtually non-existent in all the farms analyzed. This could be as a result of some surmountable factors, (figure 2) of which 68.33% had no facilities for processing, 25.42% had no knowledge about it and only 6.25% said processing milk was not their culture or tradition. This implies that if the facilities were to be present, more than half of the farms would have processed their milk. Olaloku, 1974 also made similar observation.

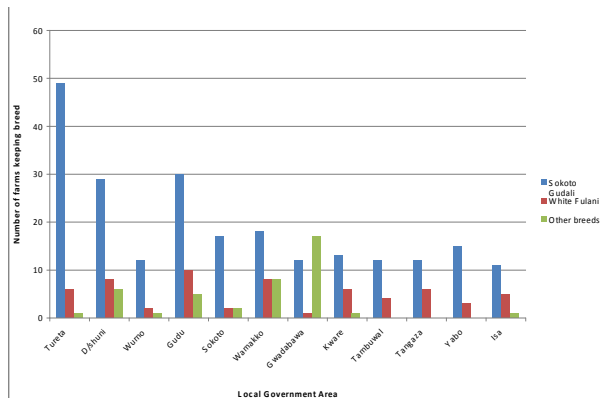


Figure 1: Breeds of cattle kept based on farm number

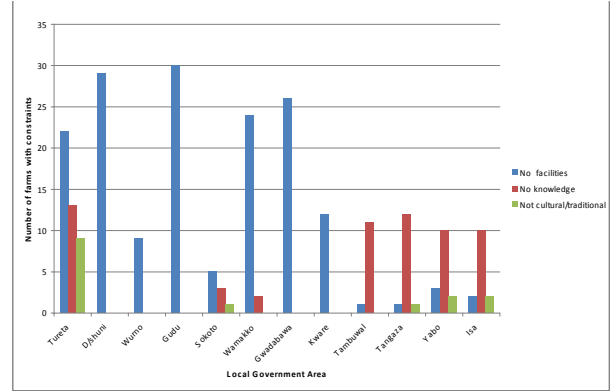


Figure 2: Constraints to milk processing

Length of Lactation, Milk Yield/Day, Milk Yield/Lactation and Calving Interval

Figure 3 shows the total number of milking and non-milking cows, based on farm number. The overall mean and standard deviation for length of lactation, milk yield /day, milk yield/lactation and calving interval were 10.26+1.86 months, 23.78+24.03 liters, 7815.30+8442.0 liters, and 11.80+2.67 months, respectively. These values varied significantly between farms and type of breeds of cow (P<0.05), (Figures 4-7).

Although, the estimates obtained for various lactation traits should be interpreted with caution, yet previously calving interval ranges of 16 months (485 days) to 27 months (825 days) in the nomadic herds and 13 months (388 days) to 18 months (537 days) in Government and privately owned herds in Nigeria were reported by other workers (Freckles, 1964; Nuru, 1974; Pullan, 1979; Zemjanis, 1974; Lamorde and Franti, 1973, Akpokodje and Bolarinwa, 1974; Wheat and Broadhurst, 1972; and Wheat, 1972). Thus, it is not completely out of place to relate the values obtained for the state to results from earlier studies on the breeds especially in the study area. For instance, the value obtained for calving interval of the cows in the State was 354 days, which is a little higher than 339 days as earlier observed (Hassan and Mohammed, 2001). The reason could be due to an impact of husbandry systems on cattle production especially on reproductive performance and that of some breeds, such as Jalli, whose lactation lengths were longer compared to other breeds.

