Farmers' Choices Among Alternative Dairy Marketing Channels in Armenia: Can Appropriately Designed ODA Substitute for FDI?

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Abstract

The Armenian dairy sector has until recently remained in a sub optimal equilibrium characterized by low quality milk, delayed payments, deep financial distress and a general lack of investment. The decision of the USDA MAP to expand their agribusiness programs into the dairy sector in 1999 however initiated a rapid revitalization and expansion of the sector. The USDA MAP used various organizational models at both the processor and farmer level to facilitate this revitalization. Given the lack of FDI and successful ODA initiated restructuring, the USDA MAP project provides an instrumental case study for analyzing where an ODA-induced public solution rather than a FDI-induced private solution has been used to link farmers to markets and solve the related contracting, investment, and enforcement problems. The paper analyzes the impact of third-party facilitated marketing channels on economic and social outcomes of small, financially distressed farmers and examines the factors affecting farmers' choices among alternative marketing channels.

Key words: Dairy, markets, Armenia, small farmers-associations

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Introduction

With the rapid development of procurement channels in Central and Eastern Europe (CEE), many small-scale limited-resource agricultural producers risk becoming excluded (Dries and Swinnen, 2004; Dries *et al*, 2004; Dries and Reardon, 2005; Reardon, 2005). Consequently, Overseas Development Assistance (ODA) agencies are reevaluating their programs to identify mechanisms that can successfully assist these producers gain or maintain market access in this new business environment. The challenge is creating economically sustainable business relationships between small-scale, financially-distressed, limited-resource producers and the procurement systems that can provide the necessary access to markets, technological know-how, knowledge, and financial capital (Cocks and Gow, 2003 a&b).

Recent CEE experiences indicate that Foreign Direct Investment (FDI) can provide a critical catalyst in the successful establishment of private solutions for assisting small farmers to access international marketing channels (Gow & Swinnen, 1998; 2001; Dries and Swinnen, 2004; Dries et al, 2004; Dries and Reardon, 2005). By entering markets with sufficient capital to ensure contract enforcement and investment support, multinational firms can overcome the pervasive hold-up and under-investment problems that previously plagued the sector, thereby stimulating investment, quality, and growth in agricultural production (Gow & Swinnen, 1998; Walkenhorst, 2000; Gow & Swinnen, 2001; Dries & Swinnen, 2004). However, FDI may not be an option for many CEE countries; therefore, can alternative third-party facilitation mechanisms be identified for facilitating market access?

Glover and Kusterer (1990), Porter and Philips-Howard (1997), Coulter *et al.* (1999), Eaton and Shepherd (2001), and Simmons (2001) discuss the benefits of public agencies in facilitating private processor-farmer relationships. However, up to now, the literature has not identified nor explained the critical processes and factors required in the design, implementation and impact of alternative business models that can sustainably facilitate small producers' long-run access to markets without FDI.

In this research we conduct an exploratory examination of the critical processes and factors involved in the establishment of publicly-facilitated marketing relationships between small agricultural producers and processors in the presence of financial distress and absence of effective enforcement mechanisms. We analyze the impact of third-party facilitated marketing channels on farmers' economic and social outcomes and discuss the factors affecting farmers' choices among alternative marketing channels.

The USDA Marketing Assistance Project (USDA MAP) in the Armenian dairy industry provides an instrumental case study for examining this phenomenon. Until recently the Armenian dairy sector had not experienced the economic recovery observed elsewhere in CEE, due to the lack of FDI-initiated solutions employed elsewhere (World Bank, 1995 a&b). Without the presence of FDI-induced private solutions that create self-enforcing relationships, encourage relationship specific investment, and drive diffusion of innovation (Gow et al, 2000), the Armenian dairy sector remained in a sub-optimal equilibrium characterized by low quality milk, delayed payments, deep financial distress and limited investment.[2]

The USDA MAP 1999 decision to expand into the dairy sector initiated a rapid revitalization and expansion of the sector. Various organizational models were used to facilitate this revitalization. Thus the USDA MAP project provides an instrumental case for analyzing the use of ODA-induced public solutions rather than FDI-induced private solution to link farmers to markets and solve the related contracting, investment, and enforcement problems noted in the literature (Gow & Swinnen, 1998; Gow *et al*, 2000; Gow & Swinnen, 2001; Dries & Swinnen, 2002a; 2002b; Cocks & Gow, 2003a; 2003b).

The rest of the paper is structured as follows: next two sections provide the review of the literature on linkages and the overview of the Armenian dairy sector and dynamics that lead to the USDA MAP initiative. The forth section describes USDA MAP and the dairy sector programs used to support the modernization of dairy processors and later establishment of farmers associations. We then complete an exploratory empirical analysis to measure the impact and responses of farmers to the alternative programs. Finally, we discuss the limitations and issues for further research.

FDI & Small Farmer Market Access

Recent research indicates that entry of FDI and their aligned procurement channel partners can rapidly correct many market failures and provide farmers' access to appropriate contracting, technology transfer, and credit facilitation structures, resulting in rapid farm investment, technology adoption and output growth as farmers have quickly responded to the new incentives offered (Gow and Swinnen, 1998; Gow *et al*, 2000). However, to respond, farmers must make substantial on and off farm investments in technology, quality assurance, processing, and food

2 This is very similar to what has been observed across CEE during the 1990's (Gow and Swinnen, 1998).

safety systems to meet the more stringent requirements that these buyers demand (Reardon, 2005). This is no problem for large well financed producers; however, it severely limits market access options for small limited resource farmers.

