The Role of Producer-Owned Cooperatives in Dairy Supply Chain: Evidence from Armenia

By

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Abstract

The dairy industry is the largest among the other agricultural industries in Armenia. According to the 2004 statistical yearbook of Armenia, there are around 566 thousand heads of cattle including 291,000 cows in the country. Since 2000, the number of cows increased by 30,000 heads. The same statistics indicate that milk production has sharply increased as well. In 2004, milk production comprised approximately 555,000 tons, which is 103,000 tons more than that of 2000. Since 2002, the cheese export from Armenia increased by 10 times. This fact is related to the development of dairy industry and increasing competition among the dairy chain actors.

This paper aims at studying and revealing the role of the producer-owned milk marketing cooperatives in the recovery and growth of the overall dairy chain in Armenia. The study reviews and analyzes the outcomes of the Cooperative Development Program implemented by the Center for Agribusiness and Rural Development. The paper also identifies and discusses the forms of vertical integration occurring in the dairy sector of Armenia and concentrates on several important issues like: contractual mechanism between cooperatives and processors, trust and social capital among the cooperative members, problems and challenges milk producers face, financial situation of dairy farmers, farm technology and innovation issues. The research was based on surveys and interviews. Official publications, internal documents, interim and final reports, coops' financial statements and other materials were also used in the study. Based on findings, certain recommendations have been proposed.

Key words: cooperative, vertical integration, dairy industry, trust.

1. Introduction

1.1 Armenia in Transition

Armenia is a landlocked and mountainous country covering an area of 29,800 km^2. 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). An estimated 64% live in urban areas, of which over half is based in Yerevan. For the one-third of the population that lives in rural areas, agriculture is the main source of livelihood (World Bank, 2005).

During the Soviet period, Armenia was exporting its outputs chiefly to the other "brother" republics, and in turn relying on them for key inputs. The severe earthquake in 1988, the collapse of the Soviet Union, and the war with Azerbaijan left Armenia in deep political, economic and social crises aggravated by overwhelming levels of bureaucracy, corruption and nepotism.

The market-oriented reforms introduced in 1991-92 comprised the privatization of many productive resources and organizations. Armenia and Georgia were the first former Soviet republics to privatize agriculture effectively and swiftly during 1991-92: after independence, followed the legislation necessary for the privatization of land; around 70% of arable land and agricultural output came into hands of individual peasant farms. In recent years, the share of agriculture in GDP comprised around 20-27 percent. During the last decade of the 20th century, Armenia thus transformed from an industrialized state to one that is to a significant degree agrarian (Lerman and Bezemer, 2003).

The egalitarian land privatization led to very small size of family farms (1.4 ha on average, of which only 1.1 ha arable). The small farm size is not conducive to the application and use of new innovative technology which itself hinders the development of the sector.

Like in many transitional countries of Europe and Central Asia (ECA), a major problem in Armenia during the transition period was the breakdown of the relationships of farms with input suppliers and output markets. The result is that many farms and rural households face serious limitations in accessing essential inputs (feed, fertilizer, seeds, chemicals, etc.) and selling their output (Swinnen, 2005). Widespread forms of contracting problems like long payment delays or non-payments for delivered products (Swinnen, 2005) were apparent in Armenia during the transition. Restructuring and privatization in Armenia has led to the separation of many previously horizontally and vertically integrated enterprises together with the emergence of new type of businesses (White and Gorton, 2004). This itself led to a situation of widespread financial distress, high discount rates, and lack of contractual enforcement (Gow & Swinnen, 2001). In general, the model of agricultural transition in Armenia is similar to that of other transition countries in the region (Cocks, 2003).

To a large extent, private solutions that successfully overcame the transition problems in ECA have not occurred in Armenia.

White and Gorton (2004) show that significant reforms are occurring in farmer – processor relationships: contracting is becoming more prevalent, especially with larger farmers. In their study they found that the majority of processors in the sample used contract support measures or innovations to be able to overcome hold-up and contracting problems. Most popular measures applied were prompt payments, transportation and monetary credits. White and Gorton also showed (2004) that the number of support measures offered was significantly higher in Armenia, Georgia and Moldova than in Russia and Ukraine, connected to the higher FDI in the mentioned samples. They tried to evaluate the impact of the contract support measures using several indicators. The support measures with the largest impact on yields were the provision of specialist storage, veterinary support and physical inputs, followed by a set of market measures (prompt payments, guaranteed prices and market access).

Moreover, a significant amount of development projects like land consolidation, cooperative development, contractual farming and cooperation, capacity building, training to farmers, etc., are being implemented by international and national organizations to take Armenian farmers out of this situation.

2. Dairy Industry in Armenia

Prior to transition, the milk processing industry had an annual capacity of 320,000 tons of dairy production, about 27,000 tons of cheese and 13,000 tons of ice cream (MoA and FAO, 2002). All former 42 state-owned dairies (milk and cheese) have been privatized. Most of these factories work at a low level of their capacity, and many of them do not operate at all. Production focuses on cheese products, pasteurized milk and other dairy products. Many small plants exist (about 500), which produce mainly salted cheese under inadequate hygiene conditions. However, there are several large dairy operations 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 for major dairy products, because of wide range of products and large number of processors in the market (SCPEC 2005). There are no foreign direct investments and joint ventures in the dairy

sector. Since independence, most of these farms have been dismantled and currently the bulk of dairy production originates from small private farms with 1-2 milking cows.