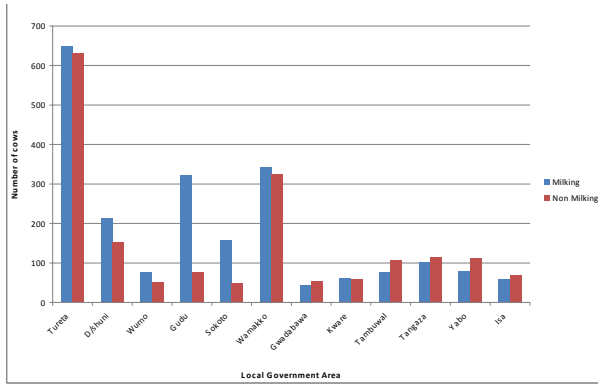


Figure 3: Total number of milking and non-milking cows based on farm number

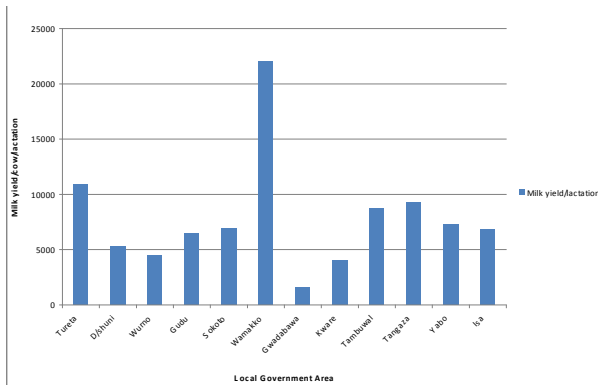


Figure 4: Milk yield/cow/lactation (liters)

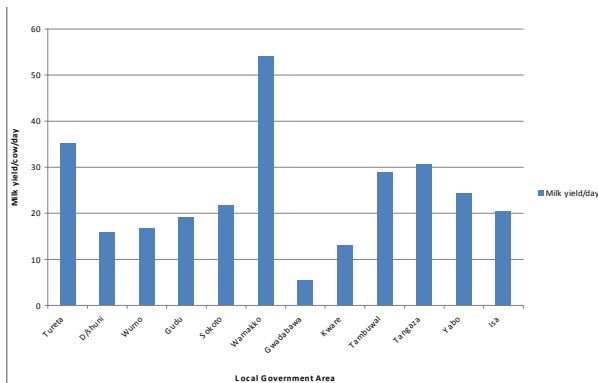


Figure 5: Milk yield/cow/day (liters)

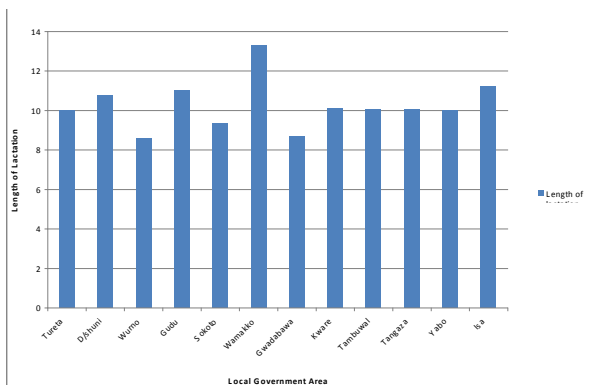


Figure 6: Length of lactation (months)

Milk Prices, Consumption Patterns and Milk Products

The overall mean and standard deviation of milk prices observed were 37.68+4.17 Naira/liter for home sells and 38.77+2.85 Naira/liter for the local market sells (Figure 8). The fluctuation in prices could be due lack of static milk prices, as a result of seasonal variation of tropical grasses in Nigeria which deteriorates rapidly during the period of growth (Ademosun, 1973; Olubajo and Oyenuga, 1974) and consequently contribute to low milk production. Since 2004, milk prices have increased in most countries. This is driven by favourable world market prices for dairy products and the devaluation of the US Dollar against most other currencies (IFCN Dairy Report, 2006). Also, different patterns of milk prices and developments in the African countries like Uganda, Kenya, Nigeria, Cameroon and South Africa were observed in 2005.

