

# Marketing channels and margins for milk in the province of Sugamuxi (Boyacá)

Canales y márgenes de comercialización de la leche en la provincia Sugamuxi (Boyacá)

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## ABSTRACT

The aim of this study is to provide information on the characteristics of the marketing of milk in the province of Sugamuxi, for which marketing channels were identified, marketing margins were established, links in the chain were diagnosed and the implementation of the Competitive Dairy Chain Agreement and its pricing system were assessed. This analysis discriminated the problems of two areas defined by topography (flatland sloped), that is the particular problems they present and the different channels in the marketing of milk they use. 235 traders were surveyed in each area. The marketing channel focused on was: producer - regional processor - wholesaler - Consumers in the plains, and in the hillside area: producer - transporter - regional industry - local - consumer, and especially on increased milk marketing. Marketing margins were calculated for raw milk and pasteurized milk. The milk producers in the flatlands are paid better, the current price system usually does not apply. Also, there is a deficient in knowledge of ACCL by other links in the chain, hindering development and competitiveness of the dairy chain.

**Key words:** marketing, dairy chain, competitiveness, trade links, the price system.

## RESUMEN

El objetivo del presente estudio es proporcionar información de las características del mercadeo de la leche en la provincia de Sugamuxi, para lo cual se identificaron los canales de comercialización, se establecieron los márgenes de comercialización, se diagnosticaron los eslabones de la cadena y se evaluó la aplicación del Acuerdo de Competitividad de la Cadena Láctea y de su sistema de precios. Este análisis discriminó la problemática en dos zonas definidas por su topografía (plana y ladera), ya que presentan problemáticas particulares y utilizan canales diferentes en la comercialización de la leche. Fueron encuestados 235 agentes comerciales de cada zona. Se resalta el canal de comercialización: productor - procesadores regionales - mayorista - consumidor en la zona plana, y en la zona de ladera: productor - transportador - industria regional - distribuidor local - consumidor, como los más importantes por mercadear el mayor volumen de leche. Los márgenes de comercialización se calcularon para leche cruda y leche pasteurizada. La leche al productor en la zona plana se paga mejor, no aplicándose en su gran mayoría el sistema de precios vigente. Así mismo se encuentra un deficiente conocimiento del ACCL por parte de los demás eslabones de la cadena, obstaculizando el desarrollo y competitividad de la cadena láctea.

**Palabras clave:** mercadeo, cadena láctea, competitividad, eslabones comerciales, sistema de precios.

## Introduction

The primary dairy sector has stood for over the past 10 years as an excellent opportunity for economic and social development in various areas of the country, having displaced some agricultural products, guaranteeing their loss. Thus, the generation of new dairy farms in this country has been increasing but not in the same economic or environmental conditions, one example is the various production systems in specialized dairy basins, located in the middle and upper thermal areas such as the Cundiboyacense highlands, including Chicamocha.

In many of these areas an additional feature is the prevalence of small farms as a means of production, competing with technical systems, specialized for better stability in the market, but with little bargaining power (MADR, 1999). Therefore, research on dairy marketing processes that focus on these remote areas would provide a commercial diagnosis of milk produced there, allowing better price control, preventing future inequities and promoting efficient marketing channels and improving product quality.

The development of productive activities within the Sugamuxi province is limited by characteristics of bio-

Received for publication: 24 June, 2010. Accepted for publication: 2 June, 2011.

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physical, social, economic and cultural, stratifying patterns of production; allowing the classification of the actors and marketing functions for study and analysis. There are differences between those who perform the same functions of marketing, giving rise to the various processes of productivity and marketing channels and margins of the plains and hillsides of the Sugamuxi province.

On the one hand, the flat area of the province has, among other features: modern irrigation systems like the sprinkler irrigation project of Usochicamocha, presence of a major water network, good quality land for crops and feed production, inland access to good roadways, elements that together allow the development in a stable and controlled fashion.