Table 1 shows key dairy indicators for the period of the last 5 years. Positive changes can be observed looking at the numbers. In particular, the number of cows increased significantly.

Table 1: Key Selected Dairy Indicators, 2000-2004.

	2000	2001	2002	2003	2004
Number of Cows (x 1000)	262.1	264.9	270.1	280.8	291
Milk Production (x 1000 t)	452.1	465.3	489.5	513.7	555.2
Milk Import (all types), tons	1,886.1	1,467.3	2,077.9	3,575.9	3,711.9
Butter Import, tons	3,778.5	3,829.8	3,303.4	3,644.6	5,109.4
Cheese Import, tons	190.6	158.6	180.2	253.5	492.7
Cheese Export, tons	0.1	41.1	96.2	1,002.6	1,005.7
PPI Dairy Products (previous year=100)%	94.3	105.0	100.3	97.4	106.4

Source: NSS, "Socio-Economic Situation of the Republic of Armenia in 2004".

Milk production in 2004 was 23% more as compared with that of 2000. This is related to the rehabilitation and operation of several large dairy processors who increased their levels of milk collection. The import of milk is increasing but at a decreasing rate. However, butter imports increased by 40% in 2004 as compared with 2003. Cheese imports comprised around 493 tons. A very promising fact is the restoration of cheese export. Starting from 2001, cheese exports increased by 24.5 times. Around 17% percent increase of cheese prices, connected to the increase of cheese export volumes, was conducive to significant increase in prices of dairy products (CBA Annual report, 2004).

Both processors and dairy farmers have many problems. Processors face the situation where they have to collect the milk directly from small household farms. This results in unstable quality and quantity of milk purchased. These small farms can't meet the necessary sanitary and hygiene conditions for milk production and are not able to introduce new technologies and methods of selection. On the other hand, small dairy farms face selling problem or milk marketing. This presents the biggest problem due to three important characteristics 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 be stored only a few days). The second differentiating property is the flow nature of milk. While most agricultural products are being harvested once a year and may be stored for later sales, milk is normally harvested twice a day. Finally, supply and demand of milk is counter-cyclical over the year. These facts put an Armenian dairy farmer acting on his own at competitive disadvantage when dealing with only a few relatively large processors (Hovhannisyan et al., 2004).

The paper aims at studying and analyzing the role and importance of the producer-owned milk marketing cooperatives to the member farmers and for the overall dairy chain of Armenia.

The objective of this paper is also to identify and discuss the forms of vertical integration occurring in the dairy sector of Armenia.

3. Research Methodology

The research was based on survey data and interviews. A databank of 103 surveyed member farmers was used in the study. Official publications, internal documents, interim and final reports of the USDA Marketing Assistance Project in Armenia and the Center for Agribusiness and Rural Development, milk marketing cooperatives' financial statements and other reports were also used in the study. Ten interviews have been conducted to find out more about vertical integration in the Armenian dairy industry. The method of purposive sampling was employed for interviews, aiming at selecting people from whom the most could be learned (Lincoln and Cuba, 1985). The criteria chosen to select the interviewees were: 1) senior experts at the Ministry of Agriculture and the World Bank, 2) managers of dairy processing enterprises, 3) and cooperative managers.

4. CARD - Cooperative Development Program

The role of USDA Marketing Assistance Project, currently restructured as a Center for Agribusiness and Rural Development (CARD) Foundation, as a third – party facilitator in the development of the dairy marketing channels in Armenia has been and remains significant. Through a package of marketing, technical and financial assistance, CARD aims at increasing rural incomes, creating jobs and raising the standard of living of rural communities. In particular, CARD contributed to the development of the dairy marketing channels in Armenia by establishing producer-owned milk marketing cooperatives and milk collection centers in many villages across the country. These cooperatives are not-for-profit organizations with the objective of marketing the milk produced by their members.

A cooperative is defined by the International Cooperative Alliance as "an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly owned and democratically controlled enterprise" (ICA, 1995) according to the following principles: a) Voluntary and Open Membership, b) Democratic Member Control, c) Member Economic Participation, d) Autonomy and Independence, e) Education, Training and Information, f) Co-operation among Co-operatives, g) Concern for Community. The goal of these List of Principles is to provide a benchmark against which entities can be compared, to establish whether they are genuine cooperatives or not (Ward and Mckillop). The first documented cooperative institution was founded in 1844 in Rochdale, England. The majority of Rochdalian cooperative principles is still in existence today and form the backbone of the current list of "Cooperative Principles".

The CARD-created cooperatives are owned and run by the members – milk producers. They participate with the principle of "one member, one vote", irrespective of the level of their investment and ownership shares. The cooperatives closely work with CARD clients – dairy processors by supplying improved quality milk and are able to work with other processors as well. Following the activities and examples of CARD, many international and national organizations and large dairy processors assisted farmer groups to establish cooperatives aimed at improving management practices in the dairy farms in order to improve the quality and quantity of milk supplied. Currently there are about 20 milk marketing cooperatives throughout Armenia.

5. Vertical Integration in the Armenian Dairy Industry

Vertical integration in the sector occurs either through full ownership or through formal or informal contracts. In Armenia, farmers or cooperatives do not own a processing company, and usually their relation is based on informal contracts. Gow and Swinnen many times discussed the importance of self-enforcing - by designing contracts such that private losses from contract breach outweigh potential benefits, (Gow & Swinnen, 2001) in developing and transition economies.

