



EAAE 98th Seminar: Marketing Dynamics within the Global Trading System: New Perspectives, Crete, Greece, 29 June-2 July 2006

‘Developing the Food Supply Chain in Armenia’

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Abstract

The transformation from a socialist system into a market economy has led to pronounced changes in the Armenian agricultural sector. The breakup of collective and/or state owned agriculture in Armenia resulted in over 300,000 small diversified farms which grow five or more crops on 1.5 ha and have two or more animal species. This also holds with respect to the food processing sector as a whole and in particular the development of new small and medium enterprises within the food sector.

Due to the marketing, technical and financial support of the Center for Agribusiness and Rural Development (CARD) in Armenia—funded by the United States Department of Agriculture—many small and medium enterprises (SME’s) are active in developing domestic and export food supply chains. CARD also helps SMEs maintain linkages within the agricultural supply chain—including but not limited to government organizations, research institutions and advisory groups, input suppliers, and food distributors.

After identifying the needs of consumers, food manufacturers, and other participants in the food supply chain, different aid projects have been launched to assure proper food quality and meet international standards. The main challenge for CARD is how to most efficiently organize the supply chain to measurably contribute directly to increasing farm income, rural employment, and sustainable development. By doing this CARD will be able to continue linking Armenian farmers to a rapidly evolving agri-food system.

Keywords: Armenian agriculture; marketing; cheese production; food quality, supply chain; distribution channels; consumer behavior

Introduction

Armenia is a landlocked and mountainous country covering an area of 29,800 km². It is located in the South Caucasus bordering Turkey, Georgia, Iran, and Azerbaijan. The population of Armenia is 3.22 million (as of April 1, 2005), with another 5 million Diaspora (NSS, 2005).

The average elevation of the country is approximately 1,650m. The climate is continental with hot summers and cold winters and has an annual rainfall varying between 300mm in the Ararat Valley to about 600mm throughout the rest of the country. Armenia is divided into nine agricultural zones. Almost forty percent of the total area is unsuitable for agriculture. The area that is suitable for agriculture amounts to approximately 1394 thousand hectares, including 494 thousand hectares of arable land (35.5%), 63.8 thousand hectares of perennial grass (6.4%), 138.9 thousand hectares of hay lands (10%), and 694 thousand hectares of pasture land (49.9%) (UNDP, 2004). Agriculture in Armenia is very irrigation-dependent.

During the Soviet period Armenia was an industrialized country with a large rural population. Armenia exported its outputs mainly to other neighboring Republics, and in turn it relied on those Republics for key inputs.

The dairy industry is Armenia's largest agricultural sector with 55% of Armenia's 335,000 farmers owning 262,000 dairy cows, approximately 500,000 sheep, and more than 50,000 goats. Most herds are dual purpose and are owned by small family farms. The average dairy herd consists of 0.93 cows and about 66% of farms own five or less cows (UNDP, 2004). Milk is primarily used for household purposes with any surplus sold to dairy processors, marketing associations, private traders, or to the local market. Milk production is substantially compromised by low genetic potential, poor pasture management systems, inadequate housing, limited low nutrition winter feed, poor herd health and no infrastructure for marketing excess milk.

The dairy processing sector is characterized by a few large processors located around the country's capital, Yerevan, and by numerous small cheese producers located throughout the country side (Hakobyan, 2004).

SMEs in Agriculture

Currently the role of small and medium enterprises (SMEs) in Armenia as the main supplier of employment can not be overstated. The SME sector accounted for approximately 39% of GDP in 2004, more than half the employment of the Armenian labor force. The SME sector has created a middle class and has provided a competitive market structure and technology advancement (Kyureghyan & Zohrabyan, 2005). Considering the importance of the SME sector in Armenia's economy, the Government has passed several laws and sub-legal acts ensuring the proper development of the sector. These laws—first and foremost—define and distinguish companies considered SMEs (Kyureghyan & Zohrabyan, 2005). Companies are classified as micro-, small-, and medium-sized based on the following criteria:

- Micro - Commercial organizations and individual entrepreneurs within the agricultural industry with an average of 5 or less employees.
- Small - Commercial organizations and individual entrepreneurs within the agricultural industry with an average of up to 15 employees.
- Medium - Commercial organizations and individual entrepreneurs within the agricultural industry and other productive spheres with an average number of up to 30 employees.

