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Developing the Food Supply Chain in Armenia

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Abstract. The collapse of Armenia's planned economy resulted in the breakup of all Soviet vertically and horizontally established marketing arrangements in the agricultural sector. A decade later, distribution channels continue to be underdeveloped and are primarily integrated with processors which increases transaction costs and decreases efficiency. Due to the marketing, technical and financial support initiated by the USDA Marketing Assistance Project (1993- 2005) and continued by its Armenian legacy institution, the Center for Agribusiness and Rural Development (CARD), many small and medium enterprises (SME's) are increasingly active in the development of domestic and export food supply chains. Considering that Armenia's largest agricultural sector is the dairy industry, this paper explores MAP-CARD's integrated market approach to the vertical integration of the Armenian Dairy Industry and analyzes key problems and how these were resolved or improved to provide SME's greater market access.

Keywords: Armenian Agriculture; Integrated Market Approach; Dairy Industry; Food Supply Chain; Distribution Channels.

Introduction

The collapse of Armenia's planned economy resulted in the breakup of all vertically and horizontally established marketing arrangements in the agricultural sector. Over a decade later, distribution channels continue to be underdeveloped and are primarily integrated with processors which increases transaction costs and decreases efficiency. Due to the marketing, technical and financial support initiated by the USDA Marketing Assistance Project (1993- 2005) and continued by its Armenian legacy institution, the Center for Agribusiness and Rural Development (CARD), many small and medium enterprises (SME's) are increasingly active in the development of domestic and export food supply chains. Considering that Armenia's largest agricultural sector is the dairy industry, this paper explores MAP-CARD's integrated market approach to the vertical integration of the Armenian Dairy Industry and analyzes key problems and how these were resolved or improved through programming that developed human capital, greater collaboration among stakeholders, and higher production standards.

Armenian Dairy Industry Context

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 average elevation of the country is about 1,650 m. The climate is continental with hot summers, cold winters, and annual rainfall varying between 300mm in the Ararat Valley to about 600mm in the rest of the country. The country is divided into 9 agricultural zones.

Approximately forty percent (40%) of Armenia is not suitable for agriculture. 1394.4 thousand hectares suitable for agriculture include: 494.3 thousand hectares of arable land, perennial grass of 63.8 thousand hectares, hay lands of 138.9 thousand hectares , and 694 thousand hectares of pasture (See Table 1). Agriculture is heavily dependant on irrigation.

The population of Armenia is 3.22 million (as of April 1, 2005), with another 5 million Diaspora (NSS, 2005). During the Soviet period Armenia was an industrialized country with a large rural population. Armenia exported its outputs chiefly to the other neighboring Republics and in turn relied on them for key inputs.

Fifty-five percent (55%) of Armenia's 335,000 farmers work in the dairy industry, making it Armenia's largest agricultural sector. As a whole, 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. Dairy farmers own 262,000 dairy cows, approximately 500,000 sheep, and more than 50,000 goats. Most herds are dual purpose and owned by small family farms. The average dairy herd consists of 0.93 cows as sixty-six percent (66%) of farms own five cows or less. The most important areas for milk production are located in the North-Eastern part of Armenia. The Tashir region is renowned for high quality cheese and it accounts for around 8 percent of all milk produced in the country (MoA, 2002).

Milk is traditionally used for household purposes with any surplus sold to a dairy processor, marketing association, private traders, or 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 of excess milk.

SMEs in Armenian Agriculture

Currently, the role of Armenian small and medium enterprises (SMEs) as the main employers in agriculture can not be overstated. The SME sector accounts for about 39% of the GDP in 2004, more than half the employment of the Armenian labor force, and has boosted the creation of the middle class, and provided a competitive market structure and technology advancement (Kyureghyan & Zohrabyan, 2005). Considering the paramount 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, 2005). Companies are classified as micro-, small-, and medium-sized based on the following distinctions:

- Micro - Commercial agricultural organizations and individual entrepreneurs with an average number of up to 5 employees.
- Small - Commercial organizations and individual entrepreneurs within the agricultural industry with an average number 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 SME development has become a driving force in the Armenian economy. The share in GDP attributable to SMEs overall grew almost twice in 2004 compared to 2000 (Kyureghyan & Zohrabyan, 2005). Table 1 illustrates the dynamics of the development of the SME sector in agriculture in 2003 and 2004.