Self-enforcing relationships in the Armenian dairy sector, Hakobyan (2004) documents as follows: farmer – processor, farmer – cooperative, and cooperative – processors relationships. The most common is the farmer – processor relationship. Hakobyan (2004) alludes to the uniqueness of this type of integration that processors have milk collection and cooling capacities and are able to pay fast cash to farmers. Very often processors offer some contract support measures to farmers, in order to guarantee the stable milk supply and higher quality of milk. The contract innovation measures (Gow & Swinnen, 2001) frequently take the form of prompt payments, covering the transportation costs, and veterinary services. According to White and Gorton (2004), contracting is relatively developed in the Armenian dairy sector. They conclude that in Armenia the relatively high level of contracting cannot be linked directly to FDI as all of the dairies in the country are owned by domestic investors but it can be linked to the growing export volumes of dairy products (White & Gorton, 2004).

Several processors are integrated with farmers through Credit Clubs. The initiator of the Credit Club program in Armenia was also USDA MAP. The concept of US Credit Unions was used as a keystone for launching the Credit Club program. Currently the Program is also administered by CARD. This type of integration looks like the model of "Triangular Structures" of the Vertical Coordination.
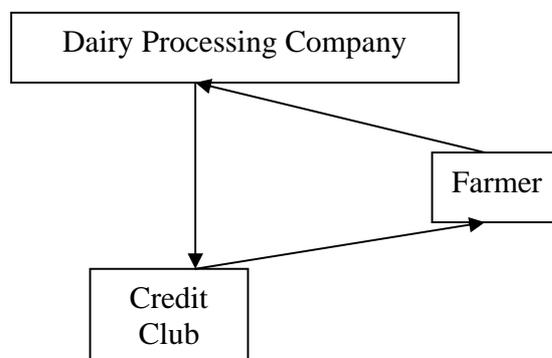

Figure 1: Triangular Structure of Vertical Coordination.

Normally, a credit club is organized together with processor who also receives financial assistance from CARD. The repayment of the loan then is administered together by the club members and processors. The processor provides loan guarantees for loans to farmer-suppliers. The loan is aimed at purchasing feed, cows, and making other milk production investments. In some cases the processor makes the loan payments on behalf of farmers.

Farmer- farmer-coop relationships are practically new for Armenia. Likewise processors, co-operatives also possess cooling tanks and storage facilities, which enable them to continuously procure milk from farmers. The reason for self-enforcement in this case is that if one farmer supplies low quality milk, the entire cooperative will suffer – as the milk will not be accepted by

the processor, or the cooperative might receive a penalty for low quality (Hakobyan, 2004). Therefore coop members constantly improve the quality of milk, and meet the requirements set by the processors.

There is evidence that in the cooperative-processor form of relationship, a mutual trust is apparent between chairman of the cooperative and the manager/owner of the processing company. Trust is referred as one of the common contract or relationship enforcement mechanisms by many authors (Gulati, 1995, Dyer & Singh, 1998). Hakobyan (2004) reports that many problems between cooperatives and processors related to the minimum quality requirements, prompt payments, etc. are being solved due to the increase in trust between the processor and cooperatives' chairmen.

6. Performance of CARD Supported Cooperatives

In their earlier study Hovhannisyan et al. (2004) mentioned that around 95% of the member farmers surveyed reported that a major benefit of a marketing cooperative is to achieve an assured market for their milk. Their interviews with cooperative managers revealed that milk processors (buyers of milk) are more willing to deal with cooperatives when procuring raw milk because: first of all it's not feasible for the processors to collect milk from each individual because of high collecting costs, then, cooperatives provide stable high quality milk because cooling tanks allow a longer storage of milk and cooperatives test the milk quality on a daily basis, and finally, cooperatives are more stable quantity suppliers. In this sense, Armenian dairy processors, as any other producers, want to assure year round stable supply of milk, to keep their production going.

Their surveys showed that the number of cows of member farmers has increased over time. Massive increase in the number of cows has been recorded in Ledjan and Elita Cooperatives. The number of cows in the aforementioned coops has increased 9 and 10 times respectively, while the other coops showed 4 times growth of this indicator (Hovhannisyan et al. 2004). In their study, the authors also mentioned that on average, the number of members in the observed cooperatives has increased by 5 times. Particularly, in Ledjan and Elita cooperatives the number of members has increased 16 and 10 times respectively, while in the rest of the surveyed coops this measure increased 6 times.

Currently, 12 CARD-supported milk producer-owned cooperatives operate in 6 provinces of Armenia collecting milk from 39 rural communities. These cooperatives involve more than 1,600 members.

The figure below shows the milk collection and payments to member farmers by CARD-supported marketing cooperatives. It was planned to collect around 3,860 tons of milk in 2005 and the experts are sure that the target was more than achieved. The cooperatives received 69% more revenues in 2004 as compared with 2003. Likewise, member farmers received 72% more in 2004 than in 2003. During the first half of the year 2005, cooperatives received 33% more as compared with the first half of 2004. Member farmers received 30% more during that period (CARD, CDP Report 2005). During 10 months of 2005, member farmers received about $705,000 for their milk sold ($1 = 450AMD). In 2003, the average price for a liter of milk comprised 87 AMD, in 2004 and 2005 it was on average 102 AMD per liter.