The distinctions of the SME in others sectors are slightly different (Micro: 1-5 employees, Small: 6-50 employees and Medium: 51-100 employees).

Due to government support, SMEs have become a developing and driving force in the economy. The share in GDP attributable to SMEs grew almost twice in 2004 as compared to 2000 (Kyureghyan & Zohrabyan, 2005). Table 1 demonstrates the dynamics of the development of SMEs in the agricultural sector between 2003 and 2004.

Table 1 Enterprises involved in agricultural production, 2003-2004

Size of enterprises	Number of companies		Average number of employees		Volume of output (million AMDs)		Share	
	2003	2004	2003	2004	2003	2004	2003	2004
Micro	54	37	163	115	540.2	135.3	3.5	1.0
Small	35	42	585	751	1723.4	1827.9	11.1	13.5
Medium	8	2	547	149	4844.1	400.2	31.2	3.0
Total SME	97	81	1295	1015	7107.7	2363.4	45.8	17.5
Large	3	5	588	853	8408	11148.3	54.2	82.5
Total	100	86	1883	1868	15515.7	13511.7	100	100

Source: Ministry of Trade & Economic Development (2005)

This table shows the number of SME's declined in 2004 and their share in the volume of output declined from 45.8% in 2003 to 17.5% in 2004. The factors affecting this decline are linked to limited export opportunities coupled with other problems plaguing the SME sector (Kyureghyan & Zohrabyan, 2005).

There is some statistical evidence indicating commercialization of agriculture has increased in recent years (Ministry of Trade & Economic Development, 2005). This was true until 2004. Since 1997 the ratio of the share of commercial organizations in relation to total agricultural output increased to 3.8% in 2003. However, this fell to 2.7% (approximately the level in 2000) in 2004. It is believed commercialization is increasing the inequality of farm income distribution as households engage in farming which can not compete with larger commercial enterprises. However, many observers argue commercialization is not a major factor behind declining farm incomes and the losses to rural households from commercialization is only 3-4% (Minasyan & Mkrtchyan, 2005).

Vertical Integration in the Armenian Dairy Industry

Prior to transition, the milk processing industry had an annual capacity of 320,000 tons of fluid milk production, about 27,000 tons of cheese, and 13,000 tons of ice cream (Ministry of Agriculture, 2002). All former 42 state-owned dairies (milk and cheese) have been privatized. Most of these factories work at a low level of capacity; many of them do not operate at all. Production focuses on cheese making, pasteurized milk, and

other dairy products. Many small plants exist (about 500) which produce predominately salted cheeses under inadequate hygiene conditions. Several recently created dairies—of small size—process their own raw milk. Foreign direct investments (FDI) and joint ventures (J-Vs) in the dairy sector do not exist. Since independence, most farms have been dismantled and currently the bulk of dairy production originates from small private farms with 1-2 milking cows. The most important areas for milk production are located in the north-eastern part of the country: The Tashir region in particular is known for high quality cheese and enterprises in Tashir process around 8% of all milk produced in the country (Ministry of Agriculture, 2002).

The collapse of Armenia's planned economy resulted in the break-up of all vertically and horizontally established and related marketing networks in the sector. Distribution channels are now underdeveloped and are primarily integrated with processors, which increases transaction costs and decrease efficiency (Hakobyan, 2004).

As previously mentioned, a major problem that small private farms encounter is milk marketing. Milk marketing is a large problem due to three important factors that set it apart from other farm products. First, milk is more perishable than other farm products (unlike most agricultural products, in its fluid form it can only be stored a few days); second, a differentiating property is the flow of milk: while most agricultural products are harvested once a year and stored for later sales, milk is normally harvested twice a day; and third, supply and demand of milk is counter-cyclical over the year. These factors put an individual Armenian farmer at a competitive disadvantage when conducting business with only a few large processors (Hovhannisyan, Urutyanyan, & Dunn, 2004). However, processors face many problems as well: processors must collect milk directly from small, geographically dispersed household farms. These farms produce inconsistent quality in low quantity. Small farms can not meet the necessary sanitary and hygiene conditions for milk production and are not—by themselves—able to easily adopt new technologies that enable them to improve. Cold chain storage is also a problem.