Recent work presents a mixed picture. Although small farmers participation in some countries and sectors has been substantial, such as dairy in Poland (Dries and Swinnen, 2004), sugar in Slovakia (Gow and Swinnen, 1998) and malting barley across Central Europe (Cocks and Gow, 2003a), participation has been substantially lower in others, such as Russia (Dries and Reardon, 2005). The results indicate that when downstream firms can ensure enforceability via products characteristics, economic market relationships, or other mechanism, then they have the appropriate incentives to correct market failures and provide small farmers with the necessary inputs (seeds, fertilizer, chemicals, credit, technology, production and marketing know-how) resulting in rapid investment, production, quality and quantity responses (Gow and Swinnen, 1998, 2001; Dries and Swinnen, 2004). However, our concern does not center on the sectors, markets and products where large international processors have the appropriate private incentives to catalyze and facilitate market access for small limited-resource farmers, but instead where there is no suitable catalyst to correct market incentives and impose competitive pressures.

The Armenian Dairy Industry

The Overview

The dairy industry is Armenia's largest agricultural sector with 55 percent of Armenia's 335,000 farmers owning 262,000 dairy cows. Most herds are dual purpose and owned by small family farms with about 66 percent of farms owning five cows or less. Milk is traditionally used for household purposes with surplus sold to a dairy processor, private trader, or in the local market.

Armenian milk production is substantially compromised by low genetic potential, poor pastures and pasture management systems, inadequate housing, limited low nutritional winter feed, poor herd health, and a general lack of animal husbandry and management skills (World Bank, 1995a). The average annual milk yield is 1,700 lt/cow/year, compared to 2,400 lt/cow/year during the Soviet era, approximately 3500 lt/cow/year in Central and Eastern Europe, and approximately 7,500 lt/cow/year in the USA. Finally, many farmers only began dairy farming after the fall of the Soviet Union, thus lack knowledge of modern farm management practices.

The processing sector is characterized by a few large dairy processors located around Yerevan and numerous smaller processors in the rural areas. The larger

facilities are redeveloped and upgraded ex-Soviet factories. The smaller facilities have generally been established by independent entrepreneurs, often in their backyard. Overall, the quality of Armenian dairy products is low, although an increasing number of processors, both large and small, are producing export quality products.

Various procurement channels are used to purchase surplus raw milk. The most common is direct purchase either by the processor collecting the raw milk from the farmer, an independent third party working between the processor and farmer, or the farmer delivering the milk directly to the processing facility. Recently a number of marketing associations with milk cooling tanks have been established that collectively sell their members' milk to processors. One large Yerevan processor has established a series of privately owned collection centers across the country.

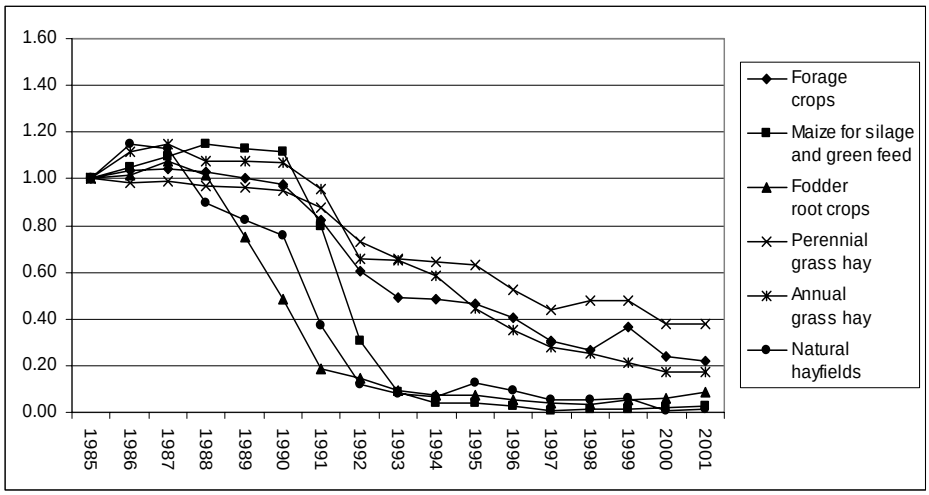
Historical Development of the Dairy Industry

During the Soviet era the Armenian government encouraged domestic livestock sector growth through various investment and operational subsidies along with inflated market prices. These programs fostered the overuse of high cost imported feeds, the development of capital and labor intensive operations, the waste of equipment, energy and other inputs, and the concentration of large numbers of animals (World Bank, 1995b).

Independence from the Soviet Union, market liberalization, and imposition of economic blockades placed the Armenian livestock industry under extreme economic pressure: producers' feed and input costs increased substantially; by 1994 they were 50 percent higher than farm gate output prices. Forage production dropped dramatically as farmers shifted production from perennial forage crops to storable annual crops in response to food security concerns (Figure 1). And decreased consumer purchasing power depressed consumer demand and lowered output prices (World Bank, 1995b). The result was the failure of Armenia's traditional large-scale dairy operations that were no longer economically viable (World Bank, 1995b).

In response, the government implemented a livestock privatization program overseen by village councils to distribute five cattle and 20 sheep per to the thousands of newly independent farmers (Sardaryan, 2001b). Prices were very low and largely symbolic and when coupled with inadequate livestock housing, poor and costly feed, severe financial distress and substantial payment delays, farmers had high incentive to sell their cattle for an immediate cash windfall (World Bank, 1995b). As a result the livestock sector contracted dramatically in the late eighties and early nineties (Figure 2; Figure 3). The worst-affected industries were pigs and poultry where numbers declined 75 percent; however cattle numbers declined