Cooperatives pay their entire income to farmers, after taking out operating expenses. Operating expenses are paid through a price margin, i.e. the difference between the price of milk and the price received by farmers. The magnitude of price margin depends on the operating

expenses of the cooperative, and normally covers utilities, lease and loan payments, salary to milk collection center staff, etc (Hakobyan, 2004).

Figure 2. Milk Collection and Payments to Members by Cooperatives (2001-2005).
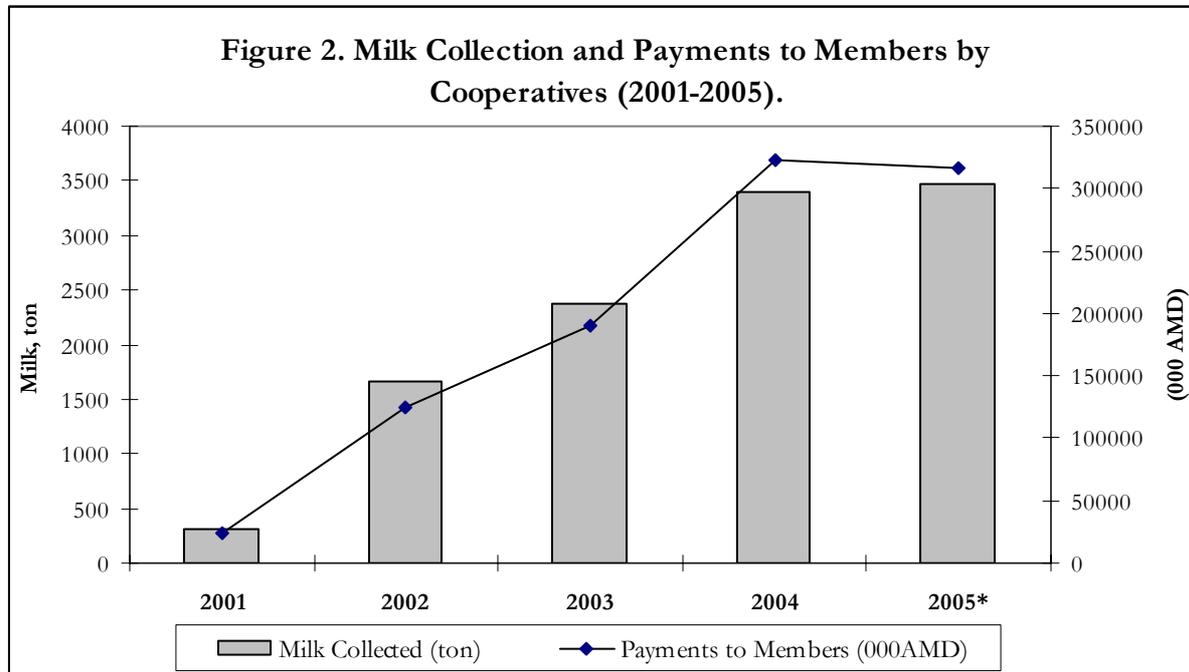
Source: Financial Statement of Cooperatives (2001-2005) and CARD Cooperative Development Program Reports.
*Milk collection and payments in 10 months only.

We can certainly state that the impact of the cooperative movement in increasing the cash incomes of member farmers remains significant.

Hovhannisyan et al. (2004) showed that 88% of farmers used cooperatives to market their milk, while 7 % sell it in the retail market and only 5 % sell directly to processors. What is interesting is that the vast majority of surveyed member farmers expressed intention to stay with cooperatives. Thirty percent of respondents would be willing to hand their milk to also those offering higher price, while the remaining 70% value loyalty, trust and stability most. In general, this situation continues to be the same almost in all cooperatives.

The role of cooperatives in the dairy supply chain continues to increase. "Ashtarak-Kat" CJSC, the biggest dairy processor, alongside with its 11 milk collection centers, is working with 5 milk marketing cooperatives. The company is collecting milk from a total of 5,000 farmers and pays them regularly on every 15th day. Not all processors are able to provide prompt payments to milk producers.

7. Dairy Supply Chain Analysis

The supply chain describes the full range of activities, which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to the final consumer, and final disposal after use (Kaplinsky and Morris, 2001) cited by Arndt et al. (2005).