The role of the United States Department of Agriculture's Marketing Assistance Project (USDA-MAP) as a third-party facilitator in the development of dairy marketing channels in Armenia has been and remains significant. Through a concentrated and coordinated package of marketing, technical, and financial assistance, USDA-MAP has increased rural incomes, created jobs, and raised the standard of living in rural communities. In particular, USDA-MAP contributed to the development of dairy marketing channels by establishing dairy marketing cooperatives and milk collection centers in many villages across the country. The farmer-cooperatives worked closely with USDA-MAP clients-processors by supplying improved quality milk (Sardaryan, Mkrtchyan, & Urutyian, 2005).

Generally, processors have small-scale operations; however, there are several large dairy plants that produce a wide range of dairy products: sour cream, yogurts, milk, ice cream, and cheeses. According to the State Commission for the Protection of Economic Competition of Armenia, no single dairy processing company dominates the market with major dairy products due to the wide range of products and the large number of processors in the market (SCPEC, 2004). Several processors are integrated with farmers through farmers groups, milk collection units, milk marketing cooperatives, and Credit Clubs (joint and severely liable financially supported groups of farmers who produce a single commodity) initiated by USDA-MAP.

The United States Department of Agriculture's Marketing Assistance in Armenia and Development of the Dairy Industry

United States technical assistance to Armenia began in 1992, shortly after the country declared independence from the Former Soviet Union (FSU) and requested technical assistance support from the United States. The United States Department of Agriculture initially responded by dispatching six Extension agents to work in association with the Ministry of Agriculture. This initiative led to a continuous stream of USDA Cooperative State Research, Education, and Extension Service (CREES) and American land-grant university consultants to help with technical and financial assistance in the agricultural sector that has continued to date. This assistance can be divided into four program periods:

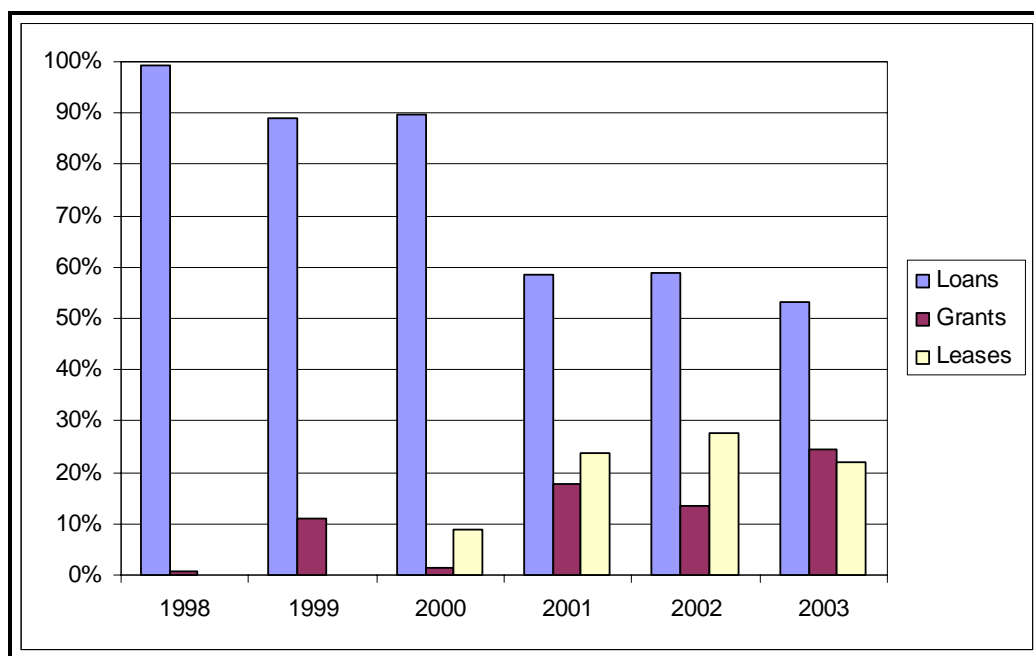
- 1992-1995: Establishment of farm level extension technical assistance
- 1995-2000: Incorporating land-grant university (LGUs) led farm-to-market technical assistance and a credit support program
- 2000-2005: Transformation into an Armenian-led farm-to-market technical assistance and a credit support program (with LGU participation) and phase-out of direct USDA management
- 2005-Present: Closure of MAP and phase-over of program activities to an Armenian registered and managed NGO called the Center for Agribusiness & Rural Development (CARD).

