A survey on processing and marketing characteristics of peri-urban agropastoral dairying in Ghana

S. A. OKANTAH, F. Y. OBESE, E. O. K. ODDOYE, P. GYAWU & Y. ASANTE

(S. A. O., F. Y. O. & E. O. K. O.: Animal Research Institute, Council for Scientific and Industrial Research, P. O. Box 20, Achimota, Ghana; P. G.: Department of Animal Science, KNUST, Kumasi, Ghana; Y. A.: Department of Economics, University of Ghana, Legon, Ghana)

SUMMARY

A survey was conducted in five districts on the Accra plains to characterize the peri-urban dairy system. Results from the survey indicated that sale of milk (fresh or processed) by farmers as well as the amount marketed varied according to districts. A high percentage of farmers in Ga Rural (82.4 per cent), Tema (85.7 per cent), and Ewutu-Effutu-Senya (91 per cent) districts which are close to marketing centres mainly sold fresh milk, while farmers in the North Tongu and Dangbe West districts farther away from marketing centres mainly sold processed milk, 76.2 and 66.7 per cent, respectively. Consumption of processed milk by farmers in the various districts was significantly ($P<0.05$) different, but not the consumption of fresh milk. Consumption of processed milk by farmers in the Dangbe West and the North Tongu districts was high, over 70 per cent, while in the remaining districts the percentages were lower, 57.1 per cent for Tema, 37.5 per cent for Awutu-Effutu-Senya, and 23 per cent for Ga Rural. There was no significant association between fresh or processed milk consumed at home and the ethnic group of household head.

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RÉSUMÉ

OKANTAH, S. A., OBESE, F.Y., ODDOYE, E. O. K., GYAWU, P. & ASANTE, Y.: *Une enquête sur les caractérisques de traitement et de commercialisation de la laiterie péri-urbaine agropastorale au Ghana.* Une enquête s'est déroulée en cinq districts sur les plaines d'Accra pour caractériser le systéme laitier péri-urbain. Les résultats de l'enquête indiquaient que la vente de lait (frais ou traité) par les éleveurs ainsi que la quantité commercialisée, variaient selon les districts. Un fort pourcentage d'éleveurs dans les districts de Ga rural (82.4 pour cent), Tema (85.7 pour cent), et Ewutu-Efutu-Senya (91 pour cent) qui sont proches des centres de commercialisation vendaient du lait surtout sous la forme fraîche alors que les éleveurs des districts plus loin des centres de commercialisation, à savoir, les districts de North Tongu et Dangbe West vendaient du lait surtout sous la forme traitée, respectivement d'un pourcentage de 76.2 et 66.7. La consommation de lait traité par les éleveurs dans tous les districts était considérablement ($P< 0.05$) différente, mais non pas la consommation du lait frais. La consommation du lait traité par les éleveurs dans les districts de Dangbe West et de North Tongu était élevée, à plus de 70 pour cent, alors que dans les restes des districts les pourcentages étaient plus bas, 57.1 pour cent pour Tema, 37.5 pour cent pour Awutu-Efutu-Senya et 23 pour cent pour Ga rural. Il n'y avait pas de relation considérable entre le lait frais ou traité consommé à la maison et le groupe ethnique du chef de ménage.

Introduction

The rapidly growing urban population in the Accra-Tema metropolitan area has created a rapidly expanding demand for fresh and processed milk from smallholder peri-urban dairy farms on the Accra plains. This production system uses varying composition of low-yielding cattle mainly of indigenous origin. There are, however,

indications of potential for production of large quantities of milk from this system (Okantah, 1990, 1992). Dairy processing and marketing are important in the development of the dairy industry (ILCA, 1981; Brumby & Gryseels, 1984). Efficient processing technologies, apart from increasing the shelve life of milk, add value to products while an efficient marketing system will tend to stimulate production and improve income of farmers, leading to better standard of living. Even though milk production on the Accra plains contributes substantially to milk production in Ghana, information on the processing and marketing characteristics of the smallholder peri-urban dairy system on the Accra plains is scanty. This knowledge will allow for models and innovative interventions to be put in place to stimulate smallholder peri-urban milk development for sustainable milk production.