It's important to distinguish the supply chain actors and supporters, who can influence on the efficiency of delivery.
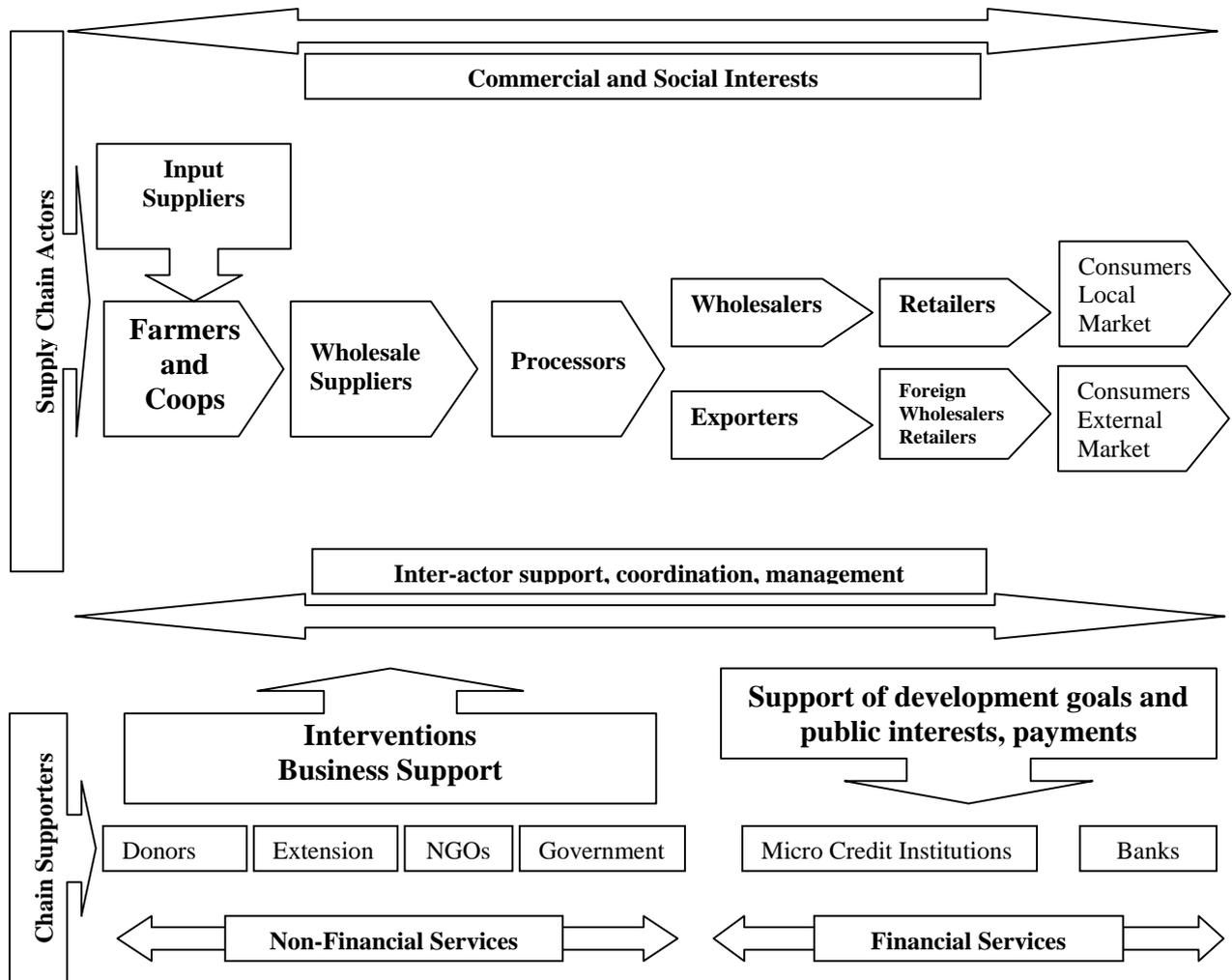

Figure 3: View of Supply and Value Chain.

It's very important to make distinctions between non-financial and financial services because provisions of these services require different types of relationships between actors and supporters, for instance collateral for obtaining a loan. Thus, an actor in supply chain, having certain financial resources, would be able to buy non-financial services without facing any problems, but would not be able to obtain credit because of lack of collateral (Arndt, Cormier and Ryzanov 2005).

Value chains represent the value of each produce as it passes along the supply chain to the final consumer. Analyzing the supply and value chains can reveal important obstacles and inefficiencies in an agricultural economy, particularly in an economy in transition, as the structures and links in the supply chain are continuing to be developed to replace the Soviet production and distribution system. After the collapse of the Soviet Union, the agricultural supply chain is being created on an ad hoc basis, largely by entrepreneurs that have enough capital to

finance the purchasing, processing, and transport of agricultural products. The value chain analysis for agricultural commodities reveals that these middlemen are currently capturing much of the value in these transactions (World Bank, 2005).

All supply chain actors and chain supporters (See Figure 3) are present in the Armenian dairy sector. However, most of the time, the processor also acts as a wholesale supplier and a transporter for itself and an exporter of its products. There are not professional logistic firms and exporters in the Armenian dairy industry. Many cooperatives also act as suppliers too. Having milk tank and truck they supply milk to processors on daily basis. There is a need for improvements in financial services too. The vast majority of Armenian banks refrain from financing agriculture due to the high risk of the sector. The only bank that has a serious share in agricultural lending is ACBA Bank (Agricultural Cooperative Bank of Armenia), which claimed to have more than 65 percent of the total commercial bank portfolio in agriculture (ACBA 2004).

The dairy value chain analysis indicates that return on costs for producers are in the range of 50-90%, making milk production a relatively attractive addition to the household income. Calculations are based on average prices for milk and cheese (See Appendix). In general, winter prices are approximately 25% higher than the summer rates due to a scarcity of milk.

The dairy enterprises have secured their supplies through refrigerated milk tanks, working closely with cooperatives. This enables them to reduce their milk purchase cost and to benefit from economies of scale in production. Their increased costs are attributable to the fact that they package their produce and also that they pasteurize the milk before processing into cheese. Their return on costs is in the range of 25-65%, which provides them with a profitable business and enables them to undertake the investments in equipment that are necessary for them to maintain their market leader status (World Bank, 2005).

A major dairy product being exported from Armenia is cheese, mainly from Lori, Tavush, Shirak, and Syunik regions. In addition to formal exports, a large amount of artisan cheeses goes to Georgia, passing through unofficial trading channels. Armenian cheeses are exported to locations where Armenian Diaspora has a notable presence: predominantly to Moscow and Los-Angeles areas. The major portion of exported cheeses constitutes traditional white salty cheeses. Industry experts claim that these cheeses have high exporting potential and progressively gain consumers of Armenian and non-Armenian decent in the potential markets (Hakobyan, 2004).