Socio-economically, the members of the production and marketing chains that work in the flatlands of the province have a greater degree of technical education, allowing them to develop their business with a certain efficiency. For farmers in this area, they have more and better natural resources on their farms, and their production systems are equipped with technology and skilled labor. Therefore, the milk produced there is sought by industries that demand a product in large quantities and of good quality.

Municipalities geographically distant from the center of the Sogamoso territories coincide with the sloping margin and fragmented milk production, but given their large numbers, are an important source of milk for the province. The hillside area is characterized economically mainly by mining and rural subsistence production (Arias, 1997). Most land in these municipalities is too steep, limited arable land or pastoral water resources are not constant throughout the year or water reservation systems do not exist, access roads are few and in poor condition, preventing permanent communication with the urban area, social services and support to agriculture are limited or nonexistent, and marketing policies have been few and inadequate (Ceron, 1991), resulting in little or no competitive production.

No doubt the features that differentiate the two types of production locations are the different land slopes and proximity to access roads, factors other than productivity, they communicate differently in urban areas and the secondary or intermediary sectors, determining factors in terms of time and distance when collecting the milk. The commercial advantage of the flatland area is that the market offers more choices for selling their product at different levels and intermediaries, further diversifying the channels of marketing of milk in the search for the end-user.

This study considers the location as the main distinguishing feature of the product quality, pre-milking and marketing, due to differences in distance to industrial plants and intermediaries, determining factors for time and distance when collecting the milk. This factor determines the distribution channels, margins of participation in wealth, selling prices, and therefore, opportunities to market the product.

This study aims to characterize the main marketing channels and margins for milk in flatland areas and hillsides of the Sugamuxi province. Immersed within the overall objective of developing a descriptive diagnosis of the current marketing of milk in the study area and provide analytical tools to producers in the area to enable them to optimize decisions regarding marketing processes of milk.

## Materials and methods

**Materials:** The study was conducted in the hillside area of the Sugamuxi province comprised of the municipalities of Mengua, Monguí, Tópaga, Gámeza, Aquitania, Cúitiva and Tota.

The research was conducted in the period from February to May 2003 during which some participants were interviewed and consulted as secondary chain sources of information such as the Municipal Units of Agricultural Technical Assistance (UMATA, its acronymy spanish Unidades Municipales de Asistencia Técnica Agropecuaria) and the Federación de Ganaderos de Boyacá (FADEGAN).

## Methodology

To perform a more detailed assessment of the marketing channels and margins in the Province of Sugamuxi, topographical zoning was produced to justify and substantiate the results.

A market research study include marketing channels and margins, begins with the knowledge of the origin of the product and its features and then tracks the process, including changes in form and property, to their final destination (Mendoza, 1991).

Once the origin and destination of milk was designated, we proceeded to identify the marketing channels and margins of the dairy chain in the region of study, through the application of surveys to the various links that perform some function of marketing. This study is considered exploratory - descriptive, so we conducted a non-probability sampling for convenience as a sounding board for the implementation of the surveys (Pope, 1984).

In the implementation of surveys for each link in the supply chain during the field work, the following aspects were taken into account:

1. Economic agent who buys the milk, the purchase price and place of purchase (showing the previous link in the chain).
2. Price per liter of milk and quantity purchased (production capacity, marketing or processing of the agent).
3. Agent who sells milk, the sale price and place of sale (the next link in the chain).
4. Physical functions that are executed (form utility).
5. Storage (time of use).
6. Distance traveled (place utility).