The study therefore aimed at identifying the different marketing and processing systems, assessing the processing and marketing facilities and milk consumption patterns of farm household, identifying constraints in the processing and marketing of dairy products, and at making recommendations that will improve/increase domestic milk production.

Materials and methods

A questionnaire, developed by the International Livestock Research Institute (ILRI) and modified by collaborators from the Animal Research Institute (ARI) to capture major characteristics of milk production in smallholder herds on the Accra plains, was administered in five districts. The selection of districts was based on distance from Accra. Table 1 shows the five selected districts and their capitals.

The survey was designed to sample six farms in each of four villages within the five districts, making a total of 120 farms in all (i.e. $5 \times 6 \times 4$). In the actual survey, a total of 107 livestock farms was sampled.

The survey was undertaken between April and August, 1995. The questionnaires were administered to the farm owners or herd managers through interpreters. Data from the field administration of the questionnaire were coded by using a format supplied by ILRI and analyzed by using the Statistical Analysis System Institute (SAS, 1987) software. Associations were tested with χ^2 statistic for significance.

Results

Milk marketing

The milk from agropastoral herds on the Accra plains was sold all year round. There was, however, a decreased amount of milk for sale during the dry season. There were formal and informal marketing systems for milk. Marketing of milk from the agropastoral herds was through the informal system where milk was sold (fresh or processed) direct to the consumer or to a trader who in turn delivered the milk or milk products to the consumer.

Only a very small portion of the consumer market is served by the informal market system; traditional milk collectors known as *Chumpos* purchase milk in plastic containers from the herds and distribute directly to consumers. The milk is handled at ambient temperatures, and does not pass through industrial processing plants or formal distribution outlets such as supermarkets or shops.

Most of the sales were done at the farm gate as opposed to transporting milk to the market for sale. Fresh milk was usually sold by herdsmen, but processed milk was sold by the household women who did the processing. At the time of this study, local farmers producing milk did not have access to the formal milk marketing system where industralized processing factories produced reconstituted milk from imported milk powder. Most of this milk was sold, in tins, through supermarkets and other shops nationwide. Other products like yoghourt and ice cream were also produced and sold nationwide. Because there was no organized milk collection, this market was closed to agropastoral farmers at the time of the study.

TABLE 1

Districts Sampled During the Survey

Distance from Accra (km)	*Name of district*	*District capital*	*No. of farm owners/ herdsmen interviewed*	*Percentage of total*
0 - 49	Ga Rural	Amasaman (20 km)	17	16.0
0 - 49	Tema	Tema (25 km)	21	19.6
0 - 49	Dangbe West	Dodowa (45 km)	24	22.4
50 - 100	Awutu-Effutu-Senya	Winneba (50 km)	24	22.4
> 100	North-Tongu	Juapong (110 km)	21	19.6
	Totals		107	100.0

There was a significant ($P<0.05$) difference in sale of fresh milk among districts (Table 2). In the Dangbe West district, about 38 per cent of all farmers interviewed sold fresh milk while in the North Tongu district no farmer sold fresh milk. However, at least 82 per cent of the herdsmen interviewed in each of the remaining districts sold fresh milk. The sale of processed milk by farmers also differed significantly among districts. In both Dangbe West and North Tongu districts, over 60 per cent of farmers sold processed milk, while in the three remaining districts less than 40 per cent of farmers sold processed milk.

The amount of fresh milk marketed varied widely ($P<0.001$) between districts, following a similar trend to the sale of fresh milk, with districts close to urban areas such as Awutu and Tema selling the greatest amount of 25.6 and 15.1 *l* per farm per day, respectively. The marketing of processed milk was also significantly ($P<0.01$) different in the various districts, with districts further way from the urban centres having the greatest tendency to process all the milk for sale. The North Tongu district recorded the highest value of 14.4 *l* equivalents, followed by the Dangbe West district with 13.1 *l* equivalents of milk.

