



Cost and returns of smallholder yoghurt production enterprises in the Western highlands of Cameroon

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ABSTRACT

Objective: To determine the cost and returns of smallholder yoghurt production enterprises in the Western highlands of Cameroon.

Methodology and results: Socioeconomic data on yoghurt production were collected from seven dairy cooperative societies during demonstrations using data guides. Analysis of the data showed that smallholder yoghurt production requires small investments that are easily affordable to smallholder dairy farmers. Variable costs account for 96% of the cost of production compared to 4% for fixed cost.

Conclusion and application of findings: The average cost/returns ratio for yoghurt production in the region is 1.6 and returns are higher in the rural than in the urban areas. Low investment requirements and running costs, high prices of yogurt and high productivity are some of the factors that increase the cost-returns ratio. Fresh milk alone accounts for an average of 55.7% of the total cost of production. The market price per litre of yoghurt produced by smallholder dairy farmers in the Western Highlands is lower than the cost of a similar quantity of imported yoghurt. The findings show that encouraging production and marketing of local yoghurt would enable small producers to generate income and consumers to save money by buying cheap but good quality local yoghurt. The positive cost-returns ratio and low investment required for yoghurt production are encouraging factors for small scale dairy farmers to invest in yoghurt production as a source of income generation towards poverty alleviation. Policy makers and stakeholders of the dairy sector need to develop measures to encourage the consumption of local dairy products especially yoghurt.

Key words: Dairy, yoghurt, small scale farmers, income.

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INTRODUCTION

The technical capacities of small scale dairy farmers were built through training by the Food and Technology unit of IRAD Bambui between 1983 and 2005. This was done in collaboration with partners such as Heifer Project International (HPI) and National Agricultural Research and

Extension Programme (PNVRA). Farmers were trained on the techniques of processing fresh milk into the various dairy products such as pasteurized milk, cheese, butter, ice cream and yoghurt.

Yoghurt is highly preferred by consumers of dairy products in the Western Highlands of

Cameroon. A study carried out in this region specifically the Bamenda Urban town in the North West Province of revealed that the most popular dairy product was yoghurt (Vabi & Tambi, 1995). The same study revealed that more than half (54%) of the 207 respondents bought yoghurt from provision stores, 22% from supermarkets, 14% from the open market and the other 10% from manufacturing firms. Based on these results, it was concluded that more imported yoghurt was consumed in Bamenda Urban town than locally produced yoghurt. Generally, the demand for dairy products in Cameroon has largely been met through imports (Von Massow, 1984; Mbogoh, 1984; Nwoko, 1986; Seoum, 1988).

The development of the dairy sector especially yoghurt production in the Western Highlands has good prospects for adding value to milk, its conservation, nutrient source and poverty alleviation. Nutritionally, vitamins from yoghurt are different from those obtained from fresh milk. While whole fresh milk contains six different types of

vitamins and has high energy value, yoghurt contains five different types of vitamins but has similarly high energy value (Pyke, 1975). Problems of lactose intolerance in fresh milk could be overcome through consumption of yoghurt since lactose deficient patients tolerate fermented dairy products better (Galagher, 1979; Jay, 1986). Fresh milk deteriorates rapidly in hot environment but once processed into fermented milk, e.g. yoghurt or cultured sour milk, its useful life can be extended without refrigeration for up to one week (Kosikowski & Mistry, 1987).

The economic benefits of yoghurt production to small scale producers in Cameroon have not been established. Such information would be useful to farmers who might want to embark on small scale yoghurt production and also for policy makers when laying down a framework to develop the sector. The objective of this study was therefore to determine the cost and return of smallholder yoghurt production in the Western highlands of Cameroon.

METHODOLOGY

Study area: The study was conducted at seven sites of *Vekovi, Bafoussam, Koutaba 1, Koutaba 2, Akum 1, Akum 2* and *Fundong* in the West and North West Provinces of Cameroon that make up the Western Highlands agro-ecological zone. These sites include one urban, three peri-urban areas and three villages. This agro-ecological zone was chosen due to the substantial number of dairy cooperatives and farmers in the area and the number of smallholder farmers whose capacities in yoghurt technology were strengthened by resource persons from the Institute of Agricultural Research for Development (IRAD) in collaboration with Heifer Project International (HPI) between 1983 and 2005. The study was carried out in 2005.