The increase of domestic demand for dairy products is largely linked to disposable incomes of the domestic population. As incomes increase, it is likely that demand in this sector will further increase as a whole and also that market differentiation will occur based on quality and price. However, any major expansion of the sector is going to rely on exports, for which there is a clear current demand. For instance, the total demand for cheese in Russia is estimated at 450,000 MT per year and production has only managed to reach 50% of this level, leaving a huge market for imports (World Bank, 2005).

Armenia has favorable conditions to compete in the Russian market, if it can supply high and stable quality and quantity of cheeses to high degree specialty markets. Milk yields in Armenia are relatively higher as compared with the neighbors (Figure 4). In addition, the reason of the main increase in milk production seems to be because of improving yields.

Figure 4. Regional milk yields per cow, 1992-2004.
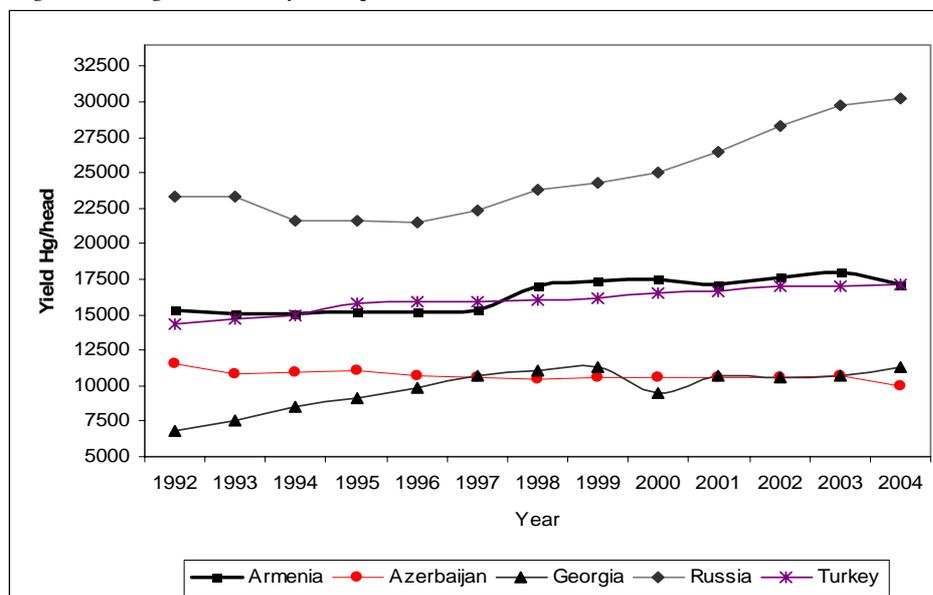
Source: FAOSTAT. Taken from World Bank, 2005.

8. Conclusions and Recommendations

In this paper, we have argued that the role of producer-owned cooperatives in the dairy supply chain continues to increase. In that process, the Center for Agribusiness and Rural Development, which continues providing technical and financing assistance to these cooperatives, has its valuable contribution. CARD uses integrated approach to assistance covering milk quality, cooperative development, dairy management, rural credit, and training in cooperative management and accounting that builds private enforcement capital between farmers and cooperatives and between cooperatives and dairy processors.

These cooperatives provide several benefits, among which the increased opportunity of milk sales is valued most by member farmers. We must again indicate that the impact of the cooperative development in increasing the cash incomes of farmers remains substantial. Following the activities and examples of CARD, many international and national organizations and large dairy processors assisted farmer groups to establish cooperatives aimed at improving management practices in the dairy farms in order to improve the quality and quantity of milk supplied.

However, there are certain inefficiencies in the Armenian dairy sector. First, lack of working capital and collateral negatively affects the ability of both dairy processors and milk producer-farmers to raise finances. The vast majority of Armenian banks refrain from financing agriculture due to the high risk associated with the sector. Banks require up to 200% of collateral level and require residential property in urban areas for collateral. Even farmers willing to pay higher interest rates may not have enough assets to collateralize the amount of loan they need. A very few milk producers are able to fund the acquisition or feeding of larger dairy herds. Small processors also lack sufficient collateral to be able to raise short-term finance, as their processing equipment is rather basic and relatively low value. In Armenia, the role of the Government in contributing to the development of the agriculture credit markets is relatively low. The

Government should create an appropriate climate for the formation of specialized agricultural credit institutions, which are widespread in Western Europe (Urutyan and Aleksandryan, 2005).

Another problem is the insufficient amount of milk cooling facilities or cold storage collection points and that it is very difficult for both processors and producers to get their milk to the dairy plants. This problem was solved to some extent in the observed producer-owned cooperatives. CARD provided them with milk cooling tanks and other needed equipments.

Cheese grades and standards are missing or lack harmonization. Grades and standards can consist of quality requirements, specifications, terms, definitions, certifications, classifications, and labeling and can be of either performance or process characteristics (Cocks et al. 2003). Technical standards and certifications in Armenia are at a very low level. Especially at the retail level, many cheeses and other dairy products are being sold without the correct quality certificates. This not only poses a threat to consumer health and safety, but it also acts as a block to further trade. While there are standard "types" of cheese in Armenia (e.g. Lori, Chanakh etc), there is a wide variation in the methods of production and the resulting tastes for cheeses of the same type. One dairy processor said during our interview, "Right now I have 40 tons of Lori cheese seating in the storage, and each cheese block I cut has different taste: how I can satisfy the customer, who requires stable and consistent quality". This lack of uniform quality, combined with the fractured nature of the production base, makes it very difficult for distributors to collect cheese into commercial quantities for domestic or export sales (World Bank, 2005).