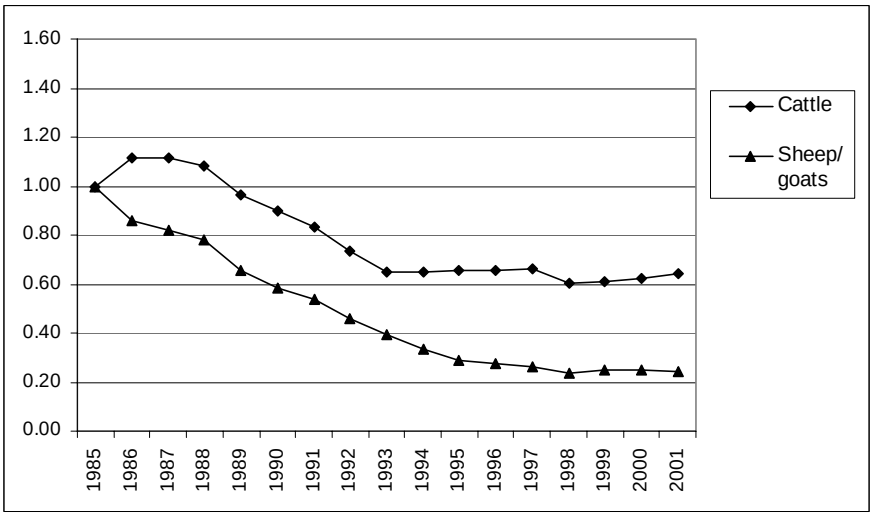
Figure 1: Change in forage production 1985 – 2001



Source: Ministry of Statistics of Republic of Armenia

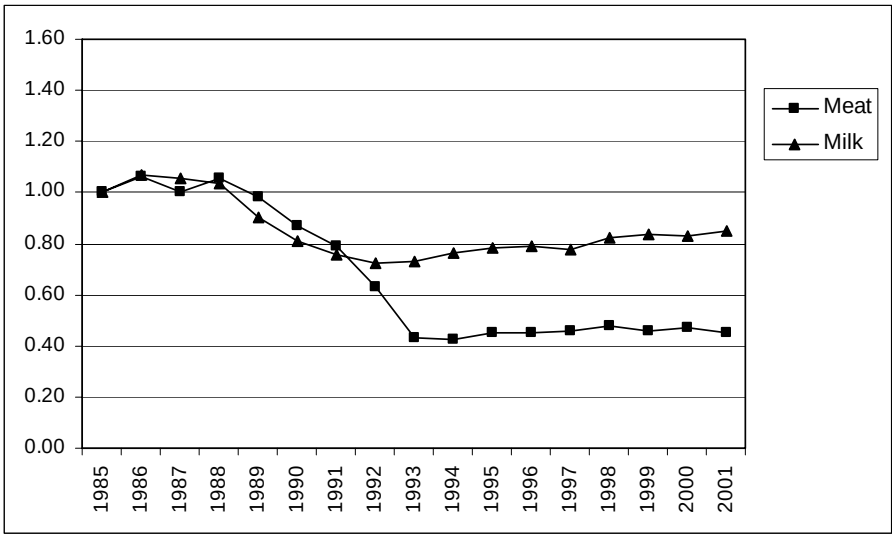
by almost 50 percent too (Figure 2). By 1994, with few exceptions, most of the large-scale intensive dairy operations had been either shut down or drastically down-scaled (World Bank, 1995a).

Figure 2: Change in grazing livestock numbers 1985 – 2001



Source: Ministry of Statistics of Republic of Armenia

Figure 3: Change in milk and meat production 1985 – 2001



Source: Ministry of Statistics of Republic of Armenia

Farmers were not alone: the dairy processors faced similar procurement and marketing problems resulting from a combination of independence, economic blockades, land privatization, decreasing cow numbers, reduced consumer purchasing power, limited working capital, and other related events. These problems forced processors to either close or severely reduce output resulting in a dramatic drop in capacity utilization.

By 1994 cattle numbers began stabilizing as farm households retained them as a protein source, an income source, and a savings instrument (Figure 2). Most rural Armenia households had sufficient cows to meet their own requirements but due to the breakdown of the marketing channels they had no ability to sell their surplus milk to processors. Consequently many dairy processors relied on imported dry milk powder to meet their procurement requirements during this period.

These transition-induced problems made recovery a difficult proposition. At the farm level, farmers were financially distressed and unprofitable and thus retreated to subsistence agriculture or barter as a result. Similarly, dairy processors faced inconsistent, poor-quality milk supplies, limited financial capital, inexperienced Soviet era management, poor sanitation, poor safety standards, high cost imported milk powder, and finally, inadequate or missing procurement relationships with farmers. The result was a dairy sector in total disarray.

Revival of the Armenian Dairy Industry[3]

Unlike many CEE countries, Armenia could not rely upon the rapid entry of multinational food companies to quickly restore an economically viable market structure (Dries and Swinnen, 2004; Dries et al, 2004; Dries and Reardon, 2005). Instead, the revival would require an alternative external shock, this came from US government ODA.

The USDA MAP

In 1992 Armenia requested USDA assistance in facilitating agricultural transition.[4] The USDA initially followed a traditional extension-driven, technology-push international development approach. However, after three years of operation it was apparent that this production focus was not meeting industry needs. So in 1996, a USDA advisory team redesigned the project from technology-push to market-pull and with that shifted the focus from farmers and production to market and business development and the economic recovery of the privatized food processing sector. The result was the USDA Marketing Assistance Project (MAP). Essentially, MAP changed the question from, "What can we produce?" to "what does the market demand and how can we profitability meet this demand?"

The USDA MAP used an integrated market driven approach to business development encompassing marketing, financial and technical assistance. This integrated approach enabled them to assist clients: identify potential market demand; develop appropriate marketing channels through marketing assistance; develop new products to meet the demand through technical assistance; and provide via various instruments the necessary finance resources to mobilize the other components. They were careful to only draw clients (entrepreneurs, farmer groups and processing firms) from agribusiness sectors identified as having the potential for economic recovery (such as cheese processing, vegetable processing, and wine production), even though they could have been harshly affected by transition.

To implement its programs, USDA MAP drew upon a permanent Armenian staff and various visiting American university faculty and industry volunteers. Since its inception, MAP has assisted over 65 different processing firms, who employ more than 2,600 full time staff and 1,100 seasonal staff and purchase raw

3 The following discussion draws upon approximately 60 in-depth interviews that the authors conducted with industry, government and academic specialists between fall 2003 and fall 2008. All interview transcripts are available from the authors on request.