Marketing margins and producer participation were established by price differential. These calculations were made from the comparison of prices found in the various links in the chain, relating to the price paid by the final consumer of the milk, which is the basis of the analysis (Mendoza, 1997). The formulas used to find the margins were as follows: According to Mendoza (1997), the marketing margin is the difference between the price paid by the ultimate consumer of the product and the price received by the farmer. Also called Marketing Gross Margin (MGM) and is calculated as:

$$\text{MGM} = \frac{\text{Consumer price} - \text{Producer price}}{\text{Consumer price}} \times 100$$

The value obtained corresponds to the share of intermediaries in the chain on the final price of the product. Direct Participation Producer (DPP) is the portion of the price paid by the final consumer of milk corresponding to the farmer (Mendoza, 1997):

$$\text{DPP} = \frac{\text{Consumer price} - \text{MGM}}{\text{Consumer price}} \times 100$$

Net Marketing Margin (NMM) is the percentage of the final price charged by the brokerage as net income by deducting marketing costs (Mendoza, 1997):

$$\text{NMM} = \frac{\text{MGM} - \text{market costs}}{\text{Price paid by the consumer}} \times 100$$

Once the necessary information was collected, it was tabulated using an Excel<sup>®</sup> spreadsheet and then we proceeded with the identification and characterization of the marketing channels and margins for milk in the region under investigation. For the presentation of the results, flow charts, pie charts, bar charts and histograms were used with the application of descriptive statistics in the analysis (Weimer, 2003).

The number of respondents in each link in the supply chain of milk for the study area are presented in Tab. 1.

## Results and discussion

### Characterization of marketing links

Sloped areas had an average of 8 cows/herd, the average estimated value of the department where 80% of farms have less than 10 cows/herd (Aragon and Duarte, 1998), and well below the average of 33 cows/herd for the production on the flatlands. In the hillside area, the use of Norman race (65%), with day milking (62%) and all manual milking dominates, while in the flatland area there is superiority of the Holstein breed (80%) that are milked manually 80% and 20% mechanically, with a predominance of 2 milkings/day (99%). Aragon and Duarte (1998) found 8% data for mechanical milking in the department, accounting for the low level of technology in the hillside area.

The difference in the price of milk paid by breed shows that milk from Norman/hybrid herds has average values lower (\$415 COP) than the Holstein herds (\$465 COP), despite having better compositional quality milk, showing that for the marketing system of the present study area the location of farms and the volume marketed are favored.

The hillside area has production levels of 37 L/herd/d and 7.4 L/animal/d in winter, volumes that warranted only consumption and production of small surpluses for sale. The result of the presence of this type of farms in this area is fragmentation of production, which is why the rural pro-

**TABLE 1.** List of surveys by type of commercial agent Boyacá.

AGENT	Production	Transport	Regional process	Industrial plant	Cheese processed	Distribution	Total
Area flatland	85	24	15	3	16	23	166
(%)	80%	53.3%	57.6%	100%	80%	100%	70.7%
Area hillside	21	21	13	0	4	10	69
(%)	19.8%	46.6%	46.4%	0%	20%	30.3%	29.3%
Total studied	106	45	28	3	20	33	235

ducer has no bargaining power due to inefficient transport and collection; subtracting from the product uniformity and quality.

In the plains, the average production volumes are 303 L/ herd/d and 12.1 L/animal/d in winter. The total milk from herds sampled in the flatland area (25,787 L/d), 22% is cold milk (5,676 L/d), improving the average sales price of a cold liter for these farms to \$522 COP.

Fedegan (2003) found that the average price paid per liter of warm milk to the producer in Boyacá is \$460 COP, a value higher than the price paid to producers in the hillside area of the Sugamuxi province (\$369 COP). These data clearly show the precariousness of marketing and the isolation find in farms in this area from the competition agreement and any authority that would promote compliance.

Such marketing of milk highlights the importance for milk transporters in the hillside area for the low price and, for processors of cheese, the compositional quality compared to the flatland area in which the carriers have reduced participation and the industry collects more milk (Fig. 1).

Transporters that have a marketing function are self-employed based on this economic activity, assuming the collection service, distribution and sale of milk, with little training and resources to provide acceptable service. In its entirety the type of transport that collects milk from farms is informal, lacking equipment or refrigeration and without proper maintenance.