Another important aspect is the lack of specialist knowledge for smaller processors and producers. Business training and consulting services need to be established on a regular basis. The smaller processors need to improve their marketing, financial, management and other business skills to be able to compete in the market and expand their activities and market share. Hovhannisyan et al. (2004) documented that the majority of the cooperative managers surveyed stated the importance of seminars and educational tools to the success of their organizations. The majority of managers noted that they had participated in the "Cooperative Management", "Financial Management in Cooperatives" and "Milk Quality Improvement" seminars carried out by the agrarian university professors and extension specialists. They mentioned that education and employee training programs of cooperatives were very important.
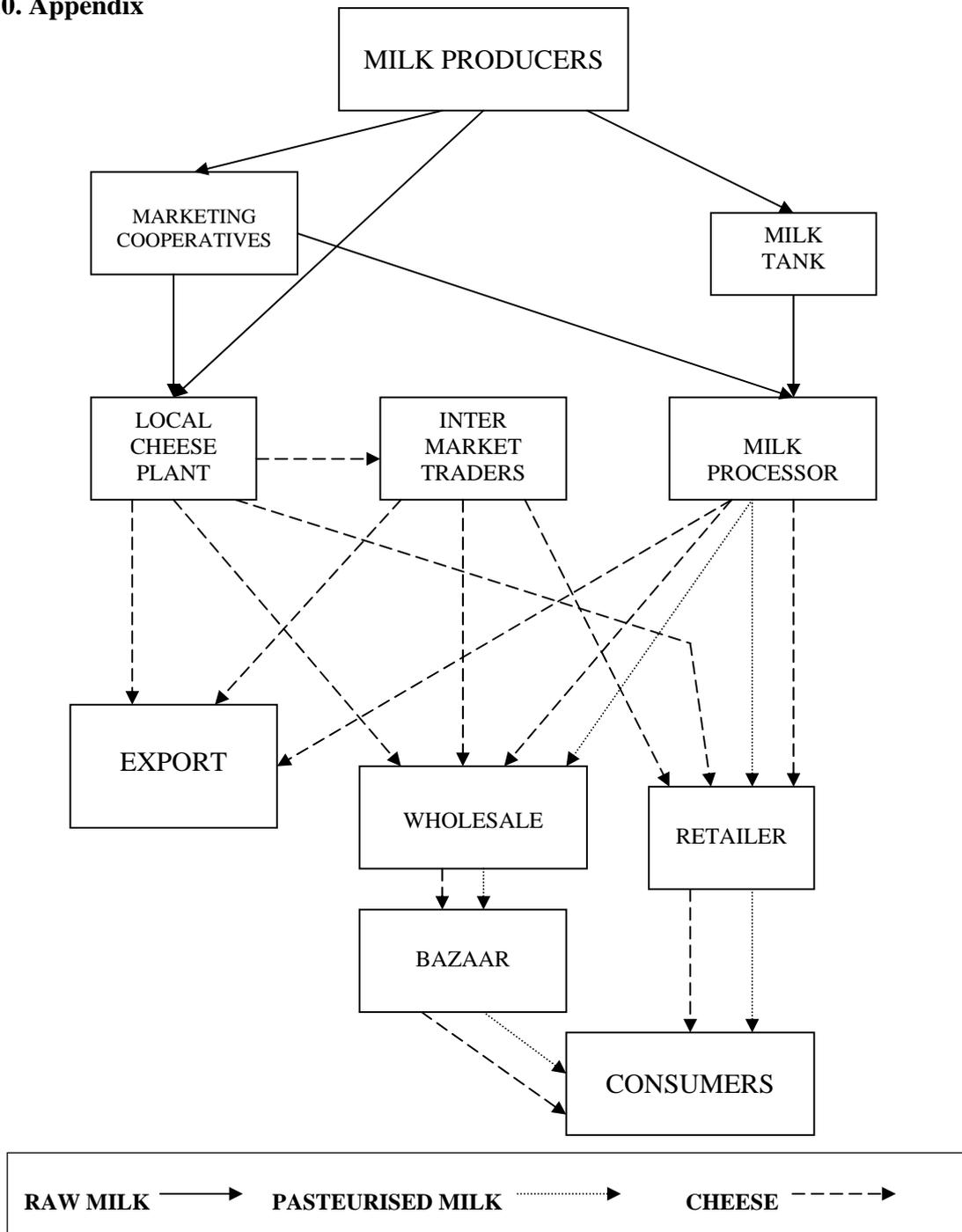
This paper is aimed at advocating to continue cooperative development and extend it over other aspects of the agricultural sphere enabling farmers to further integrate themselves in the agrifood chains and networks and improve their incomes.