The data on milk consumption showed 39.25%, 49.81% and 10.94% for <2liters, 2-4 liters and >4liters consumptions, respectively (Figure 9). Consumption of 2-4 liters by people indicates the need for nourishment from milk constituents because every requirement of a balance diet except Vit. D, iron and some of the B-vitamins (e.g. Nicotinic acid) are found in milk (Olaloku 1974). The greater than 4liters consumption shows lowest frequency because milk serves as a source of income to producers, and hence they consume less and take the rest to local markets for selling and earning returns for the maintenance of farms and other aspects of livelihood.

The products made from milk and data for each included Nono (45.45%), Manshanu (42.36%) and Kindirmo (12.19%), (Figure 10). The highest percentage recorded for Nono was not unexpected as the product requires simple processing techniques thereby making it to be the commonest and is being consumed by the people. Milk has to be processed to this stable product in other to increase its shelf-life due to high ambient temperatures and absence of refrigeration facilities in rural production areas, large volumes of milk sometimes get wasted. In Africa, only about 25% of the total milk produced is processed to standard products (cheese, yoghurt, butter, etc), while the per capita consumption of these products is usually less than 15kg (Ndambi, 2006).

Production Constraints

The production constraints that were recorded included inadequate feeds and water (79.39%), inefficient milking methods (7.09%), lack of efficient market system (9.12%), lack of static milk pricing (4.05%) and power failure (0.34%), (Figure 11). Among the aforementioned, the basic problem was in-adequate feed and water, which is worsened during dry seasons (Payne and Hannock, 1957).

The higher value obtained for inadequacy in feed could be the contributing factor to lower milk yields of indigenous breeds. Only one large integrated farm in Sokoto metropolis-indicated power failure as one of its constraints. Other farms' operations are more-or-less power-requiring.

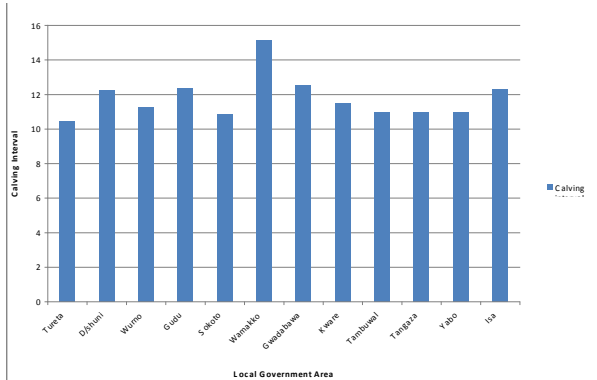


Figure 7: Calving intervals (months)