Table 1: Commercial companies for agricultural goods production, 2003-2004.

	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: Statistical Data of the SME sphere in Armenia, 2003- 2004.
Ministry of Trade and Economic
Development

Not only the number of SME's declined in 2004, but also their share in the volume of output has 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 showing commercialization of agriculture has increased in recent years. This was

true until 2004. Since 1997 the ratio of the share of commercial organizations in relation to total agricultural output was increased to 3.8% in 2003; however, it fell back to 2.7% (approximately the level in 2000) in 2004.

It is believed that commercialization is increasing the inequality of farm income distribution as households engaged in farming can be put out of business by commercial firms. However, many authors argue commercialization is overestimated as a major factor behind declining farm incomes of rural households as the losses for rural households from the commercialization are estimated at 3-4% (Minasyan & Mkrtchyan, 2005).

SME'S and Dairy Farmers

Prior to transition, the milk processing industry had an annual capacity of 320,000 tons of dairy production, approximately 27,000 tons of cheese, and 13,000 tons of ice cream (MoA, 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. Since independence, most government farms have been dismantled and currently the bulk of dairy production originates from small private farms with 1-2 milking cows in the Tashir region and North-Eastern Armenia.

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.

The collapse of Armenia's planned economy resulted in a break up of all vertically and horizontally established and related marketing arrangements in the sector. Distribution channels are now underdeveloped, and are primarily integrated with processors, which increase transaction costs and decrease efficiency (Hakobyan, 2004). As mentioned earlier, a major problem small private farms face is milk marketing. This presents the biggest problem due to three important characteristics of the dairy sector that set it apart from other farm products. Milk is more perishable than other farm products (unlike most agricultural products, in its fluid form it can only be stored a few days). 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. third, Finally, supply and demand of milk is counter-cyclical throughout the year. These facts put an Armenian individual farmer, acting on his own, at a

competitive disadvantage when dealing with a relatively few large processors (Hovhannisyan et al., 2004).

In the supply chain, processors have many problems as well. They collect milk directly from small household farms resulting in inconsistent quality and quantity of milk purchased. Small farms can't meet the necessary sanitary and hygiene conditions for milk production and are not---by themselves---able to introduce new technologies that enable improvement. Lack of storage facilities further inhibits business growth and sustainability.

USDA- MAP/CARD Development of the Armenian Dairy Industry

The role of the United States Department of Agriculture's Marketing Assistance Project (USDA-MAP), as a third-party facilitator in the development of Armenian dairy marketing channels, has been and remains significant (1993- 2005). Through a concentrated and coordinated package of marketing, technical, and financial assistance, USDA-MAP 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 and other processors as well (Sardaryan G., Mkrtchyan N., Urutyan V., 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 due to the wide range of products and 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.

USDA 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 USDA responded initially by sending 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. For discussion and analytical purposes, this assistance may be divided into four program periods:

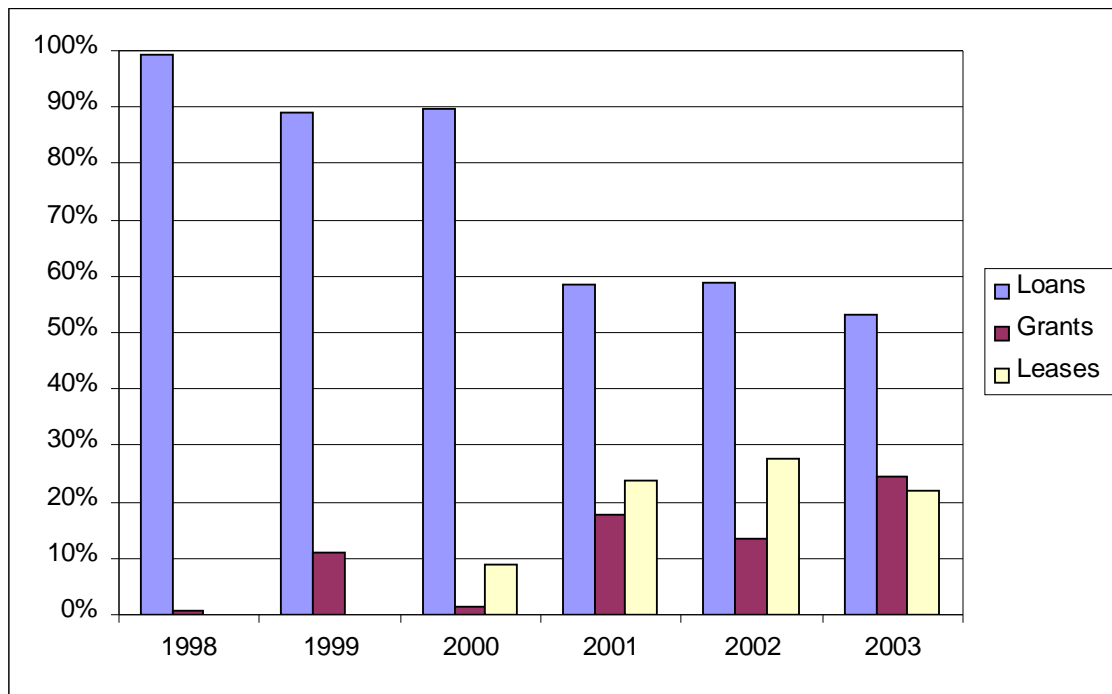
- 1992- 1995: Establishment of farm level extension technical assistance;
- 1995- 2000: Incorporating Land Grant Universities (LGUs) led farm to market technical assistance and a credit support program (MAP);
- 2000- 2005: Consolidation into an Armenian led farm to market technical assistance and a credit support program (with LGU participation) and phase out of direct USDA management;
- 2005- Present: Introduction of an Armenian registered and managed NGO called the Center for Agriculture & Rural Development (CARD).

In 1996, USDA assistance to Armenia was redesigned from an Extension technology-push approach to a market-pull strategy with shifted focus from farmers and production to market and SME development with economic recovery of the privatized food processing sector. Essentially, the Marketing Assistance Project changed the question from, “What can we produce”? to “What does the market demand and how can we profitably meet this demand”? Thereby began USDA-MAP using an integrated market driven approach to business and market development encompassing marketing, financial, and technical assistance.

At the outset, MAP focused on improving the livelihoods of rural Armenians working in the fruit and vegetable sector, but within a year shifted attention and resources to assistance to the dairy industry. USDA MAP completed a series of feasibility studies, market research, and industry analysis to identify small processors, farms, and regions that were in need of aid. What emerged was the recognition that a consumer-driven system was essential to develop a completed and efficient dairy supply chain and for building a long-term, economically sustainable downstream market for farmers.

Financial assistance was delivered in various forms: initial assistance usually comprised 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 other additional input supplies, as well as for leasing dairy machinery.

Figure 1: Loans, grants, and leasing as percentage of total financial assistance to the dairy industry, 1998 – 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, new product development, and training in cheese making technologies in Armenia and abroad (Cocks J., Gow H., 2003.). Marketing assistance focused on providing dairy processors with promotional assistance, trade show support, market linkages, export assistance, and in-store 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 supplies from farmers. Recognizing this, USDA-MAP initiated in 1999 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 the formation of those associations was the requirement that the associations be driven by the villagers themselves and not dictated by government or a foreign aid program.