In 1996 USDA assistance to Armenia was redesigned from an Extension technology-push approach a to market-pull strategy with a shifted focus from farmers and production to market and SME development within the privatized food processing sector. The USDA's Marketing Assistance Project shifted the question of 'What can Armenian farmers produce?' to 'What does the market demand and how can Armenian farmers profitably meet this demand'? In doing this, USDA-MAP provided marketing, financial, and technical assistance to stimulate a market approach to business.

At the outset, MAP focused on improving the livelihoods of rural Armenians working in the fruit and vegetable sector, but within a year the project shifted its focus to the dairy industry. USDA-MAP completed a series of feasibility studies and market research projects and identified small dairy processors, farmers, and regions in most need of aid. Findings emerged that recognized what was needed was a consumer-driven system and an efficient dairy supply chain to service it to sustain long-term economic growth.

Financial assistance was provided in various forms. Initial assistance took the form of grants for facility renovation, cheese making equipment purchase, cheese inputs/cultures, and sanitation materials. Operating capital loans were provided to purchase milk during the peak season and input supplies, as well as for leasing dairy machinery. See Figure 1 for the type of financial assistance USDA-MAP offered the dairy sector between 1998 and 2003.

Figure 1 Loans, grants, and leasing funds as a percentage of the financial assistance provided to the dairy industry, 1998 – 2003



Source: USDA-MAP (2003)

Technical assistance was directed towards improving both raw milk procurement and quality. At the processing level, technical assistance helped design processing facilities, support sanitation efforts and new product development, and facilitate training in modern cheese making technologies (Cocks & Gow, 2003).

Marketing assistance focused on providing dairy processors with promotional assistance, trade show support, market linkages, export assistance, and in-store product promotion. While dairy processors achieved success in marketing their cheeses, domestically and internationally, they were hampered by a lack of consistent quantity and quality of raw milk supply from farmers. Recognizing this, in 1999 USDA-MAP initiated a farmer assistance program designed to establish Milk Marketing Associations centered on collectively owned milk coolers that would allow association members to combine their milk for marketing to processors. A prerequisite to forming these associations was the requirement that they be initiated by rural villagers and not dictated by the government or a foreign aid program. Between 2001 and 2005 there was a significant increase in the number of cooperatives formed, the number of farmers collecting and selling milk, the

number of communities involved with the USDA-MAP dairy program, and the number of collection tanks established in remote villages. See Table 2. This year, in 2006, CARD will organize three additional cooperatives and set up five more cooling tanks in rural communities.

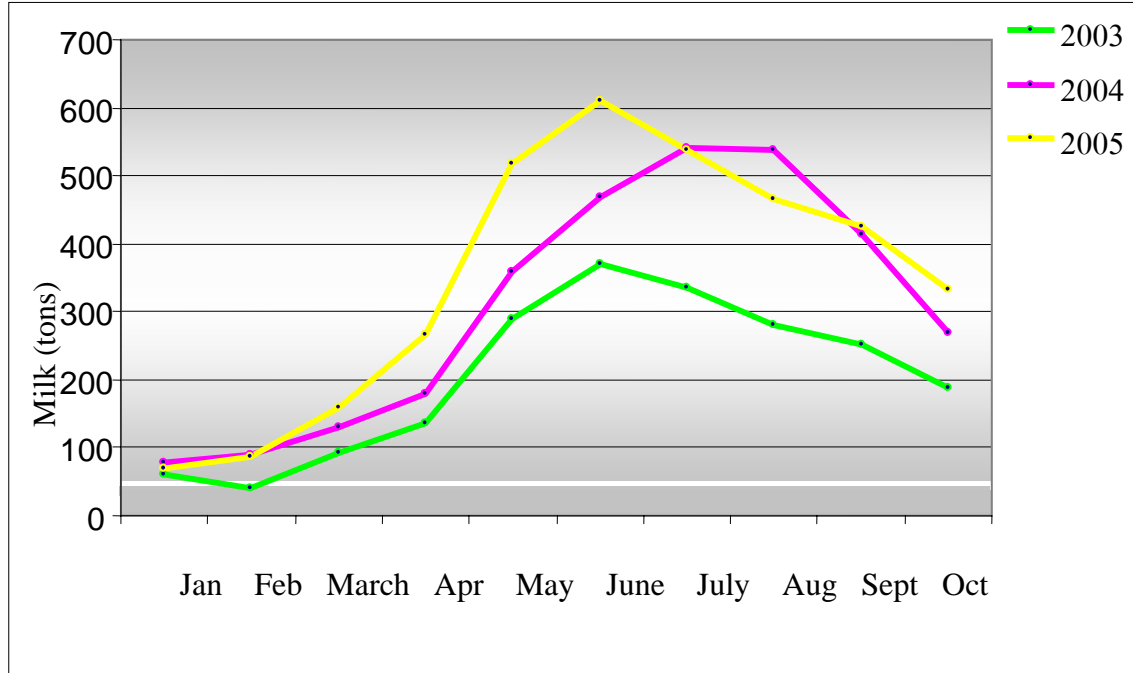
Table 2 Results of USDA-MAP-formed Milk Marketing Cooperatives

