

DAIRY PRODUCTION IN SOME SELECTED INTEGRATED FARMS IN SOKOTO STATE OF NIGERIA

W. A. HASSAN AND B. T. MOHAMMED

Department of Animal Science, Usman Danfodio University
P.M.B. 2346, Sokoto

Target Audience: Dairy cattle farmers and researchers, consumers of dairy products, policy makers

ABSTRACT

A survey of eight integrated farms in four local government areas of Sokoto state in north-western Nigeria revealed the following about dairy production on such farms: Breed of cattle kept, Sokoto Gudali, Friesian, and Sahiwal; average dairy herd size, 69.4 head; husbandry system was largely semi-intensive; milking was mainly by hand in the morning for about 14 minutes per cow; milk processing was largely non-existent on the farms; age at first calving, 34.7 +4.8 months; length of lactation, 247+42 days; milk yield /day, 42+1.0 litres; milk yield/lactation, 1,047 +353 litres; calving interval, 339+24 days; type of breed effect was found to be significant ($P<0.05$) on all the five measures of lactation performance; also all of them differed significantly ($P<0.001$) across the farms; identified dairy production constraints included non-sufficiency of grazing land, lack of all-year round water supply and high cost of feed stuffs.

Keywords: Dairy production system, lactation performance, production constraints.

DESCRIPTION OF PROBLEM

Sokoto state was widely reported to be among the largest producers of cattle in Nigeria next to Borno State (1) Efforts were made to boost rural and urban dairy production in the state. For instance, in the Fourth National Development Plan (1981-1985), an allocation of #2.0 million was earmarked for the promotion of dairy farming (2) The aim of the government was to make the smallholder dairy farmers self sufficient in the production of milk and milk productions in rural areas.

In northern and central Nigeria, privately-owned dairy herds are kept on integrated farms located mostly either on the periphery of (or inside) some major towns. They are owned by rich urban businessmen who capitalise on the potential of the animals as an investment, a source of milk products for their families and the prestige associated with cattle ownership. (1).

There has hardly been any characterization study or performance evaluation of the animals in such herds. This study was therefore carried out to collect first hand information on dairy production on some selected

integrated farms in Sokoto State. The survey was hoped to be followed by performance monitoring of the dairy cattle in those herds with a view to discerning and quantifying production constraints and proffering practical solutions to them.

MATERIALS AND METHODS

The Survey farms

Eight (8) integrated farms in four local government areas (LGAs) of Sokoto state were surveyed. The farms were purposefully selected for the study, for their dairy production component. The LGAs and the number farms were Gwadabawa(1), Shagari (1), Sokoto (3), and Wamakko (3). Geographically, the study area is located between 10° - 14° N and 3° - 4° E. The climate is largely semi-arid with a long and severe dry season that varies from months in the north to some five months in the south. The total annual rainfall varies from 625 mm to 1000mm(3).

Data collection and analysis

By means of a structured questionnaire, information on dairy production was collected from the integrated farms. Aspects covered by the questionnaire were the history and ownership of farm, dairy cattle herd size and dynamics, husbandry practices, lactation performance, milking and milk processing problems and prospects. Data collected were summarised using descriptive statistics(4). Multiple analysis of variance was carried out to establish any possible significant effects of farm, type of breed of cow, and the interaction between these two factors on lactation performance (5). Subclass means were compared using the Duncan's multiple range test. Breeds of cattle were classified as indigenous or imported. This step became necessary because the available imported breeds occurred with low frequencies. As a result of lack of records for age at first calving for the cows in Farm No. 7, data from only seven farms were analysed for the trait.

RESULTS AND DISCUSSION

The farms and their owners

The farms were established 3-27 years before the survey. All were privately owned. They were all sited near natural water sources (streams and rivers). This was a major consideration for their location because of easy access to drinking water for the animals. Three of the farms were located in Sokoto metropolis; the rest were peri-urban. The ages of the farm owners ranged from 45 to 65 years and they had an average of 16 years of experience in dairy farming. Two of the farms were owned by women. The majority of the farmer kept sheep and goats alongside the cattle.

Dairy herd size and dynamics

The mean holding size was 69.4 head of cattle, ranging from 16 to 136 (Table 1). Two hundred and ninety-six (296) of the 555 cattle surveyed were females, with the breeding animals occurring in the ratio of one bull to five cows. The mean herd size found in this survey falls within the range of 60-200 head reported for urban dairy herds in Nigeria (5) Only two of the farms had less than 20 heads of cattle.