4 The assistance effort from the U.S. government has been managed by the USDA with the Office of International Programs in the USDA Cooperative State Research, Education, and Extension Service (CSREES) having direct responsibility for the efforts.

materials from 18,000 farmers. At the farm level MAP has facilitated the establishment of 33 farmer marketing associations[5] in the dairy and fruit and vegetable sectors, 48 production credit clubs, and has provided substantial technical assistance to farmers.

USDA MAP involvement in the Dairy Industry

When USDA MAP was established it targeted the fruit and vegetable sector. However, in late 1997, Gagik Sardaryan, USDA MAP Economic Development Advisor, challenged management: If MAP was to benefit all rural Armenians then they need to look beyond the fruit and vegetable sector. Large populations of Northern and Southern Armenians did not grow fruit; instead they derived the majority of their household income from livestock.[6] Sardaryan proposed that attention and resources be shifted toward assistance for the dairy industry.

Table 1: Armenian dairy industry in 2000

Region	Cattle Numbers	Cow Numbers	Milk Production (T)	Milk Yield (Kg/Yr)
Gegharkunik	83,747	46,775	79,200	1,693
Shirak	71,457	36,200	62,400	1,724
Aragatsotn	55,284	30,706	55,400	1,804
Lori	58,283	32,485	55,400	1,705
Kotayk	42,445	26,153	42,400	1,621
Syunik	36,947	21,233	40,000	1,884
Tavush	36,594	19,366	34,400	1,776
Armavir	36,933	18,838	31,200	1,656
Ararat	31,644	18,151	31,100	1,713
Vayots Dzor	19,869	10,758	21,400	1,989
Yerevan	2,537	1,430	3,300	2,308
Total	**478,730**	**262,095**	**456,200**	**1,741**

Source: Agriculture in the Republic of Armenia, 1990 – 1999: Armstat

5 They are called 'associations' as apposed to 'cooperatives' in an attempt to disassociate them from the Soviet era cooperative farms and the stigma still associated with these Soviet era farms.

6 In fact more Armenians were involved in the livestock sector than any other economic activity. Livestock production provides the principle means of survival for many villagers through the sale or barter of animals and animal products for other essentials such as salt, sugar, coffee, flour, and sometimes medical care (USDA MAP, 2001). Milk processing was arguably the most important sector of the Armenian food processing sector, if for no other reason, than that it affected the lives of most people (USDA MAP, 2001).

The Dairy Processing Sector

USDA MAP recognized that the key to rural development was access to economically sustainable downstream market, hence they strategically aimed their assistance towards the processing sector knowing that farmers would benefit through backwards vertical spillovers. To be successful their developed business models had to be economically sustainable and driven by market and client needs, not the USDA. Consequently, client identification and screening was critical. They only accepted clients, if they possessed sufficient entrepreneurial and business ability to succeed, along with sufficient social capital to mobilize local producers.

They initially selected three processors in 1998. Since then processors are granted assistance based upon set criteria and provided with a flexible and customized package of financial, technical, and marketing assistance aimed at increasing production, improving product quality, and market access (Table 2). Initial assistance generally consisted of financial and technical assistance to increase production and improve product quality, and follow up marketing assistance.

Table 2: Dairy processors receiving assistance from USDA MAP as at end of 2002

Dairy Processor	Location of Processor	Date of Formation	Start of Assistance	Milk Purchased	Exports (Sales Value)
Agroholding	Shirak	2002	2002	58 t	-
Andranik Papikyan	Aragatsotn	2000	2001	300 t	-
Armavir Kat	Armavir	1996	2002	700 t	-
Ashtarak Kat	Yerevan	1996	2002	621 t[1]	-
Ashotsk Cheese Plant	Shirak	1996	1998	800 t	3 %
Boti Cooperative	Aragatsotn	1994	2001	615 t	7 %
Chanakh	Kotayk	1991	2000	600 t	-
Dustyr Melanya	Lori	1996	1998	800 t	52 %
Gnel Khachatryan	Gegharkunik	1997	2000	270 t	-
G. Atoyan & Friends	Shirak	1997	1998	183 t	-
Khak	Ararat	1995	2002	250 t	-
Mastarachedo	Aragatsotn	1999	2000	303 t	-
Saraghar	Tavush	2002	2002	34 t	-
Village Group	Lori	2000	2000	1,200 t	19 %
Vordi Armen	Kotayk	2000	2000	430 t	18 %

1 Raw milk only. The company imports considerable volumes of milk powder.
Source: USDA MAP 2002 marketing audit

Financial assistance was delivered in various forms: grants for facility renovation; purchasing cheese making technology; cultures and training; working capital loans; and leases for capital assets, pasteurizers, milk cooling tanks, and other capital equipment. Although grants misaligned incentives compared to leases or loans, they were seen as a necessary evil to ensure sustainable platforms for later economic growth.

Technical assistance was directed towards improving both raw milk procurement and final product quality. At the farm level technical assistance helped processors and their farmer suppliers with milk procurement and increasing raw milk quality. At the processing level, assistance supported sanitation, cheese making, design of processing facilities, membership in the Larry Cheese Union, and educational trips for managers to Poland and the U.S.

Marketing assistance focused on providing dairy processors with promotional assistance, trade show support, market linkages, export assistance and new product development. USDA MAP often assists clients' first export shipments, but then left them alone to manage their markets for themselves. New clients often request and were granted new product development assistance. This assistance helped increase the range of products offered and offset import competition of European style cheeses.

Assistance to dairy processors, the number of dairy processor clients, and each individual processor grew substantially (Table 3). The number of processors assisted increased 88 percent. The number of employees per processor increased 175 percent and the number of farmer suppliers per processor increased 160 percent. Additionally 33 percent of processors were producing and exporting export-quality cheeses. While this was significant progress, in general the industry was still struggling to produce a consistently high-quality product.