Data collection: During the study, one practical demonstration of yoghurt production was conducted in each of the sites under the usual smallholder farm conditions. The stirred yoghurt making technology described by Kamga and Anyangwe in 1991 was demonstrated. Primary data were collected during the demonstrations from the respondents (members of dairy cooperatives) using a data collection guide. Data include socioeconomic characteristics of dairy cooperative respondents such, e.g. marital status, sex,

literacy level, occupation, age, number of dependents, income and expenditure.

The various equipment and materials (pots, knives, buckets, coolers, bottles, culture, clothes, salt, milk, thermometer, refrigerator, plunger, funnel, chair, sift, labour input etc) used were also recorded. Other data included cost of a liter of milk, quantity of yoghurt produced and sold and the market price of a liter of yoghurt. The prices of equipment and materials used were obtained from the local market closest to each site. The cost of labour was calculated on hourly basis using the local cost at each site.

Further discussions with the members of seven dairy cooperatives selected randomly from 20 cooperatives in the study area led to annual financial projections on yoghurt production, costs and returns. After making these projections in excel spreadsheet, they were presented to the dairy cooperatives for comments, improvement and approval.

The farmers retained for this study were the producers trained by IRAD and belonging to dairy cooperatives. In the first stage, seven dairy cooperatives to which all the 50 farmers trained by IRAD belonged were tracked. Seven dairy cooperative

delegates representing those actively involved in yoghurt production for the local market conducted the demonstration. The rest of the trained dairy cooperative members provided support to each of the selected leader during the demonstration exercise.

Data analysis: The cost and return data were analyzed using the budgetary method. Annual constant depreciation of assets was used with particular

emphasis on multiple uses of assets. Where assets were used for things other than yoghurt production, the depreciated cost was shared among activities for which the asset is used. Quantitative data were analyzed using descriptive statistics such as means. Cost and Return ratios were also calculated using projected data. Qualitative (socioeconomic) data were analyzed using frequencies and percentages.

RESULTS AND DISCUSSION

The dairy cooperatives had an average membership of 30 with women representing 61% of the membership. All members were married and had an average age of 35 years. One of the 7 cooperatives was based in an urban area, 3 in a village set up and the other 3 in a peri-urban area. The average age of the cooperatives was 6 years. The dairy cooperatives promoted by Heifer Project International (HPI) were the major sources of milk used by smallholder dairy farmers groups to produce yoghurt. Six of the seven cooperatives depended on their dairy farms for milk whereas one bought milk from the dairy farmers.

The average annual quantity of yoghurt produced by a smallholder producer in the Western Highlands of Cameroon was 1,707 litres. The total average annual cost incurred at this scale of yoghurt production stood at 811,225 frs cfa. Fixed cost was 22,464 frs cfa representing just 4% of the total cost. The variable cost was estimated at 788,848 frs cfa and accounted for 96% of the total cost (table 1).

The average cost of producing a litre of yoghurt varied between sites ranging from 418 – 874 frs cfa with an average of 516 frs cfa. This is slightly above the cost of producing a liter of pasteurized milk (300-406 fcfa) sold in Bamenda (Cameroon) as determined by Goldman and Pingpoh (1984) As is the case with pasteurized milk, the average cost of producing yoghurt reduces as the volume of milk processed increases. Goldman et al (1985) concluded that the production costs of dairy enterprises in some agro-ecological zones of Cameroon vary depending on the level of investment. The unit cost estimated for Bafoussam based yoghurt producers is highest because of high investment (18.5%). On average the cost of fresh milk alone represents 55.7% of the total cost of production. The average unit cost of a litre of milk was 214 frs cfa, which is 14 frs cfa above the national average price of 200 fcfa per litre of milk at the farm gate level (Ndambi & Bayeme, 2006).

Table 1: Annual expenditure (f cfa) in yoghurt production enterprises in western highlands of Cameroon.

Sites	Liters produced	Fixed Cost	Variable Cost	Total expenditure	Unit Cost	% FC	% VC
Vekovi	2,112	13,184	873,450	886,634	420	1.5	98.5
Bafoussam	468	84,186	370,386	454,386	874	18.5	81.5
Koutaba 1	2,244	3,758	933,700	937,458	418	0.4	99.6
Koutaba 2	2,020	8,933	868,500	877,433	434	1.0	99.0
Akum1	704	5,025	297,200	302,225	429	1.7	98.3
Akum 2	2,816	32,071	1,283,300	1,315,371	467	2.4	97.6
Fundong	1,584	10,091	895,400	905,491	572	1.1	98.9
Total	11,948	157,248	5,521,936	5,678,998	3,614	27	673
Average	1,707	22,464	788,848	811,285	516	4	96