Table 2. Result of activities of milk marketing cooperatives

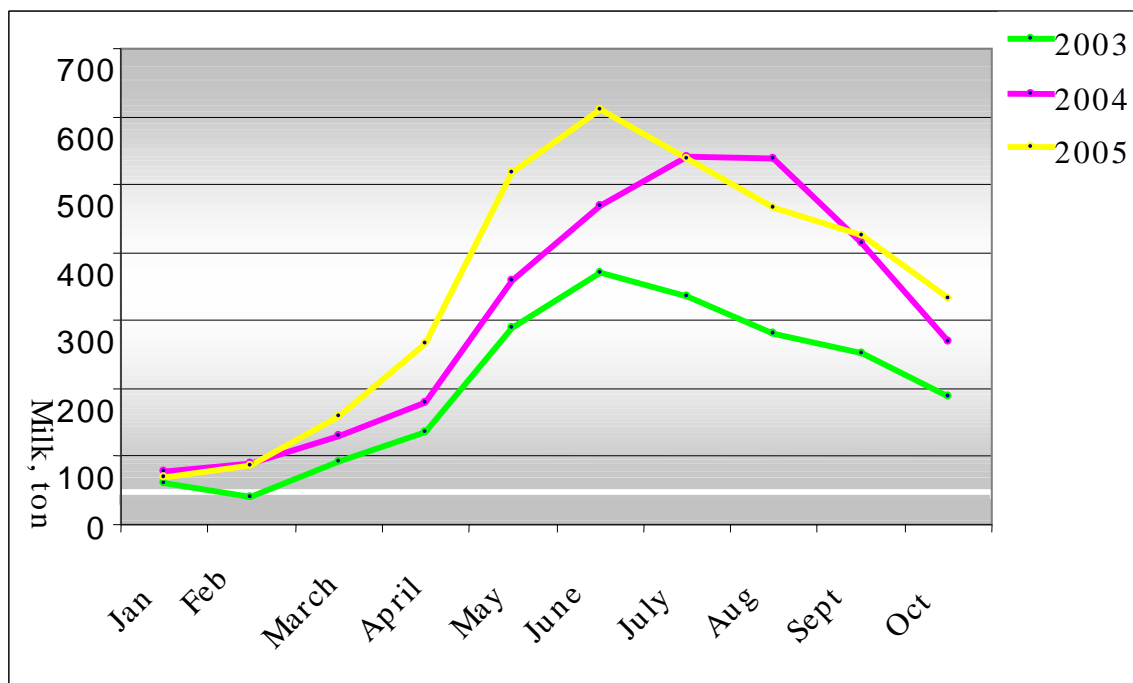
		2001	2005	2005 / 2001 (%)
	1	2	3	4
1	Number of cooperatives	5	12	240.0
2	Members	177	1 482	837.3
3	Communities	15	40	266.7
4	Number of milk collection units	6	17	283.3
5	Number of milk cooling tanks	8	25	312.5
6	Capacity of milk cooling tanks	6 400	25 610	400.2
7	Milk sold, ton	330	3 803	1152.4
8	Sales 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, dram/kg	89.3	100.4	112.4
	Of which was paid to the farmer, dram/kg	78.2	92.4	118.2
10	Sales of milk 000 / dram	29 473	381 769	1295.3
	Of which to the coop. members	25 800	351 384	1362.0
11	Of which to the coop. members	25 800	351 384	1362.0

Table 2 illustrates a significant increase in the number of cooperatives, the number of farmers selling milk, the number of communities involved, and the number of collection tanks since 2001. This year, in 2006, CARD will organize 3 new milk marketing cooperatives and establish milk cooling tanks in 5 communities.

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 percent of milk produced (Figure 2).

Figure 2: Seasonality of milk marketing at CARD supported cooperatives.