Milk Procurement and Farmers Associations

While dairy processors were achieving success marketing their cheeses, domestically and internationally, they were hampered by a lack of consistent quantity and quality of raw milk supplies from farmers. Processors did not have sufficient reputation and trust with farmers or adequate pricing incentives to induce farmers to both improve the reliability of the quantity and raise the quality of the milk they delivered. Similarly, at the farm level, given that farmers were financially-distressed and resource-constrained they lacked suitable incentives to improve quality or reliability of deliveries.[7]

7 Similar problems are pervasive across the CEE countries (Gow and Swinnen, 1998; Dries and Swinnen, 2004).

Table 3: Farmer numbers and development of milk marketing associations 2000 – 2003

Association (# of Villages)	Region	2000	2001	2002	2003
Lejan (3)	Lori	161	411	430	496
Elita (5)	Lori	-	60	250	300
Tolors (1)	Syunik	-	67	56	54
Vahan (1)	Gegharkunik	-	45	72	110
Lendrush (1)	Shirak	-	27	0	0
Puskino (1)	Lori	-	34	56	67
Rosa (1)	Gegharkunik	-	32	31	32
Akhalatian (3)	Syunik	-	-	48	60
Khosrov Kat (1)	Ararat	-	-	-	33
Emulik (1)	Tavush	-	-	-	32
Aran-Vard (1)	Aragatsotn	-	-	-	33
Spitak (1)	Lori	-	-	-	31
Aygut (1)	Gegharkunik	-	-	-	34
Agarak (1)	Lori	-	-	-	33
Sverdlov (1)	Lori	-	-	-	32
Van (1)	Ararat	-	-	-	32
Total farmers		**161**	**676**	**943**	**1,379**

Source: USDA MAP 2000 marketing audit, USDA MAP 2001 marketing audit, USDA MAP 2002 marketing audit

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 them to combine their milk for marketing to processors. Once the team determined the legal requirements for registering cooperative organizations, they began talking with village leaders in several villages about the prospect of forming marketing associations in their respective villages.

Farmers Associations and Collection Centers

The first association was developed in Lejan village in the Lori region, the traditional milk producing region in Armenia. The Lejan village was chosen for a number of reasons: firstly, the villagers had been selling milk to a local processor and were not being paid, thus they needed an alternative marketing arrangement; secondly, it was a poor isolated village in need of assistance; thirdly, there were good farmers in the village; and finally, there was a knowledgeable and honest

leader in the village who both had the trust and respect of the villagers and had the business acumen to successfully drive the initiative forward.

In hindsight, USDA MAP stated that identification of a suitable business leader within the community was critical to ensuring the establishment of a sustainable association. The leader must both have the trust of the community and be a competent entrepreneurial businessman; if they possess only one of these attributes then the potential long-term success of the association is compromised (Cocks and Gow, 2003b).

The central concept behind the formation of the associations was that they had to be driven by the villagers themselves and not dictated by a centralized governmental or aid agency plan. Farmers needed to come together on the basis of common economic interests (Sarukhanyan, *et al* 2002). Once a potential leader was identified in Lejan village, USDA MAP initiated village meetings to discuss association formation, operation, responsibilities and benefits. They also discussed leadership, transparency, and building trust. Following these meetings, village members voted for an association with 21 farmers joining late in 1999.

Once established, a board of directors was elected who registered the association and negotiated a processor marketing contract. It was important that the processor marketing relationship was established independent of USDA MAP to ensure long run sustainability. Concurrently, a collection center was established. The milk cooling tank was provided on a lease-to-buy agreement, interest free loan for the first six months while the association was getting established. The milk cooling tank served two purposes; improving raw milk quality, and secondly, providing an initial capital gain for bringing villagers together to join the association. Farmers deliver milk once or twice daily, depending on the season and their household requirements, and tested immediately.

By the end of the first full year of operation the association had increased farmer numbers from the initial 21 to 161, with plans underway for developing an additional collection center in a neighboring village. One hundred tons of milk had been sold in 2000 which brought an additional 7,500,000 drams or $13,600 into the village. The success of the Lejan association was sufficient motivation and evidence for USDA MAP to expand the cooperative development program in 2001.

Following the Lejan marketing association's success, USDA MAP embarked on a rapid program expansion in 2001. The same basic establishment model used, however the Lejan success meant that USDA MAP could wait for villages to approach them about forming an association rather than approaching villages. Sometimes a USDA MAP-assisted dairy processor would encourage a village to approach USDA MAP about forming an association. As with the development of the processing sector, USDA MAP personnel believed it was important in the

development of the association that the village was the driving force and not USDA MAP. If the establishment of the association was driven by the villagers then they would attach more ownership and loyalty to the association.

There was a rapid expansion of the associations especially during 2001 and 2003 (Table 4). The majority of the associations were successful with growing member numbers, improving milk quality, and successful leasing payments. Association member numbers increased 320 percent from 2000 to 2001, 39 percent from 2001 to 2002, and 46 percent from 2002 to 2003.

Table 4: Comparison over 2001 and 2002

	2000	2001	2002	Change 2000 - 2002
Number of dairy processors assisted	8	10	15	88 %
Full time employees	99	166	492	396 %
Part time employees	7	90	186	1,655 %
Full time employees per processor[1]	12	17	33	175 %
Farmer numbers	852	3,165	4,175	390 %
Farmers per processor	107	317	278	160 %
Average price to farmers AMD/lt	n/a	88	91	-
Average farmer income US$	n/a	$225	$252	-
Quantity of milk processed (tonnes)	n/a	4,520	6,490	-
Domestic sales	n/a	n/a	$4,001,970	-
Export sales	-	n/a	$193,362	-
Export as percentage of total sales	-	n/a	5 %	-
Percentage of USDA clients exporting	-	25 %	33 %	-