The gross income from the production of an average of 1,707 litres of yoghurt in the Western Highlands of Cameroon ranged between 468,000 and 2,252,800 frs cfa per annum with an average of 1,276,543 frs cfa (table 2). The price of a litre of yoghurt ranged between

500 and 1,000 frs cfa. Depending on the forces of demand and supply for yoghurt in the area of study prices varied from 500, 800 and 1,000 frs cfa. The income from yoghurt production should have reduced if the price of fresh milk doubled after the devaluation of

fca in 1994. However, doubling the price of milk would also lead to an increase in the price of yoghurt hence increase in income.

The price per litre of yoghurt is paradoxically lowest in Koutaba though the annual demand for yoghurt is seemingly higher. In this area the community comprises traditional consumers of milk and milk products hence has a presence of many suppliers and low income consumers especially children. The numerous suppliers also incur the lowest unit cost of production due to low investment as shown on table 1. Most of the milk is harvested from their own dairy farms, and this is often not considered as expenditure in yoghurt production, hence the low prices. In a previous survey of household consumption patterns of dairy products in Nigeria it was concluded that ethno-cultural differences are more important than geographical location in explaining the consumption patterns and frequencies of consumption of domestically produced dairy products (Di-Domenico &

Vabi, 1988; Jansen, 1990; Jabbar & Di-Domenico, 1990).

Analysis shows a net positive income for small scale yoghurt producers irrespective of whether the enterprise is located in the village, peri-urban or urban localities. The farmers in urban set up barely break even with only a small surplus of 13,614 frs cfa. This small margin was because of the high level of investment and reduced quantity of yoghurt produced unlike the counterparts in peri-urban and village set ups. The results show that small scale yoghurt production can be an income generating venture. Similar results were obtained in Namibia (Bille et al., 2000) after analyzing the cost and returns of producing 500 litres yoghurt from goat milk. Developing yoghurt production and the dairy sector as a whole can contribute to poverty alleviation especially due to its ripple effect. It not only increases the demand and supply for yoghurt but also spurs the production of fresh milk. Increased consumption of milk also helps to address protein deficiency in diets.

Table 2: Annual income (f cfa) from yoghurt production in western highlands of Cameroon.

Sites	Quantity of yoghurt produced (litres)	Market price (per Litre)	Gross Income
Vekovi	2,112	1,000	2,112,000
Bafoussam	468	1,000	468,000
Koutaba 1	2,244	500	1,122,000
Koutaba 2	2,020	500	1,009,800
AKUM 1	704	1,000	704,000
Akum 2	2,816	800	2,252,800
Fundong	1,584	800	1,267,200
Total	11,948	5,600	8,935,800
Average	1,707	800	1,276,543

The analysis of annual income and expenditure for small scale production of yoghurt in the Western Highlands gives a cost/returns ratio that varies from 1.0 - 2.4, with an average of 1.6 (table 3). The lowest cost/returns ratio of 1.0 was obtained in an urban environment, which was because of high investment and low scale of yoghurt production. Scaling up production and marketing would increase the ratio significantly. Interestingly, the cost/returns ratio is

highest in village set ups (Vekovi and Akum 1) followed by peri-urban area and least in urban set ups (Bafoussam). This is due to low running and investment costs and availability of cheap milk from owned dairy farms, unlike the urban farmers who incur transport costs weekly to buy milk at higher prices. This finding indicates that developing the sector can be of vital importance to alleviating poverty in the rural areas.



Table 3: Cost and Returns ratio of yoghurt production enterprises in western highlands of Cameroon.

Sites	Total Expenditure (fcfa)	Gross Income (fcfa)	Net Income (fcfa)	Benefit-Cost Ratio
Vekovi	886,634	2,112,000	1,225,366	2.4
Bafoussam	454,386	468,000	13,614	1.0
Koutaba 1	937,458	1,122,000	184,542	1.2
Koutaba 2	877,433	1,009,800	132,367	1.2
AKUM 1	302,225	704,000	401,775	2.3
Akum 2	1,315,371	2,252,800	937,429	1.7
Fundong	905,491	1,267,200	361,709	1.4
Total	5,678,998	8,935,800	3,256,802	11
Average	811,285	1,276,543	465,257	1.6

The objective of this study was to determine the cost and returns of smallholder yoghurt production enterprises in the Western highlands of Cameroon. The results show that small scale yoghurt production requires small investments that can easily be afforded by smallholder dairy farmers. The positive benefit-cost ratio and low investment requirements are encouraging factors for small scale dairy farmers to invest in yoghurt production as a source of income and for poverty alleviation.