		2001	2005	2005 / 2001 (%)
	1	2	3	4
1	Number of cooperatives formed	5	12	240.0
2	Number of cooperative members	177	1,482	837.3
3	Number of villages involved	15	40	266.7
4	Number of milk collection units	6	17	283.3
5	Number of milk cooling tanks	8	25	312.5
6	Capacity of milk cooling tanks (liters)	6,400	25,610	400.2
7	Tons of milk sold	330	3,803	1,152.4
8	Sales of milk			
	a) per cooperative/per ton	66	316.9	480.2
	b) per member/per ton	1.9	2.6	137.6
9	Price of milk sold (AMD/Kilo)	89.3	100.4	112.4
	Portion paid to the farmer	78.2	92.4	118.2
10	Sales of milk 000/AMD	29,473	381,769	1295.3
	Portion paid to Co-op members	25,800	351,384	1362.0

Source: USDA-MAP (2005)

CARD has studied the historical seasonality of milk marketing during the first ten months of the year and found that between May and September 2005 milk marketing cooperatives sold 74% of the milk they produced. See Figure 2. Such a situation creates problems within cooperatives in terms of cash flow and inadequate distribution of farm income, as well as with the supply of fresh milk for milk processing and cheese production. This seriously affects the financial stability of SMEs that process milk (Sarukhanyan, Harutyunyan, & Vanyan, 2005).

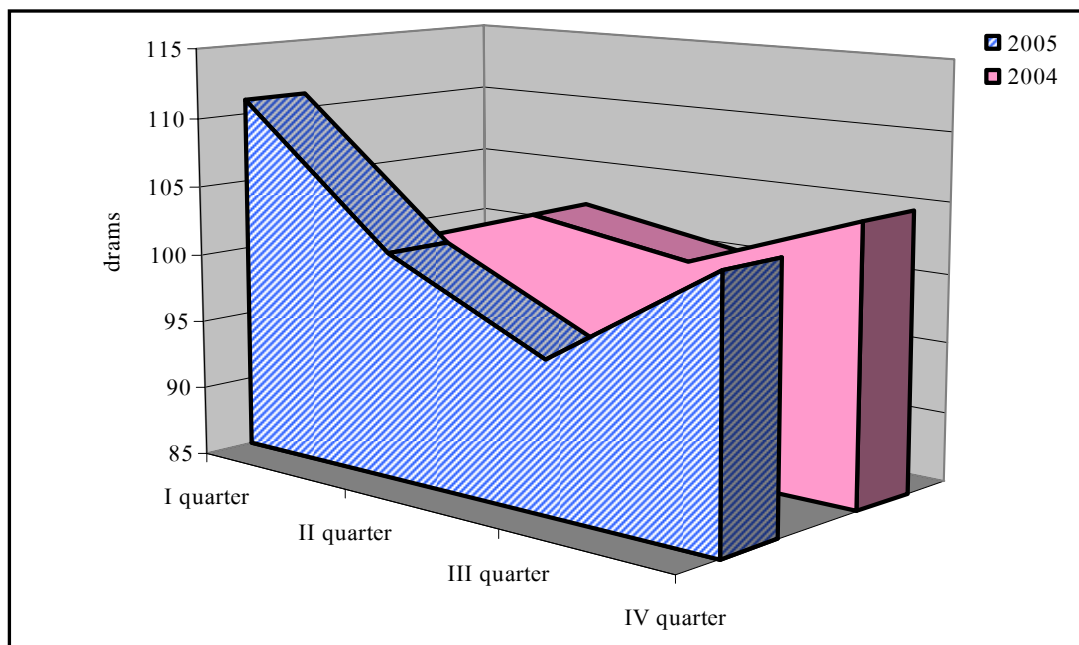
Figure 2 Seasonality of milk marketing at CARD supported cooperatives