1 Employees increased substantially in 2002 following the addition of Ashtarak Kat as a new USDA MAP client.

Source: USDA MAP 2000 marketing audit, USDA MAP 2001 marketing audit, USDA MAP 2002 marketing audit

While the process was largely successful, problems were evident. In the initial stages of establishing associations, farmers had difficulty understanding the

association concept as they were prejudiced by the Soviet-era style of cooperation and cooperative farms. Consequently members were unwilling to give to the association, and often dropped out if they believed they were not receiving sufficient benefits (Sarukhanyan, *et al* 2002). Association and board meetings were belittled and treated as inconsequential (Sarukhanyan, *et al* 2002). Additionally, association leaders often disregarded the board of directors (Sarukhanyan, *et al* 2002). Consequently, the establishment of leadership, transparency, democracy and trust within the association were critical for sustainability. Without sufficient trust, opportunistic behavior would lead to failure.[8]

Alternative Procurement Models

USDA MAP also assisted processors establish and improve their procurement relationships with upstream farmers. For small scale processors who procured directly from villages in the close vicinity of their plant, there was no need for an association to be established, so USDA MAP leased cooling tanks to the processor and farmers deliver directly to the processor. When the processors were larger, alternative business models were required.

An alternative procurement model based on privately owned collection centers has been developed by a Yerevan based company, Ashtarak Kat, now the largest dairy processor in Armenia. As part of their new procurement system, Ashtarak Kat developed a series of privately owned milk collection centers around the country with the assistance of USDA MAP. The system worked with the company collecting milk from farmers in villages surrounding the collection center, testing the milk and paying the farmer according to the quality, and then transporting the milk to the collection center for cooling. From the collection center the milk is trucked to the processing facility in Yerevan. The collection centers were developed initially because they were faster and easier to develop and quality could be monitored better. However the company intends to work with USDA MAP to facilitate the establishment of marketing associations. They believe associations will be easier from a transportation and management perspective.

8 The Lendrush association was wound up in 2002 after less than two years of operation, due to: poor leadership; lack of trust between members; ineffective board; low quality milk that harmed their processor relationship; and inability to make cool tank lease payments. The USDA MAP now uses this association as a model to demonstrate what not to do, whereas Lejan is a model of success.

Farmer Responses: Empirical Analysis

In 2004 USDA MAP recognized the need to examine the impact and response of farmers to these alternative milk procurement channel models. During the fall of 2004 a farmer survey was piloted and revised. A stratified random sampling frame was established in collaboration between the USDA MAP and the authors' institution's research team to measure the impact and response of farmers to alternative channel structures. Twenty three villages in eight marz (regions) were selected for evaluation. The survey was conducted over the winter of 2004. A total of 745 farmers were surveyed within the dairy industry. The survey was primarily cross-sectional although some reflectionary questions were included about milk production, number of cows, choice of marketing channel, and reasons for switching or not switching across marketing channels. The survey included information on household demographics, income generation, asset ownership, production, finance, land use, business relationships, marketing structures and organizational affiliations.

Shifting Marketing Channels

Recognizing that assistance beginning from 2000 may have affected the structure of dairy milk marketing in Armenia, the survey instrument included reflectionary questions back to 1999 designed to elicit any changes in marketing over time. It is important to recognize that in some marz (areas) and villages, formal marketing channels were available in 1999, but these were not linked to the USDA MAP. In other marz and villages no formal marketing channel existed in 1999, as neither a private dairy processor nor a USDA MAP facilitated collection center was available. Consequently, farmers' marketing decisions were constrained by the available options.

The survey instrument separated out 10 different marketing channel structures and farmers were asked in each year to specify the channel where the majority of their milk was used. For ease of analysis these channel choices have been compressed into four major headings that best reflect the organizational structure of these channels: cooperatives, private channel, personal consumption, and other. The *Cooperatives* grouping includes all farmers who are selling to one of the farmers associations that cooperatively own and operate the milk cooler and collection centers; *Private Channel* includes the delivery of milk directly to a milk plant or privately owned collection center; *Personal consumption* includes personal consumption as liquid milk and as a processed milk product, probably cheese; and *Other* includes barter, sale of fresh milk and milk products in the local village or market, and sale to traders or middlemen.

Table 5 summarizes the changing choice in marketing channel used by farmers over the period 1999 to 2004 in each of the eight marz. In most marz a dramatic shift towards commercial marketing channels (*cooperatives & private*) can be observed when those channels are available. For example in Lori marz, 50% of the farmers who had either been selling their milk through informal channels (*other)* or *personal consumption* in 1999 shifted to marketing their surplus milk through formal channels (*cooperatives & private*). Similar shifts can be observed in Tavush, Aragatsotn, and Gegharkunik marz. In Syunik marz, where no commercial milk processor operated, the introduction of a farmers association resulted in a rapid shift to this *cooperative* marketing channel over the six years. Similarly, in Kotayk and Shirak marzes shifts to commercial *private channels* were observed. Although the speed and number of farms shifting varies across marzes, a clear picture develops out of Table 5 showing that the majority of farmers who previously sold their surplus milk through the ad hoc informal marketing channels (*other*) rapidly switched to commercial channels (*cooperatives & private*) once they become available. Similar but not necessarily as dramatic shifts are seen from *personal consumption* to commercial marketing (*cooperatives & private*). This slower response may result from farmers in these marzes having alternative income sources.

To better understand the impact of these new marketing channel opportunities on farmers, we have graphed and conducted t-tests and ANOVA on the resulting investment decisions (number of cows) and income derived from the alternative marketing channels compared to comparable farmers within the same village groupings. Figures 4 and 5 shows the resulting dynamics for *Group 1* – marzes where farmers associations have become the dominant marketing channel by 2003. The t-test results indicate that the numbers of cows per farm and income levels per farm for farmers in cooperative channel are not statistically significantly different from the other three comparison groups in both 1999 and 2003 at the 10% significance level. However when the change in numbers of cows and income over time was tested across channels, we find that the slope of change in income for farmers in cooperative channel is statistically higher, with a 5% significance level, compared to farmers in each of the other three channels. This indicates that the farmers who joined the associations might have started with a mean income below both personal consumption and private market but have observed the larger gain in income during the 5 year period. The resulting relative gains are likely to provide the necessary impetus for the farmers associations' long-term economic sustainability as the association has positively impacted income growth for members.