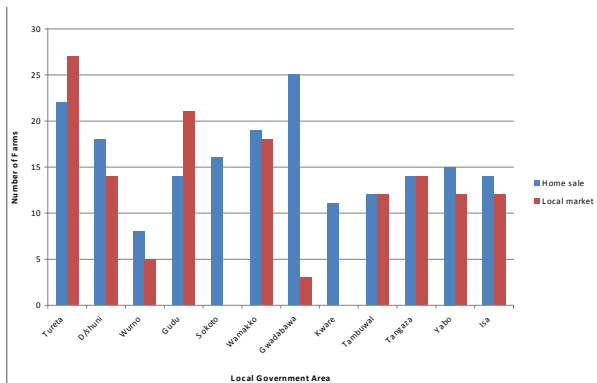


Figure 8: Number of farms that sell milk at homes and local markets

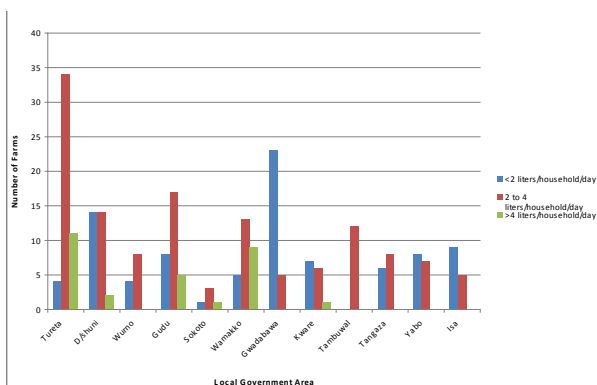


Figure 9: Milk consumption patterns

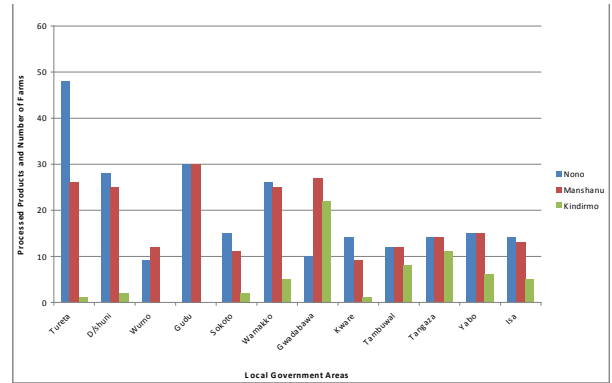


Figure 10: Processed products

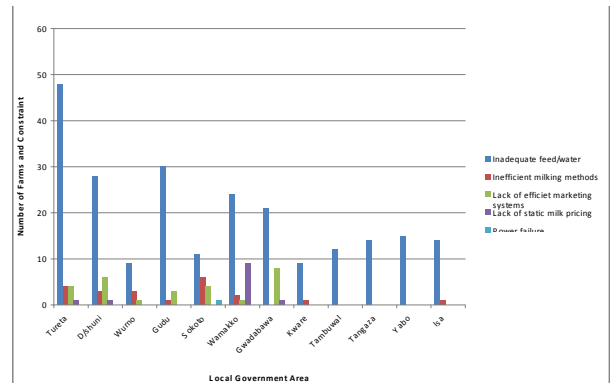


Figure 11: Production constraints

Recommendations and Conclusions

- 1) Provision of basic dairy facilities by Government and credits to poor farmers by agricultural banks in order to overcome production constraints.
- 2) Genetic improvement, through research, of indigenous dairy cattle for a better milk yield to meet up with the demand.
- 3) A further research should be conducted to determine the precise nutritional requirements of indigenous dairy cattle when maintained under different feed resources and seasons so as to help tailor their appropriate nutritional needs.
- 4) Harnessing all the requirements towards increasing milk production to meet up with the demand. However, sector policies, organizational structures and support services for dairy farms need to be properly oriented to stimulate dairy development especially by strengthening the dominant informal sector and encouraging small and large-scale dairy production.

References

Ademosun, A.A. (1973). Nutritive evaluation of Nigerian forages: The effect of stage of maturity on the nutritive value of *Panicum maximum* (Guinea grass). *Nigerian Agricultural Journal*, **10**: 170-177.

Ahunu, B.K., Arthur, P.F., Danbaro, G. and Aboagye, G.S. (1993). Pre-weaning growth