Commercially, the area of destination of this milk is 74% for industry, followed by the sale of raw milk (unpasteurized) 23% and cheese producers 3%. Liters sold as raw milk

in the hillside area was 3756, accounting for 49.6% of total raw milk marketed in the province, with a final destination of Sogamoso consumers. In the plains, 59% is sold as raw (unpasteurized) milk, followed by industry at 37 and 4% cheese middleman. Carriers who sell raw milk (*cruderos*), do not belong to an organized union so they are subject to strong price competition between them and their activity is considered illegal.

The existence of *cruderos* is due to the milk consumption habits of people who prefer this type of milk due to its lower price and because it is attributed as being of quality and freshness. However, the existence of this milk on the market threatens public health and harms the processed milk market, plus it is a strong informally structured market, creating unfavorable conditions for the link of the production due to nonpayment and submission of prices.

The average distance traveled by carriers in the hillside and flatland areas is 86 km d<sup>-1</sup> and 50 km d<sup>-1</sup> respectively, representing an average cost of \$81 COP/liter in the sloped area, calculated based on monthly expenses (fuel, vehicle maintenance and assistance) and the gallons sold per month, versus \$78 COP/liter in the flatland.

The 28 processing companies in the study area differ depending on the amount of milk processed rather than level of technology, which is based on the use of pots and tubs operated by many workers. For the hillside area, the volume of milk processed by regional companies is 12,946 L d<sup>-1</sup>, with an average \$421COP a gallon paid to producers and \$489 COP to the carrier. The flatland area offers a larger volume of milk to regional companies with 39,438 L d<sup>-1</sup>, who pay on average \$447 COP a gallon to producers and \$513 COP to the carrier, based on particular negotia-

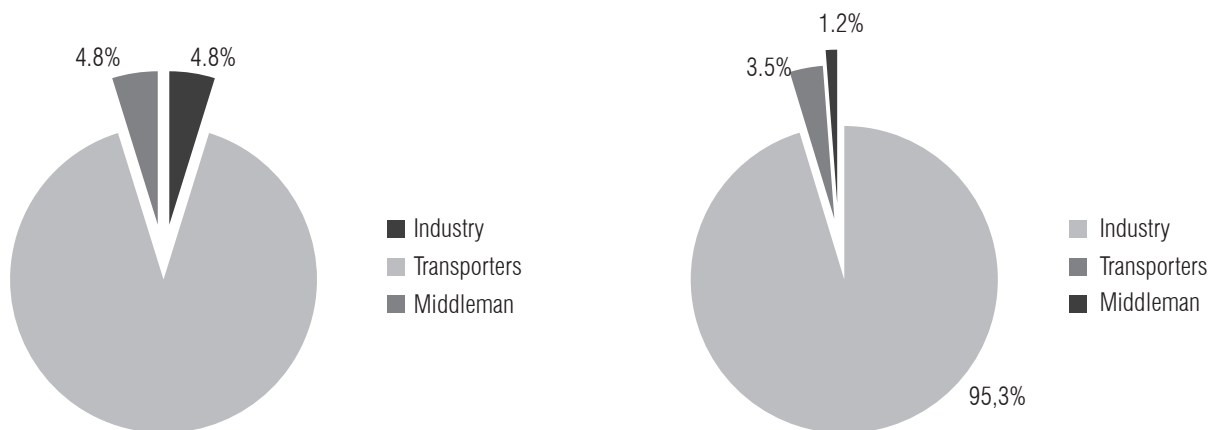


FIGURE 1. Selling destination of milk produced in the area: sloped (a) and flat (b).

tions, supply and demand and references from national companies.

Institutionally, of all the processing companies in this area, only two met the obligation of livestock and dairy development for 2002, with values lower than those actually processed (Fedegan, 2003). This demonstrates the lack of information on existing businesses and the current state of marketing agents, corroborating the informality of these companies, which impedes progress of the entire chain by reducing the budget for promotion and competitiveness. Dairy products produced, cheese is the most important because of its portability and ease of marketing. All the cheeses produced in the province, 35% (50.222 kg/month) is processed by the companies in this area, with 84% of the selling occurring in the province and the rest sold in other cities, mainly in Bogota.