Table 5: Number of Farms per Market Channel by Marz (1999 to 2003)

MARZ	year	Cooperative	Private Channel	Personal Consumption	Other	Total
Lori	1999	25	25	49	43	142
	2000	32	28	46	36	142
	2001	47	42	26	27	142
	2002	46	44	26	26	142
	2003	48	46	23	25	142
	2004	59	43	20	20	142
Tavush						
	1999	3	2	37	11	53
	2000	5	2	37	9	53
	2001	8	2	36	7	53
	2002	10	3	35	5	53
	2003	19	4	28	2	53
	2004	21	3	26	3	53
Aragatsotn						
	1999	1	4	81	36	122
	2000	1	16	74	31	122
	2001	1	27	64	30	122
	2002	1	32	60	29	122
	2003	1	33	58	30	122
	2004	25	40	48	9	122
Syunik						
	1999	1	0	54	17	72
	2000	2	0	53	17	72
	2001	32	0	30	10	72
	2002	54	0	16	2	72
	2003	59	0	12	1	72
	2004	59	0	12	1	72
Gegharkunik						
	1999	0	1	81	32	114
	2000	0	5	83	26	114
	2001	4	19	74	17	114
	2002	5	22	72	15	114
	2003	10	29	63	12	114
	2004	34	30	44	6	114
Kotayk						
	1999	0	18	55	21	94
	2000	0	25	50	19	94
	2001	0	33	44	17	94
	2002	0	34	44	16	94
	2003	0	35	43	16	94
	2004	0	38	43	13	94
Shirak						
	1999	0	60	40	18	118
	2000	0	70	31	17	118
	2001	0	100	13	5	118
	2002	0	109	5	4	118
	2003	0	110	4	4	118
	2004	0	106	5	7	118
Armavir						
	1999	0	0	20	10	30
	2000	0	0	18	12	30
	2001	0	1	17	12	30
	2002	0	1	18	11	30
	2003	0	1	17	12	30
	2004	0	1	18	11	30

Figure 4: Change in Cow/farm from 1999 to 2003 in Group 1 Villages

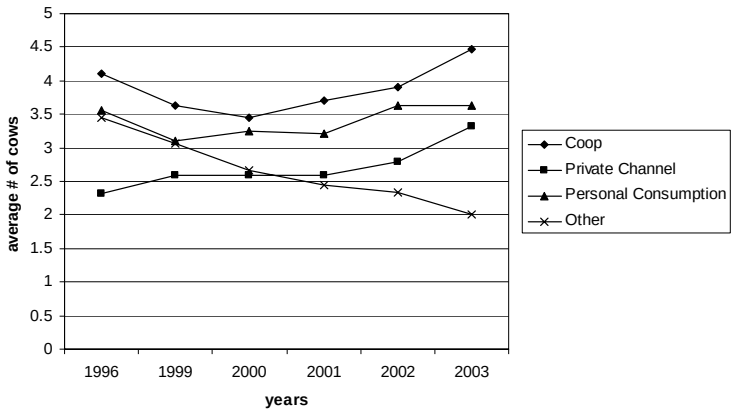
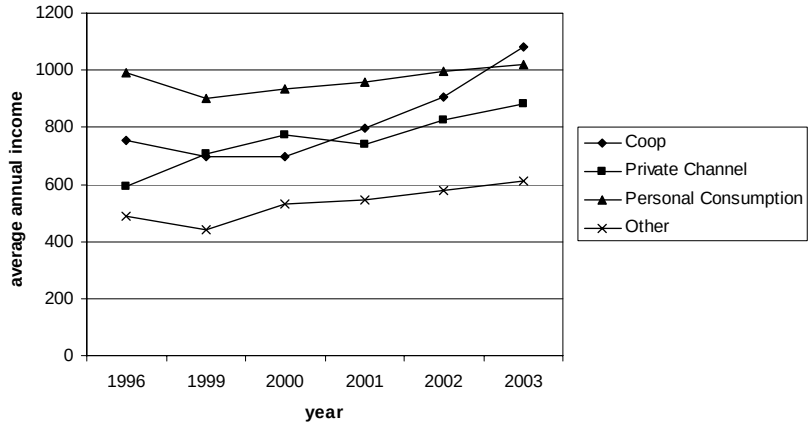


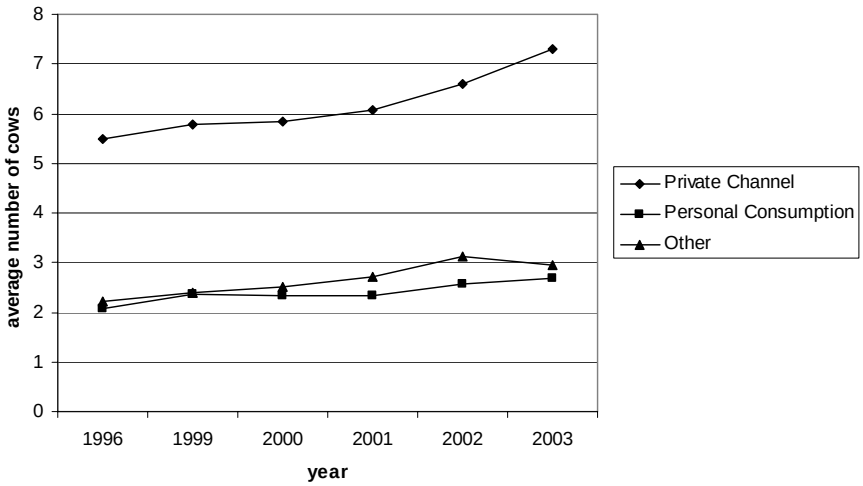
Figure 5: Change in avg. income per household from 1999 to 2003 in Group 1