Source: CARD (2005)

Milk production seasonality affects milk pricing as well. See Figure 3. The highest average price (450 drams=\$1.00) per 1 kg of milk marketed by milk cooperatives was in the first quarter (111 drams/\$0.246) and the lowest price was in the third quarter (95.7 drams/\$0.212). The payments to the members of the cooperatives per 1 kg of milk in the period of 2004-2005 decreased from 95 drams/\$0.211 to 92.4 drams/\$0.205, reflecting a decrease in the price of milk and an increase in the level of the price margin (Sarukhanyan, Harutyunyan, & Vanyan, 2005).

Figure 3. Average price per kilo of milk marketed by cooperatives in 2004 and 2005, Quarters I-IV



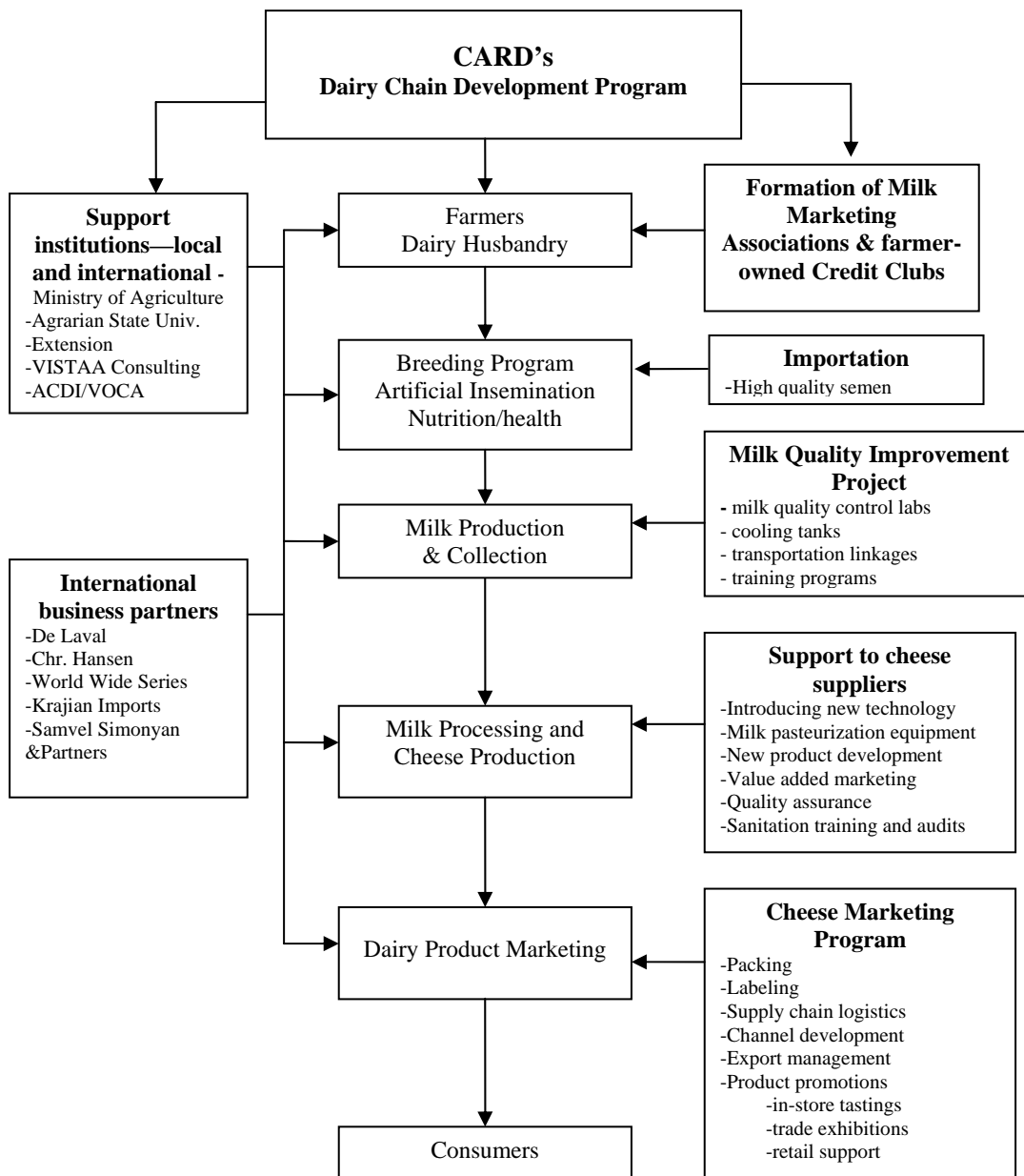
Source: Adapted from Sarukhanyan, Harutyunyan, & Vanyan, 2005.