Four cheese middleman were interviewed, which collect on average 81kg/agent/week, purchased from two providers on average. In their entirety, cheese middleman sold directly to consumers, using only public transport. The business of cheese production is the livelihood for individuals who are in the production of surplus milk marketing option.

The marketing of products from regional companies is mainly to consumers and shopping plazas in Sogamoso, representing 67% of local sales, 17% is sold to wholesalers and chain supermarkets and 16 % of sales are made to markets in other cities.

The three national pasteurizing companies operating in the plains collect a total of 30,759 L d<sup>-1</sup> in the province of Sugamuxi purchased directly from the farmer and collected 100% on the farm, ensuring that 95% of this function takes place in specialized tank cars. Two of these companies are strategically located at a distribution center in Maguncia, Sotaquirá (Boyacá) and the other transports its milk directly to the processing plant in Sopo (Cundinamarca). These companies loom large in the marketing of the milk produced in the provinces of Centro, Tundama and Sugamuxi (Boyacá department), highlighted by their broad coverage, quality laboratories and timely payments.

The average price paid for the milk of these companies is \$542 COP, due to the partial (66%) and total (33%) application of the Competitiveness Agreement and its Price System made fortnightly, all have retained a biweekly payment.

In the distribution link, 33 facilities were surveyed in the city of Sogamoso for chain stores, regional supermarkets,

market places and neighborhood stores, which sell dairy products such as pasteurized milk (25.4%), milk powder (14.6%) cheese (32.1%), fermented (23.8%) and condensate (13.1%). These products come from regional companies 39% and national and multinational companies 61%, regional involvement being very low compared to the significant amount of milk produced in the region and the number of local companies. There is probably a greater presence of products of national and multinational companies because they offer greater assurance to the retailer and consumer product quality and also have more efficient distribution systems. Table 2. Shows the different amounts of milk for the dairy chain links in the flatland and hillside of the Sugamuxi province.

**TABLE 2.** Volumes of milk marketed by the agents of the chain.

Agent	Province (L d <sup>-1</sup> )	Zone	
		Flatland	Hillside
A. Producers	26,553	25,787	766
B. raw milk transporter	7,577	3,821	3,756
C. Industrial transporter	12,076	1,576	10,500
D. Regional industries	44,384	39,438	12,946
E. Nacional industries	30,754	30,754	0
Total (B+D+E)	82,715	82%	18%

### Marketing channels for milk

Marketing channels of milk were built from the systematic observation of all stages of marketing of milk and identification of marketing agents involved, from producers to consumers in Sogamoso, with the product in two forms: raw milk and other derivative processing.

Of milk produced in the flatland area 74.0% is sold to regional processors, 21.3% to national and multinational processors, 3.5% to carriers and 1.2% to cheese middleman. The channel is producer - regional processor - wholesaler - consumer, as the most important market for the greater volume of milk in the area (Fig. 2). Yet these regional processes, while managing more milk in the province, distributed only 39% of dairy products marketed in Sogamoso compared to 61% by national and multinational companies who have positioned themselves in this market segment due to the quality and guarantee of their products and good distribution system.

The picture in the hillside area is that 90.4% is sold to carriers, 4.8% to regional processors and 4.8% to cheese middleman. The channels are producer - transporter - regional industry - local - consumer and producer - transporter - consumer, as the most important by marketing the highest volume of milk in the area (Fig. 3).