Figures 6 and 7 show the results for *Group 2* – marzes where delivery to a private dairy processor or collection center has become the predominate channel of choice. These results indicate a quite different set of responses. Firstly, the farmers delivering to the private channels have statistically significantly higher income and number of cows over all years than their fellow villagers supplying other channels. Additionally, the rate of increase in cow numbers and income for private channel farmers is significantly higher than the other farmers. This seems to indicate two key outcomes. First, private dairy companies chose to locate their collection centers in villages that possess wealthier farmers with larger numbers of

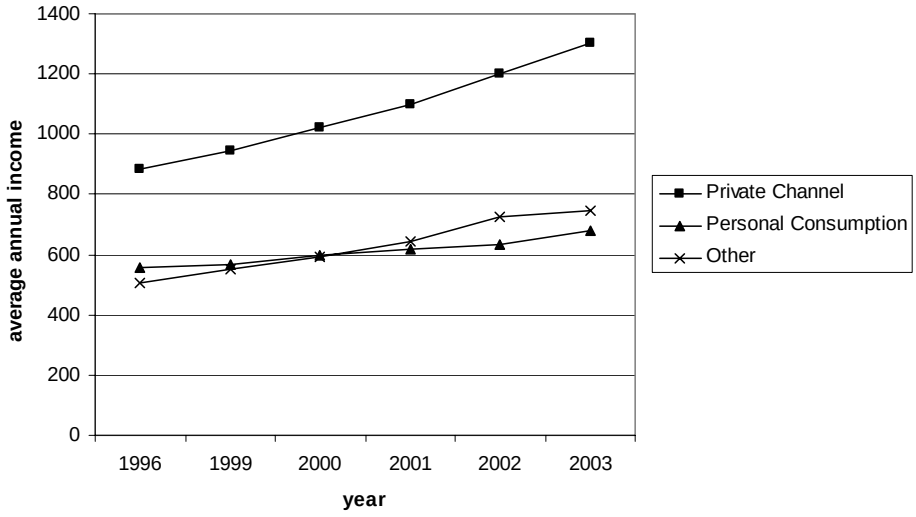
cows. This makes economic sense for the companies as it minimizes their procurement transaction costs. Second, once these private channels are established, farmers rapidly respond to the market incentives by further investing in dairy production.

Figure 6: Change in Cow/farm from 1999 to 2003 in Group 2 Villages



Interestingly, the rate of growth in income and cow numbers is not statistically different between farmer association members in *Group 1* and farmers marketing to private channels in *Group 2*. This seems to indicate that although these farmers started at different resource levels, the establishment of suitable marketing structures and organizations coupled with the introduction of correct incentives resulted in similar economic responses by farmers in private and cooperative marketing channels. This finding matches the ad hoc evidence provided by Ashtarak Kat dairy processor who has recently begun shifting their focus away from establishment of private collection centers to supporting USDA MAP established farmers associations as their preferred strategy for expansion of their procurement base.

Figure 7: Change in avg. income per household from 1999 to 2003 in Group 2



When farmers were asked to state their reasoning behind shifting marketing to either a farmers association or private channel, their responses were very similar. For the farmers marketing through the association, 37% stated the association provided a reliable and guaranteed market, 27% said it simplified management and 29% stated cash transaction as a main reason for shifting. Similarly, for farmers marketing to private firms, 42% stated that it provides a reliable and guaranteed market, 35% that it simplified management and for 15% the cash transaction. Thus if we evaluate these results within a "real options framework," it is the reduced uncertainty that these new channels bring that has resulted in altering investment incentives and driving growth.

Note that there are several qualifications related to this analysis. Firstly, the results underestimate the response and impact on the collective group of farmers who switched, as we have pooled everyone together based upon the year 2003. However, as Table 4 indicates, some of the associations have only recently been formed, thus there has been little opportunity for impact to occur. As a consequence, the impact on farmers who shifted earlier to the new marketing channel will be diluted by those who shifted later. This should hold for both private and farmer association channels.

Conclusions

This paper analyzes the impact of third-party facilitated marketing channels on economic and social outcomes of small and financially distressed farmers and examines the factors affecting farmers' choices among alternative marketing channels. The USDA MAP and the Armenian Dairy industry were used as an instrumental case study to gain a greater understanding of the issues, responses and impact involved in this process. The Armenian dairy industry provides a natural experiment for the evaluation of this as there has been no foreign investment within the industry nor external ODA before the USDA MAP program began in 1999. A mixed methods approach combining qualitative and quantitative data collection and analysis was used.

The results indicate that the establishment of economically sustainable marketing channels (both private and farmers associations) can have a substantial impact on local farmers. Ad hoc case evidence indicates that private processors will initially target villages with larger or wealthier farmers as their preferred location for the establishment of private collection facilities. This is supported by survey evidence. Once established farmers who market through these new channels observe faster income growth, they respond by increasing cow numbers and this builds upon itself. For villages characterized by smaller and less wealthy farmers, the introduction of the USDA MAP farmer association model resulted in similar gains, just from a lower initial starting point. Interestingly, interview responses indicate that private processors have recognized the responses induced by the establishment of farmer associations and have recently begun working closely with the USDA MAP to support the establishment of additional associations as their preferred procurement model for expansion.

The analysis shows that farmers rapidly respond to suitable economic incentives. Foreign direct investment is not required as the catalyst for change if the third party facilitation is provided on an arms length basis to each level of the channel, but does not become the link between channels. These results are the first study within transition agriculture to show that FDI is not required as a catalyst to induce the establishment of a higher equilibrium of incentives and competitive market responses. It provides initial evidence that ODA can act as a substitute for FDI if design of the assistance is provided in an appropriate manner.

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