Table 1: Holding size and composition of dairy herds

Farm	Bull calf	Cow calf	Bull	Cow	Total
1	34	15	20	67	136
2	4	1	4	7	16
3	10	22	7	27	66
4	3	11	1	35	50
5	8	11	2	28	49
6	13	22	20	80	135
7	5	3	0	8	16
8	15	21	7	44	87
Total	92	106	61	296	555
Mean	11.5	13.2	7.6	37.0	69.4

The breeds of the cattle present on the farms were the indigenous Sokoto Gudali, the imported Holstein-Friesian and Sahiwal, with the Sokoto Gudali constituting about 79% of the total sample (Table 2). The relative better adaptability of the Sokoto Gudali in its natural ecological niche partly

Table 2: Types and distribution of dairy cattle breeds across farms

Farm	Types of breed				Total
	Indigenous	%	imported	%	
1	58	78	78	57.4	136
2	16	100.0	0	0.0	16
3	56	84.8	10	15.2	66
4	50	100.0	0	0.0	50
5	20	40.8	29	59.2	49
6	135	100.0	0	0.0	135
7	16	100.0	0	0.0	16
8	87	100.0	0	0.0	87
Total	438	78.9	117	21.1	555

explains this finding. The observation was buttressed by the fact that some of the farmers recorded substantial losses through the death of imported animals earlier in the lives of their farms. Incidentally, the three farms with imported stock were owned by big-time entrepreneurs, who brought the Holstein-Friesian and Sahiwal from Britain and Pakistan, respectively.

Husbandry practices

In four of the farms, the cattle were housed together irrespective of sex and or age in open sheds made from cement blocks and iron roofing sheets. Feeds and water were offered to the animals in concrete vats and metal basins, respectively. In these farms where cattle were kept intensively, the animals were grazed within the farms, mostly from the morning hours of the day, for an average of 7.5 hours. The forage obtained from grazing was supplemented with concentrates such as oil-seed cakes and grain offals. Crop residues such as cowpea-hay, cereal stalk and rice-stover formed the bulk of the feedstuffs in the dry season. In the remaining four where the husbandry system was semi-intensive, the animals were kept in open yards, taken out to the range in the late hours of the morning and returned to the yard between five and six o'clock in the evening. The animals were led to streams and rivers for watering. Disease outbreak was not common in both groups of herds; only a few farmers mentioned cases of bloat and mastitis.

Lactation performance

The overall means (+standard deviations) for age at first calving, length of lactation, milk yield/day, milk yield /lactation and calving interval were 34.7 +4.8 months, 247+42 days, 4.2+1.0 litres, 1,047+353 litres, and 338+24 days, respectively (Table 3). These values varied significantly between farms ($P < 0.001$) and type of breed of cow ($P < 0.05$) (Table 4). Generally, the better lactation performance of the imported dairy cattle breeds over the Sokoto Gudali was not unexpected, since the former had been improved purposely for dairy production. Although the estimates obtained for the various lactation traits should be interpreted with caution, it is not completely out of place to relate the values obtained for Sokoto Gudali to results from earlier studies on the breed, especially in the study area. For instance, the values obtained for at first calving (34.7 months) and calving interval (339 days) were lower than 42.6 months and 467 days, respectively (6).

Milking and processing

Milking was mainly by hand mostly in the mornings and sometimes in evenings for an average of 14 minutes (range = 12.5 - 17 minutes) per cow. Only one of the farmers practised machine milking and processed milk

Table 3: Means and standard deviations (S.D.) for lactation performance traits by farm*

Farm	Age at first calving (months)		Lactation length (days)		milk yield/day litres		milk yield/lactation litres		Calving interval (days)	
	No.	Mean S.D.	No.	Mean S.D.	No.	Mean S.D.	No.	Mean S.D.	No.	Mean S.D.
1	9	36.7 2.0 ^b	6	302 6 ^c	9	4.7 0.4 ^b	6	1,386 148 ^c	6	300 0 ^a
2	11	36.5 1.8 ^b	10	300 0 ^c	11	5.0 0.5 ^b	10	1,455 101 ^c	10	342 25 ^b
3	9	38.7 5.3 ^b	8	304 11 ^c	9	3.8 1.2 ^b	8	1,093 364 ^b	7	304 11 ^a
4	16	31.1 5.0 ^a	11	243 28 ^b	16	5.0 1.3 ^b	11	1,306 432 ^c	12	348 20 ^b
5	8	36.8 3.8 ^b	7	210 17 ^a	8	3.4 0.6 ^a	7	741 176 ^a	7	356 11 ^b
6	13	33.7 5.2 ^a	12	218 14 ^a	14	3.5 0.5 ^a	12	760 114 ^a	9	350 15 ^b
7	-	-	6	210 19 ^a	7	3.6 0.5 ^a	6	765 88 ^a	5	342 16 ^b
8	15	33.6 4.4 ^a	13	215 11 ^a	15	4.1 0.4 ^a	13	891 83 ^a	12	346 15 ^b
overall	116	35.2 4.5	95	247 42	124	4.4 1.3	95	1,113 415	86	344 28