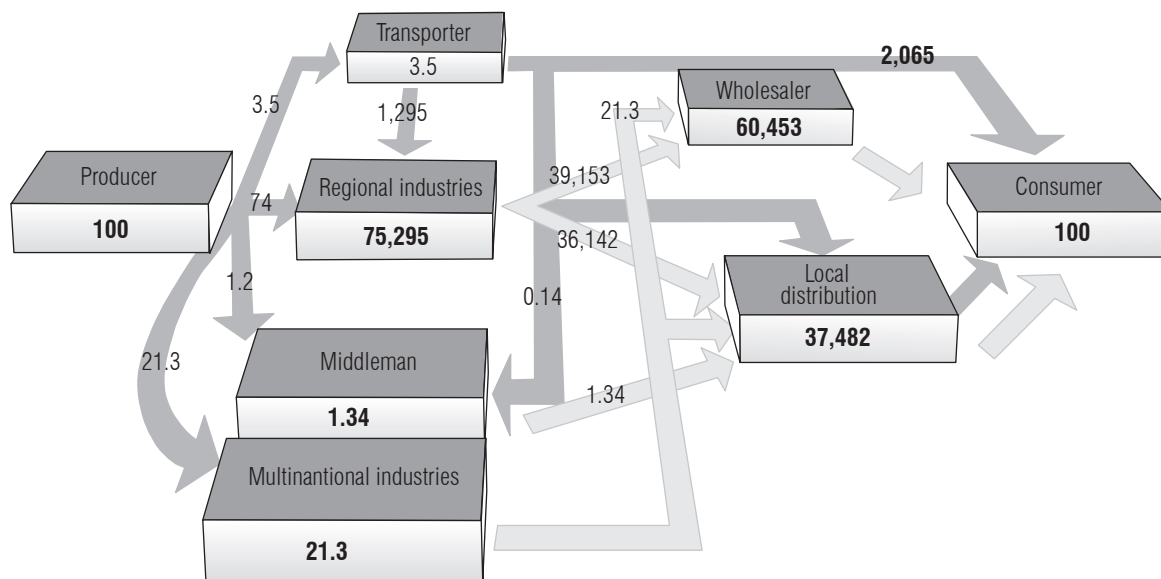


FIGURE 2. Marketing channels for milk in the flat area of the province Sugamuxi.

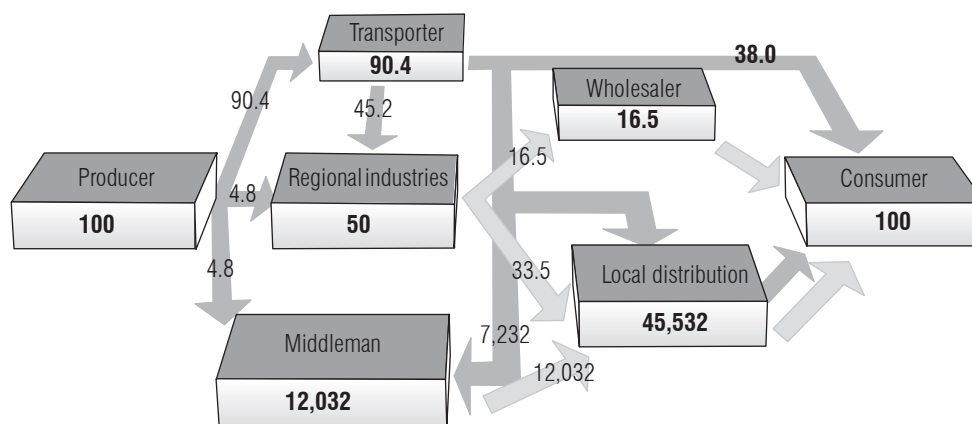


FIGURE 3. Marketing channels for milk in the hillside area of the province Sugamuxi.

Another particular channel in the area was found for cheese, distinguished by the home processing by the manufacturers and the presence of a single agent or cheese processor who takes advantage of the ease of collection of cheese compared to milk and sells directly to consumers in the market places.

Overall, the supply chain of milk in the Sugamuxi province lacks horizontal integration or union for all links, mainly producers, in the absence of some form of cooperatives or associations to help them achieve a greater range of participation in the chain, or the benefits of automation, helping with and decreasing input costs of livestock, among others, confirmed by the low level of association found in

this study (16%) and what was said by Baquero (2000), who argues that the lack of associative approach creates difficulties in the processes of generation and transfer of technology and the creation of networks for the provision of support services.