- performance of West Africa shorthorn cattle and their Jersey crossbreds in Ghana, *Tropical Animal Health and Production*, **25**(1): 33-40.
- Akpokodje, J.U. and Bolarinwa, R.O.A. (1974). Reproductive efficiency of white Fulani cattle of northern Nigeria in southern environment. *Journal of Nigerian Veterinary Medical Association*, **3**: 6-11.
- Bayer, W. and Wanyama, J. (2005). Biotechnology in animal agriculture and poverty alleviation: An NGO perspective. Available at: http://www.agrecol.de/dokumente/Bayer_Biotech_Poverty.pdf.
- Bebe, B.O., Udo, H.M.J., Rowland, G.J. and Thorpe, W. (2003). Smallholder dairy systems in the Kenya highlands: breeds preferences and breeding practices, *Livestock Production Science*, **82**: 117 – 127.
- Diop, P.E.H. and Mazouz, A. (1995). Production laitière en Afrique australe du Sahara: problématique et stratégie. In: *Reproduction et production laitière, Actualité scientifique, Universités francophone*. pp. 19-26. Available at: <http://www.bibliotheque.refer.org/livre68/16800.pdf>.
- FAO (1990). *The technology of traditional milk production in the developing countries*, FAO Animal production health paper, pp. 85-333, Available at: <http://www.fao.org/docrep/003/to25ie/to25ie00.htm>.
- FAOSTAT (2006). Available at: <http://www.faostat.fao.org>.
- Freckles, W. (1964). *The Cattle and Meat Industry in Northern Nigeria*.
- Hassan, W.A. and Mohammed, B.T. (2001). Dairy production in some selected integrated farms in Sokoto state of Nigeria, *Tropical Journal of Animal Science*, **4**(2): 109-115.
- Hemme (2006). *World Dairy Sector Fact Sheet 1990-2004*, IFCN dairy report, IFCN Dairy Research Centre, Kiel, Germany p. 52.
- IFCN Dairy Report (2006). *Milk prices developments during 1996-2005 in US Dollars*. IFCN Dairy Research Centre, Kiel, Germany pp 38.
- Lamorde, A.G. and Franti, C.E. (1973). *Nomadism and Cattle Production in Nigeria*, University of California, Davis, USA.
- Mwenya, W.N.M. (1993). The impact of the introduction of exotic cattle in East and Southern Africa, in Future of livestock industries in East and Southern Africa. (J.A. Kategile and S. Mubi, editors) *Proceedings of a workshop held at Kadoma Ranch Hotel, Zimbabwe, Ethiopia*. Available at: <http://www.fao.org/waides/ilri/x5485E/x5485e04.htm>.
- Ndambi, O.A. (2006). Recent Trends in African Milk Production Systems, *IFCN Dairy Report*, IFCN Dairy Research Centre, Kiel, Germany p. 138.
- Nuru, S. (1974). *Infectious bovine abortion in Northern Nigeria*. PhD Thesis, Ahmadu Bello University, Zaria, Nigeria.
- Olaloku, E.A. (1974). Problems and possibilities for milk production. In: (J.K. Loosli, V.A. Oyenuga, and G.M. Babatunde, editors) *Animal production in the tropics. Proceedings of International Symposium on Animal Production in the Tropics*, Lagos, Nigeria, pp.488-489.
- Olubajo, F.O. and Oyenuga, V.A. (1974). The yield, intake and animal production of four tropical grass species grown at Ibadan, *Nigerian Journal of Animal Production*, **1**: 217-224.
- Payne, W.J.A. and Hannock, J. (1957). The Direct Effect of Tropical Climate on the Performance of European Type Cattle 2, *Prod. Emp. J. Exp. Agric.* **25**: 321-338.
- Payne, W.J.A. (1990). *An Introduction to Animal Husbandry in the Tropics*. Longman Ltd, Singapore. pp.747.
- Pullan, N.B. (1979). Productivity of white Fulani cattle on the Jos Plateau, Nigeria, herd structure and reproductive performance. *Tropical Animal Health and Production*, **11**: 231-238.
- Tambi, E.N. (1991). Dairy production in Cameroon: Growth, development, problems and solutions. *World Animal Review*, 1991, pp. 238-48. Available at: <http://www.fao.org/docrep/ui200T/ji200Tog.him>
- Wheat, J.D. (1972). Analysis of Data on Azwak and Rahaji Cattle at Gumel, Kano State, Nigeria. *Samaru Miscellaneous Paper* no. 40, Institute of Agricultural Research, Ahmadu Bello University, Zaria, Nigeria.
- Wheat, J.D. and Broadhurst, J. (1972). An Analysis of Data on Bunaji Cattle at Birnin Kudu and Kabomo, Northern Nigeria, *Samaru Miscellaneous Paper* No. 25. Institute of Agricultural Research, Ahmadu Bello University, Zaria, Nigeria.
- Zemjanis, R. (1974). Veterinarian and animal production. Annual Meeting of the Nigerian Association, 25th -28th, Sept. 1974, PortHarcourt, Nigeria.