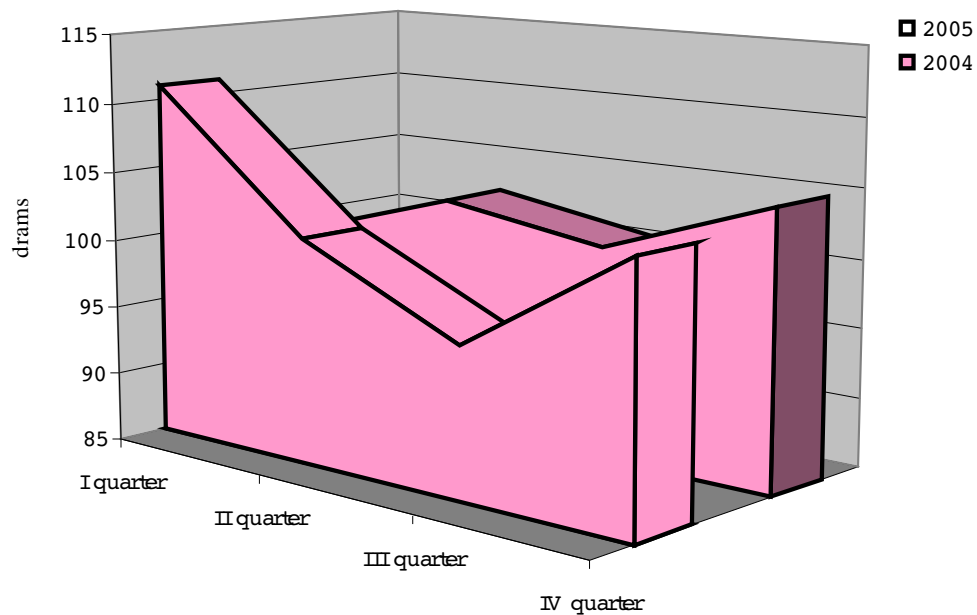


Such a situation- - with the seasonality of milk marketing- - creates problems, not only in cooperatives in terms of cash flow and inadequate distribution of farm income, but also with a inconsistent supply of fresh milk for milk processing and cheese production. This seriously affects the financial stability of the SME's that process milk (Sarukhanyan R. et al. 2005).

The seasonality of milk production affects milk pricing as well: the highest level 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

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. This is connected both with the decrease of the milk price and increase of the level of the price margin (Sarukhanyan R. *et al.* 2005).

Figure 3. Average Price per 1 kg of Milk Marketed by Cooperatives in 2004 and 2005, I-IV Quarters



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

Small and medium enterprises (SMEs) are increasingly 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.* With 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 recognizes the litmus test of assistance to the dairy industry is the long-term sustainability of the industry following the eventual withdrawal of (USDA) foreign assistance funds. CARD also recognizes that substantial financial, technical, and marketing assistance to dairy processors and milk marketing associations could be continued, but for sustainable long-term growth, developing local support institutions and human capital in the dairy industry is essential. CARD promotes human capital via multiple programs.