Each link in the chain carries on business without being involved in the functions of marketing, there are only two types of integration levels: Transportation - regional and national companies and regional companies - distributors. This low presence of vertical integration in the area is poor to the extent that the market does not acquire regional development and the chain does not have higher levels of profitability for the agents.

The relationships between links in general are of little confidence because the product transaction (purchase - sale inspection) lends itself to deception, going then to quality tests to check the status of milk purity and honesty of the seller. As a result, the chain efficiency decreases as costs rise by repeated testing.

### **Marketing margins of milk**

Analyzing the behavior of marketing margins of the 17 channels of distribution of milk and their derivatives in the Sugamuxi province would be too extensive. For this reason, we will focus on the analysis of marketing margins of raw milk for the hillside area, and marketing margins of processed milk for the flatland.

In the case of raw milk, according to the sales prices found, a Marketing Gross Margin of 45% was found and producer participation was 55% (100% - MGM). Net Margin Trading (NMM) of milk for transporters for pasteurization was 2.2%.

This channel marketing of raw milk is common in the provinces of developing countries, since they are close to production areas. Marketing systems present in the provinces, not being developed, lead to the producers receiving a margin of greater participation in the chain at a low price paid by the consumer, because of the low value added product.

In the case of pasteurized milk, the channel producer - transportation - industries - distributors is the most evolved because it provides more involved agents including their values added to the final product. According to these sales prices, a gross margin of 57.1% was found with marketing and producer participation of 42.8%. The MGM is divided into 9.5% for transport, 34.1% for industry and 13.5% for distributors. Net marketing margin for carriers was 2.3%.

The aggressive marketing of processed milk in relation to raw milk, shows the change in the DPP by the increase in both participating agents and the value added of the product generating the highest price paid by the consumer. This shows that with the development of the dairy chain, national policy evolved in the prices paid for milk in channels where there was an increase in marketing margins, according to the entry of new technologies and expertise in operations. However, the marketing channels of pasteurized milk and dairy products in the flat area of the province of Sugamuxi do not have levels of efficiency and effectiveness in the chain to justify the price paid by the consumer and paid to the producer.

## **Conclusions**

The present study indicates that the location of the farms is a factor that becomes more important when setting prices paid to producers over other compositional factors such as quality, challenging the philosophy of agreement for quality competitiveness.

Institutional presence should direct their efforts in providing services of technical and administrative training, coordination of marketing processes, updating and verification of information and control of prices paid for milk along the chain, to ensure continuity and sustainability in the dairy business in the hillside area of the province of Sugamuxi.

With the formation of rural associations, projects for collection centers could be carried out, which facilitate the collection of milk and offer a greater bargaining power. Likewise, the presence of producer associations could facilitate training processes and technology extension offered by Umatas, federations and other institutions.

To prevent the consumption of raw milk, efforts should be focused on both the consumer through campaigns that warn of the risks of using this type of milk, as well as transporters, by requiring only the correct sale, processors, vehicle and element types for transporting milk.

The availability of information on characterization and operation is considered the main condition for developing a dairy chain in the Sugamuxi province as well as in other dairy areas, especially with access and usefulness for the participants. This would promote awareness among stakeholders of the links in marketing and collective action, making it possible to improve the organizational level of the chain.

An improvement in the organization of actors and processes of marketing, would be the optimal use of resources and infrastructure available to the province. This would imply that the creation of associations (producers, transporters, processors and distributors), to develop coordination procedures in the concentration, preparation and dispersion of milk and dairy products, avoiding cost overruns and therefore competition.

The imperfection of the market for milk in the province of Sugamuxi is evident in the lower prices paid to producers compared to other regions, where its distance to consumption centers will generate higher transport costs and compensation should be adjusted proportionately with location.

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