*Means with different superscripts along a given column differ significantly ($P < 0.001$).

into yoghurt. No consistent data were available on cost of production and the evenings for an average of 14 minutes (range = 12.5 - 17 minutes) per cow. Only one of the farmers practised machine milking and processed milk into yoghurt. No consistent data were available on cost of production

Table 4: Means and standard deviations (S.D.) for lactation traits by type of breed of cow*

Trait	Indigenous breed			Imported breeds		
	No.	Mean	S.D.	No.	Mean	S.D.
Age at first lactation (months)	74	35.5	4.2 ^b	7	27.4	4.8 ^a
Length of lactation (days)	67	246.0	44.0	6	265.0	12.0 ^b
Milk yield (litres / day)	82	4.0	0.8 ^a	7	6.3	0.5 ^b
Milk yield (litres / lactation)	67	991.0	310.0 ^a	6	1,675.0	108.0 ^b
Calving interval (days)	61	337.0	25.0 ^a	7	356.0	11.0 ^b

* Means with different superscripts along a given row differed significantly ($P < 0.05$).

and milk into yoghurt. No consistent data were available on cost of production and returns from sales of milk and yoghurt due probably to lack of adequate record keeping. Hence, it was not possible to carry out any cost and return analysis.

Problems and prospects

most of the farmers complained of insufficient grazing land, lack of sufficient all year round water supply and high cost of feedstuffs. Lack of high genetic potential animals in the traditional herds and low market prices for fresh milk, which create a disincentive to producers were identified as additional limiting factors (7). Other constraints to domestic milk production include the competition from imported dairy products, inefficient technical and extensive factors, inadequate labour supply as well as ecological factors (8).

CONCLUSION AND APPLICATIONS

1. Apart from the production constraints mentioned by the farmers, the survey also revealed the relatively low level of dairy cattle husbandry on most of the farms and all that is associated with it, especially low output.
2. Through largely descriptive, the observed significant genetic and non-genetic effects on lactation performance point to the presence of large variation which can be exploited in stock performance improvement efforts in the study area.
3. The estimates obtained for some lactation performance traits can serve

as baseline information for performance evaluation studies of the dairy cattle in the integrated farms.

REFERENCES

1. **FDLPCS. 1992.** Federal Department of livestock and pest Control Services. Nigerian livestock Resources. Vol. 11. National Synthesis. Federal Government of Nigeria, 440 pp.
2. **Anonymous. 1981.** programmes of Sokoto state in the Fourth national Development Plan 1981 - 1985. ministry of Economic Planning, Sokoto.
3. **Federal Ministry of Economic Planning 1981.** Techno-Economic Survey of Sokoto state, Volume II. Livestock. Moco Nigeria Limited, Lagos Nigeria, September 1981.
4. **Steel, R.G.D. and J.H. Torrie 1981.** Principles and Procedures of Statistics. A biometrical Approach. 2nd edition, McGraw-Hill International Book Company, Tosho Printing Co. Ltd. Tokyo, Japan, 633 pp.
5. **SPSS 1993.** Statistical Package for Social Sciences. SPSS for Windows Version 6. Practice-oriented Introduction to modern data analysis, Addison-Wesley Publishing Co. Bonn, 238 pp.
6. **Wheat, J.D and J. Broadhurst 1972.** An analysis of data on Sokoto Gudali cattle at Bulassa and Dogondaji, Northwestern State, Nigeria. Samaru miscellaneous paper, No.39:1 - 10 (fide : FDLPCS, 1992).
7. **Dettmers, A. and B.C. Olotu 1978.** Performance of crossbred and purebred cattle in selected Nigerian dairies. In: Proceedings of the first national seminar on dairy development, Vom, July 10 - 13, 1978. Federal livestock Department Lagos.
8. **Nwoko, S.G. 1986.** Dairy imports in Nigeria: Development and policies. ILCA / LPU Network Paper no. 7, Ababa, Ethiopia, 22 pp.