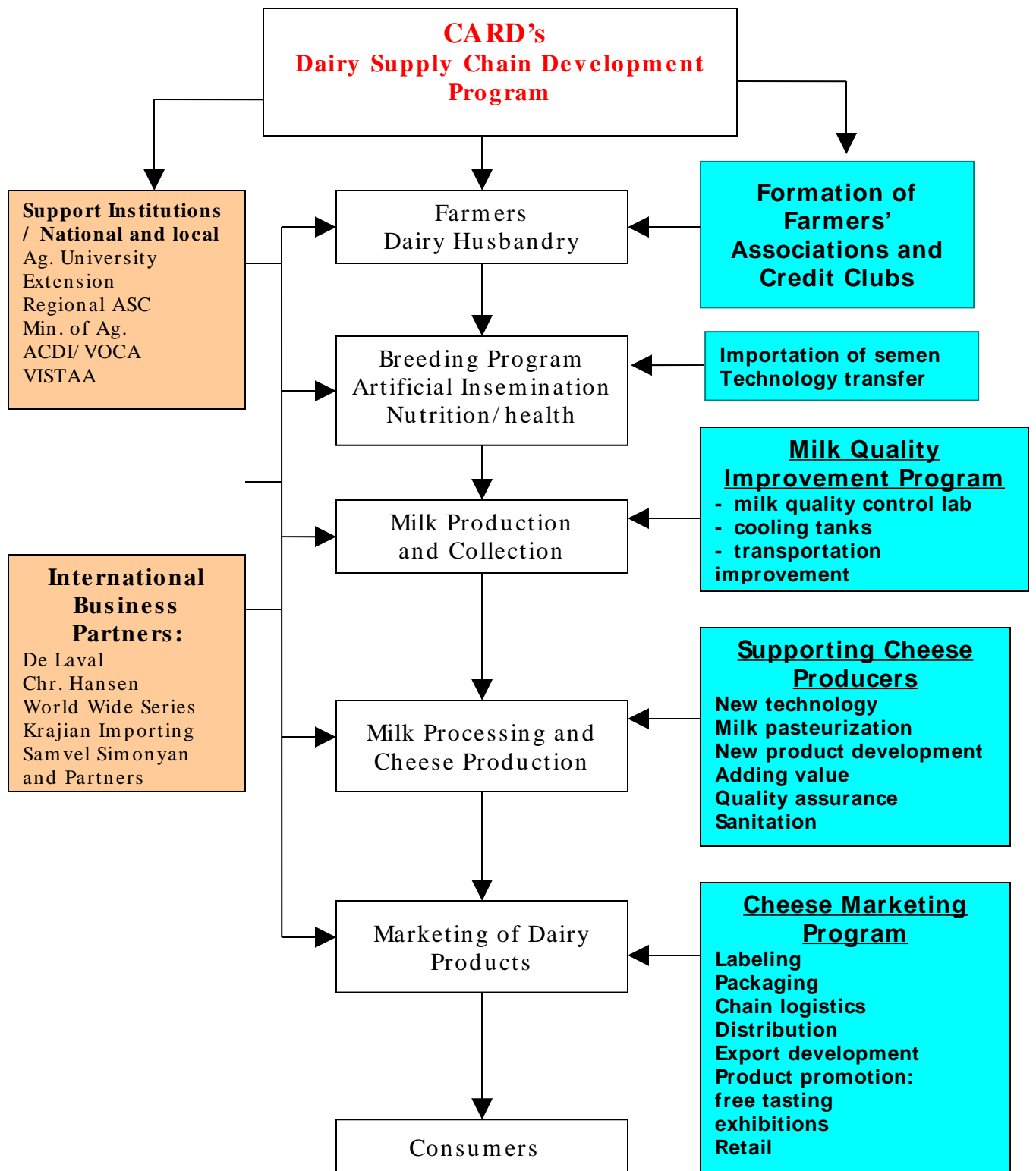
1) New ingredients and cultures for the dairy industry are now available via CARD, which represents a number of globally known input supply companies, such as Chr. Hansen (ingredients/cheese cultures); World Wide Sires (dairy cow semen), and others.

2) Building on USDA's Rural Youth Program based on an American-style 4-H Club system, CARD contributes to 1) short-term assistance rural Armenian youth agricultural education projects; 2) long-term investment in the human capital of rural Armenia; and 3) social change as adults watch the success their children have with innovative approaches and technologies. Initially one Calf Club was established in 2002, three more in 2003, and now there are 14 Calf Clubs in Armenia today teaching in community by example the skills of animal husbandry.

4) To promote sustainability of professional knowledge, CARD established a Master Cheese Maker's School at the Duster Melania Dairy to train new (and upcoming) cheese producers, as well as local university dairy students on current technologies for cheese production and milk/cheese quality.

5) CARD nationally promotes long-term sustainability in the dairy industry by the organization and funding of an annual dairy industry conference. The first conference, held in November 2002 by USDA-MAP, continues each year with participants that include dairy processing firm managers, milk marketing association presidents, Ministry of Agriculture representatives, and agricultural extension specialists. While the first conference was entirely subsidized by USDA-MAP, stakeholders now pay an increasing percentage toward the total conference costs assuring its sustainability.

The following figure illustrates the comprehensive approach CARD applies to further development of the Armenian dairy food supply.



Conclusion

The Armenian 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 demonstrates to key participants the greater benefits of organizing a food production and distribution system.

Many SME's are active in Armenian dairy supply chains. Most 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. As an agribusiness and rural development agency, CARD continues the USDA-MAP legacy. Understanding mutual interests and created shared visions and strategies provides a basis to explore the conditions for joint initiatives and to take the first step towards a sector or chain supply strategy. For in the end, a business strategy must lead to supplying customers with a product that meets their demands and expectations as the result of fine-tuning and transparency between all partners in the food supply chain.

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