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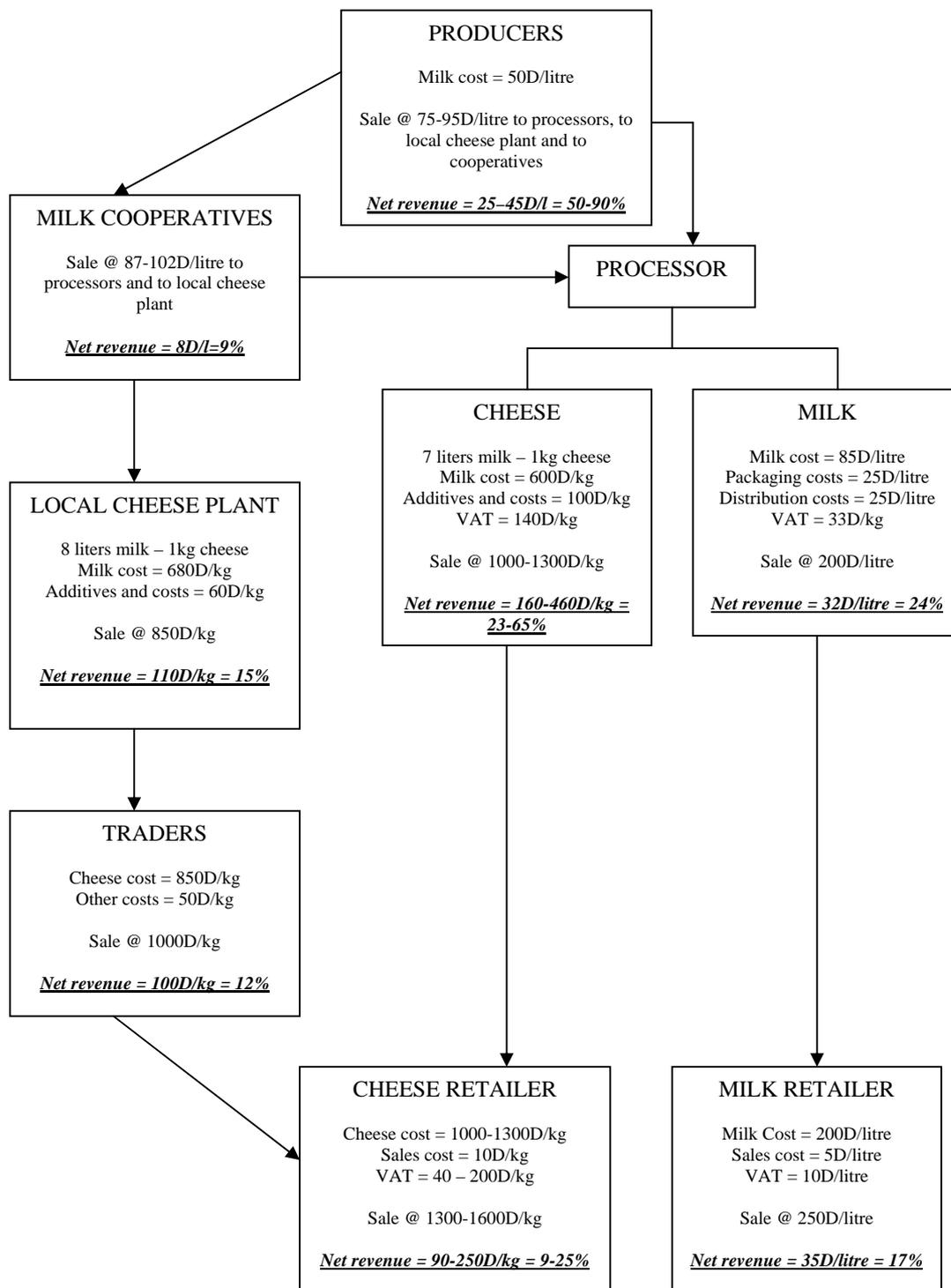
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10. Appendix

Figure 5. Dairy Supply Chain.

PRODUCERS

Milk cost = 50D/litre

Sale @ 75-95D/litre to processors, to
local cheese plant and to
cooperatives

Net revenue = 25–45D/l = 50-90%

MILK COOPERATIVES

Sale @ 87-102D/litre to
processors and to local cheese
plant

Net revenue = 8D/l=9%

PROCESSOR

LOCAL CHEESE PLANT

8 liters milk – 1kg cheese
Milk cost = 680D/kg
Additives and costs = 60D/kg

Sale @ 850D/kg

Net revenue = 110D/kg = 15%

CHEESE

7 liters milk – 1kg cheese
Milk cost = 600D/kg
Additives and costs = 100D/kg
VAT = 140D/kg

Sale @ 1000-1300D/kg

*Net revenue = 160-460D/kg =
23-65%*

MILK

Milk cost = 85D/litre
Packaging costs = 25D/litre
Distribution costs = 25D/litre
VAT = 33D/kg

Sale @ 200D/litre

Net revenue = 32D/litre = 24%

TRADERS

Cheese cost = 850D/kg
Other costs = 50D/kg

Sale @ 1000D/kg

Net revenue = 100D/kg = 12%

CHEESE RETAILER

Cheese cost = 1000-1300D/kg
Sales cost = 10D/kg
VAT = 40 – 200D/kg

Sale @ 1300-1600D/kg

Net revenue = 90-250D/kg = 9-25%

MILK RETAILER

Milk Cost = 200D/litre
Sales cost = 5D/litre
VAT = 10D/litre

Sale @ 250D/litre

Net revenue = 35D/litre = 17%

Source: Armenia's Rural Economy – From Transition to Development, World Bank 2005, adopted with changes.

Figure 6. Dairy Value Chain.