Our findings also show that the selling price of a litre of yoghurt in the Western Highlands (average 800 frs cfa) is lower than the market prices of a similar

quantity of industrially produced yoghurt (1200-1500 fcfa). Despite the low price, it is still a profitable venture for small scale dairy farmers and also it also permit consumers to save money rather than depending on expensive imported yoghurt. Policy makers and the stakeholders of the dairy sector can further develop the sector by taking measures to encourage the production and consumption of local dairy products especially yoghurt. Cooperative societies should also be encouraged to venture into yoghurt production which is clearly vital for poverty alleviation and improving the nutritional status of households, especially of children.

REFERENCES

- Bille PG, Novor MN, Goreseb J, Keya EL, 2000. Evaluating the feasibility of adding value to goat milk by producing yoghurt using low cost technology method for the rural Namibia. The journal of food technology in Africa Vol. 5 No. 4, p. 139-144.
- Di-Domenico CM. and Vabi BM, 1988. Women in the Production, Consumption and Marketing of Dairy Products in Nigeria. Paper Presented at the Workshop on Development Alternatives with Women in the New Era. Institute of African Studies; University of Ibadan. Nigeria, 26th – 29th September.
- Galagher CR, 1979. Lactose Influence and Fermented Dairy Product. Journal of American Dietetic Ass. G5, 418-419.
- Goldman M, Vabi BM, Mbah DA, 1985. Semi-intensive Commercial Dairy Farming in the Adamawa Province, Republic of Cameroon: A Case Study, Rev. Sci, et Tech, Ser. Sci. Zootech, Vol. 1 (4), Pp. 71 – 78.
- Goldman M. and Pingpoh DP, 1984. The Cost of Producing Fresh Milk Sold in Bamenda, North West Province, Cameroon. Institute of Animal Research, Bambui Centre: 1-15
- Jabbar MA. and Di-Domenico CM, 1990. Dairy Consumption Patterns in Southern Nigeria, Paper Presented at the Symposium on Dairy Marketing in Sub-Saharan Africa held ILCA, Addis Ababa, Ethiopia, 26th – 30th Nov.
- Jay JM, 1986. Food Microbiology. 3rd edn. Van Nostrand Reinhold Co; NY USA.
- Jansen HG, 1990. Dairy Product Consumption in Northern Nigeria: Structure, Patterns and Determinants, Paper Presented at the Symposium on Dairy Marketing in Sub-Saharan Africa held at ILCA, Addis Ababa, Ethiopia, 26th – 30th November.
- Kamga P. and Anyangwe F, 1991. Effects of Temperature on the fermentation of fresh cow's milk. Revue de production du Cameroun. Numen 1991. vol. 1, 42 -47



- Kosikowski FV. and Mistry VV, 1987. Cheese and fermented milk products. Vol. 1 pp 87- 105 F.V.Kosikowski publishers, 1 Peters Lane. Westport, Connecticut, USA.
- Michael MV. and Tambi EN, 1995. Household Consumption Patterns of Dairy Products in Bamenda Urban Town; North West Province, Cameroon. Journal of International Food & Agribusiness Marketing, Vol. 7 (1995). The Haworth Press, Inc.
- Mbogoh SG, 1984. Dairy Development and Internal Marketing in Sub-Saharan Africa: performance, Policies and Options LPU Working Paper No 5 ILCA, Addis Ababa; Ethiopia.
- Ndambi A. and Bayeme H, 2006. Cameroon Dairy Sector and Chain Profile, IFCN 2006 report
- Nwoko SG, 1986. Dairy Imports in Nigeria: Development and policies, ALPAN Network Paper No. 7. ILCA, Addis Ababa; Ethiopia.
- Pyke M, 1975. Success in Nutrition. John Murray Ltd. London.
- Seyoum, 1988. Patterns of Consumption of Dairy Products in West Africa. ILCA Working Document No. 11, Addis Ababa; Ethiopia.
- Von Massow VH, 1984. Dairy Imports into Sub-Sahara Africa: Development and policies. ALPAN Network Paper No. 3 . ILCA, Addis Ababa; Ethiopia.