There was a positive and significant regression of fresh milk marketed on number of household members ($b=1.2$). There was no significant difference between the ethnic groups in the sale of fresh and processed milk (Table 2). With the exception of the Ewes, between 62 and 65 per cent of farmers in each of the other ethnic groups sold fresh milk, or less than 48 per cent sold processed milk.

TABLE 2

Percentage of Total Milk Sold Either Fresh or Processed by District and Ethnicity

	Mean annual fresh milk produced (kg/herd)	*Fresh milk sold (%)*	*Processed milk sold (%)*
District			
Awutu-Effutu-Senya	13476	91.7	4.2
Dangbe West	10421	37.5	66.7
Ga Rural	9600	82.4	17.7
North Tongu	11146	0.0	76.2
Tema	12681	85.7	38.1
Ethnic group			
Fulani	8977	63.5	33.3
Ga	11554	65.2	47.8
Ewe	11562	23.1	69.2
Others	13766	62.5	37.5

Milk processing

Milk processing methods were all traditional. However, there was an industrialized processing system which depended on imported milk power which farmers did not have access to the time of the study. The major product in the traditional processing system was cottage cheese, also known as *Wagashi* which was normally sold. Other products like sour milk and butter or cheese were also produced but were normally consumed by the family.

The soft cheese, *Wagashi,* was manufactured by heating raw milk to about 80 °C, care being taken to avoid boiling. An extract from the stem of *Calotropis procela*, an *Euphobia* species, was added to the milk for coagulation. The temperature was maintained for 3 to 4 h during coagulation. The coagulant was then heated to boiling to expel whey. The heat was removed and the curd allowed to cool. The curd was transferred into small basket moulds and the whey allowed to drain overnight. The resulting cheese was ready for consumption. Expected yield of cheese was about 10 per cent weight of raw milk (Okantah, 1990). Milk was left overnight to form sour milk.

For butter production, milk was left overnight to coagulate. The coagulated milk was agitated in a partially filled gourd until butter was separated from the butter milk and the latter was decanted. Churning time was usually 30 to 40 min. The butter was washed with water. Expected yield of butter was less than 5 per cent weight of raw milk. The yield of butter depended on the percent fat content of the raw milk (Okantah, 1990). Milk processing was mainly an activity of women in the households, usually wives of the household heads.

Milk consumption

Households consumed fresh and processed milk as a major part of their diet. Usually, sour milk was consumed in the morning before animals were taken out to graze. As a variation, some corn flour was stirred into the sour milk. Cottage cheese was diced, fried, and included in most meals. There was a significant ($P<0.05$) difference between districts in the consumption of processed milk (Table 3). In the Dangbe West and North Tongu districts, over 70 per cent of the farmers consumed processed milk, while in the remaining districts the percentages were 57.1 for Tema, 37.5 for Awutu-Effutu-Senya, and 23.5 for Ga Rural. There was, however, no significant ($P>0.05$) difference between districts in the consumption of fresh milk at home. In all districts, most farmers (over 71 per cent) consumed fresh milk at home.

TABLE 3

Percentage of Farm Households Consuming Either Fresh or Processed Milk by District and Ethnicity

	Fresh milk consumed (%)	*Processed milk consumed (%)*
District		
Awutu-Effutu-Senya	100.0	37.5
Dangbe West	83.3	70.8
Ga Rural	100.0	23.5
North Tongu	71.4	76.2
Tema	90.5	57.1
Ethnic group		
Fulani	85.7	60.3
Ga	95.7	52.2
Ewe	84.6	46.2
Others	100.0	25.0

There was no significant association between processed milk consumed at home and the ethnic group of the household head (Table 3). There was the tendency for all ethnic groups to consume more processed milk at home. Similarly, ethnicity was not correlated with fresh milk consumed at home. At least 84 per cent of all farms surveyed consumed fresh milk at home irrespective of the ethnic group of the household head.