Value Chain Approach introduced by USDA-MAP and employed by CARD

Armenian small and medium enterprises (SMEs) are active in the supply or value chain of the dairy industry. Most of these enterprises specialize in cheese production. They also maintain numerous linkages with farmers, input suppliers, government organizations, research organizations, rural development NGOs, *et al.* By focusing on SMEs as a key element to developing a value supply chain in the dairy industry, CARD is emphasizing the need for cooperation, information exchange, trust building, technology transfer, and communication. When organizing a supply chain it is important to assure all efforts contribute directly to increasing farm income, rural employment, and sustainable development.

CARD recognized the litmus test of their assistance to the dairy industry would be the long-term sustainability of the industry following the eventual withdrawal of (USDA) foreign assistance funds. CARD also recognized it needed to provide substantial financial, technical, and marketing assistance to dairy processors and milk marketing

associations for sustainable, long-term growth and develop local support institutions and human capital in the dairy industry. Thus, CARD is now addressing these issues with several programs across the entire marketing chain. See Figure 3. New ingredients and cultures for the dairy industry are now available via CARD, which represents a number of globally known input supply companies, such as Chr. Hansen (ingredients/cheese cultures), World Wide Sires (dairy cow semen), etc. Building on USDA's Rural Youth Program, which is based on an American-style 4-H Club system, CARD has continued this as: 1) a short-term way of assisting rural Armenian youth; 2) as a long-term investment in the human capital of rural Armenia; and 3) as a mechanism to initiate change in adults as they watch the success their children have with new approaches and technologies. One Calf Club was established in 2002 and three more in 2003. There are now fourteen Calf Clubs operating in Armenia today. Lastly, another initiative is directed toward sustainability revolves around the establishment of a Master Cheese Maker's School at the Duster Melania Dairy. This school trains new and upcoming cheese producers and local university dairy students on current technologies for cheese production and milk/cheese quality.



Source: Authors (2006)

A final approach of CARD promoting long-term sustainability in the dairy industry is the organization and funding of annual dairy industry conferences. The first conference was held in November 2002 by USDA-MAP with participants that included dairy processing firm managers, milk marketing association presidents, Ministry of Agriculture representatives, and Extension specialists. At that time it was entirely subsidized. This year conference attendees will pay 30% of all conference costs and this percentage increases each year.

Summary

The dairy sector is increasingly characterized by tightly aligned supply or value chains that extend from genetics through producers, processors, and end users. Vertical linkages in the supply chain and qualified supplier approaches in the agricultural sector are relatively new for the dairy industry in Armenia. Introducing and developing some of the critical dimensions of a supply/value chain help key participants understand the implications of this new way of organizing a food production and distribution system.

Many SME's are active in the dairy supply chains. Most of them are focused on cheese production, milk collection and marketing, wholesale or export, and input supply. Thus enterprises need each others' services and support to improve the performance of the supply chain.

Understanding mutual interests, visions and strategies provides a basis to explore the conditions for joint initiatives and to take the first step towards a sector strategy. For in the end, a sector strategy must lead to supplying customers with a product that meets their demands and expectations as the result of collective input and cooperation between all partners in the food supply chain.

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