Discussion

The reduced amount of milk for sale during the dry season was due to lack of enough nutritious feed and water which affected milk production. Seasonal variation in total amount of milk collected is a major constraint in this dairy system. Provision of watering points and feed supplementation for animals during the dry season should improve milk production.

The lack of fresh milk sales in the North Tongu district and the low volume of fresh milk sales in the Dangbe West district may be attributed to most herds being in rural areas where the road network was very poor. Access to the main urban centres, Ho and Tema, for sale of fresh milk, and also to these rural areas by customers was difficult. The

mean distance between farms and major roads was 16 km compared to 2.5 km in peri-urban districts. Consequently, most of the milk in these areas was marketed in the processed form, since processing extends the shelf-life of milk. This observation is similar to what was reported by O'Connor (1992) in Ethiopia, who observed that milk producers near cities and large towns had ready market outlets for liquid milk, unlike those in the rural areas where the nearest market was beyond the limit of product durability. The producers in the rural areas, therefore, tend to process the liquid milk for sale. Debrah (1992) also reported that intra-urban milk producers in Addis Ababa sold neither butter nor cheese, while producers located far from milk collection centres found it more profitable to produce and sell cooking butter and cottage cheese than to sell fresh milk.

The positive and significant regression of fresh milk marketed on number of household members (b=1.2) may be because household income depended highly on sale of milk and therefore, the larger the household, the more milk that was needed to be sold to meet household requirements.

Marketing of milk through the informal system confirms earlier report by Okantah (1988) that formal milk collection arrangements were lacking on the Accra plains, and that Fulani herdsmen organized their own individual milk sales. Debrah (1992) also reported that in Ethiopia milk was similarly marketed through informal channels, with producers making most of the sales at the farm gate. As at the time of the survey, none of the farms sampled was in a dairy recording scheme. A milk collection scheme commenced shortly after the survey had ended, covering 23 farms with about 500 l of milk being collected daily. The sale of processed milk by women observed in this study agreed with the report by Shapiro, Jesse & Stacey (1992) that in sub-Saharan Africa women sold processed milk. Only 44 out of the 107 farms surveyed were processing milk for sale and this represented 41.1 per cent of the total. On such farms, women spent a total of 4 h per day on dairying activities, which represented 23.5 per cent of the total time spent on dairying by the household, as compared to the 13 h spent by men. It can, therefore, be inferred that men did most of the work associated with dairying. The use of traditional methods of processing by women observed in this study confirms earlier report by Okantah (1990) which indicated that traditional methods of processing milk on the Accra plains were laborious, time consuming and inefficient in product recovery. Improved rural dairy processing industries could be introduced in such areas to stimulate rural development. As the dairy industry develops, small-scale industrial processing would play a more important role, and the role of women would probably also become more important.

Households consumed fresh and processed milk as a major part of their diet similar to the situation observed for Fulani/Hausa cattle rearers in southern Nigeria (Jabbar & di Domenico, 1992). The higher consumption of processed milk in the Dangbe West and North Tongu districts compared to the remaining districts (Tema, Awutu-Effutu-Senya and Ga Rural) may be due to their being farther away from the urban areas. It has been argued that the farther the district is from the urban centre, the higher the tendency to process all the milk. Thus, the consumption of processed milk varies directly with the distance of the district from the urban centre.

In conclusion, the results of this study corroborate the earlier assertions of Okantah (1988) that substantial amount of milk is produced on the Accra plains, and that the traditional processing methods used are laborious, slow, and inefficient. Thus, it is neccessary that more efficient milk collection schemes be put in place to purchase and transport milk from smallholder producers to the formal industrial processing sectors. In addition, improved rural milk processing plants could be established through farmer co-operatives. The provision of a bouyant market for milk will stimulate increased peri-urban and rural milk production and improve incomes of

smallholder cattle farmers.

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