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**Meeting Private Grades and Standards in Transition Agriculture:
Experiences from the Armenian Dairy Industry**

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1. Introduction

One of the main trends emerging from the agroindustrialization process is the rise of 'grades and standards' (G&S) in food products. G&S were initially developed by the public sector to reduce transaction costs and ensure product quality and safety but have become a strategic instrument of competition in differentiated product markets (Reardon *et al*, 2001). Firms are using grades and standards to protect and develop brands in the international marketplace and in some cases to fill in for missing public standards. While producers in developed countries have the resources to meet these requirements, in developing countries these changes have tended to exclude small firms and farmers from participating in market growth, because of the implied investment requirements (Reardon *et al*, 2001). This is leading to already disadvantaged farmers in these countries being forced to produce basic subsistence food crops and become further excluded from the opportunity to join the global food industry.

While past research has evaluated the effects and trends of G&S (Reardon, *et al*, 2001; Farina & Reardon, 2000; Reardon & Farina, 2002) the organizational structure to enable small farmers to meet these requirements has largely been overlooked. In this paper we use a theoretical contract enforcement framework to argue that private enforcement capital developed through the facilitation of an external aid agency can be an effective means for creating credible and sustainable relationships capable of meeting G&S. We draw upon theory from Cocks and Gow

(2002), Oliver and Gow (2002) and Gow *et al.* (2000) to argue that in situations characterized by high discount rates and low reputation or trust levels (such as transition agriculture) that the use of a third party external enforcement agent can be used to provide the necessary linkage between the parties to facilitate transactions. Through the facilitation role of the external agency, private enforcement capital is developed between the firm and the farmers, opening the path for a sustainable mutually beneficial relationship.

Empirical evidence is provided by the case of the United States Department of Agriculture Marketing Assistance Project (USDA MAP) in Armenia and its role in establishing farmer owned milk marketing cooperatives. By acting as an external facilitator in the initial establishment and ongoing development of milk supply cooperatives the USDA MAP has provided a solution to the dual market failure problems of reliable supply of the consistent quality of milk required by processors while enabling farmers access to markets and ensuring timely payment and therefore enabling farmers and firms to credibly contract for the collective marketing of their milk. Through the establishment of a unique and flexibly designed combination of leadership development, training in governance, financial management, dairy management, and quality improvement programs, the USDA MAP has assisted the groups in expanding the self enforcing range in such a manner that the cooperative should be capable of sustaining long term credible exchange relationships once the external agency withdraws. This is important as aid programs have often failed at ensuring sustainability once external management and financial support is removed. Data for this paper was collected through a series of semi-structured interview with USDA MAP staff, dairy processing firm managers, cooperative managers, and cooperative presidents during the fall of 2002, and over a two week period in March, 2003.

2. Grades and Standards

Over the past twenty years there has been an increasing flow of trade in agricultural products, an increasing presence of multinational firms in developing countries, a fostering of greater linkages between rural and urban communities, increased product differentiation, and higher grades and standards (G&S) requirements for food products (Reardon & Barrett, 2000). This is in addition to the increasing presence and power of multinational supermarket chains and the integration of agricultural supply chains from 'field to fork'. These trends which are concurrently occurring with the globalization of the world economy are resulting in the phenomenon that is commonly referred to as 'agroindustrialization'.

Reardon *et al.* (2001) discuss how the shift from commodities to differentiated products and increases in consumer demand for product quality and safety is leading to additional pressure for and use of standardization in food labeling and certification. This is leading to standardization of processes and inputs which is inadvertently raising the standards required for farmers.

Essentially this standardization is expressed through G&S. G&S include rules of measurement established by regulation or authority (standards) and a system of classification based on quantifiable attributes (grades) (Jones & Hill, 1994). G&S can consist of quality requirements, specifications, terms, definitions, classifications, and labeling and can be either performance or process characteristics.

Historically grades and standards have been viewed in the public realm. However recently where public standards have been missing or inadequate private firms have been developing their own G&S to use as an instrument of competition in differentiated markets to build reputation for quality and safety, and to support brands. Increasingly private G&S are being incorporated into

meta-management systems to ensure quality and safety at all levels of the chain and enforce and certify the implementation of process standards (Reardon & Farina, 2002). The importance of developing G&S for firms in the downstream sector (processing and retailing) is paralleled in the upstream sector by firms (farmers) for whom meeting private G&S is necessary for survival (Reardon & Farina, 2002). While farmers in developed countries with sufficient financial, physical, and human capital are able to meet these requirements they are unattainable for many farmers in developing countries due a combination of substantial relationship-specific investment and financial, physical, and human capital requirements. Reardon *et al.* (2001) argue this has driven many small firms and farmers out of business in the past five to ten years. For example, thousands of small dairy operations have gone out of business in the past five years in the extended MERCOSUR region because they were unable to meet new quality and safety G&S for milk and milk products that required large investments in equipment and buildings and coordination and management (Reardon *et al.*, 2001; Dirven, 2001).

3. Organizational Structure

Without the provision of a credible enforcement or governance system, transacting parties are unwilling to make the necessary investments required to support the development of long-term marketing or exchange systems due to fears of rent expropriation by their exchange partners. Instead, they attempt to minimize the costs of opportunistic behavior and rent expropriation by retreating to investments in commodities that have few temporal or relationship specificity requirements that can therefore be freely traded in spot markets for the immediate receipt of cash or barter equivalents. This was very evident during the first years of transition in Central Europe where a rapid shift from specialty crops and livestock to grains was observed (Gow and

Swinnen, 1998). However, producer responses such as this constrain the development of high quality specialty value added markets which by definition require substantial relationship, firm, or market specific investments on behalf of the transacting parties. Thus, if farmers are to be encouraged to make investments in value added products, not only are the correct incentives necessary but also the provision of a credible governance or enforcement mechanism (Gow *et al.* 2000).

Enforcement can be separated into two parts: internal (such as trust and reputation) and external (such as a court of law). Particularly in the agri-food chain, the use of legal dispute mechanisms are often not viable, due to litigation costs, ineffective contract law, poor third party verifiability, and finally, the potential loss of the only suitable trading partner for that commodity (Gow *et al.* 2000). This is especially the case in developing and transition economies where the rule of law is weaker and more difficult to enforce, contract law is limited or poorly developed, and some industries are dominated by monopsonies.

Klein (1996) shows how private enforcement mechanisms can be used to support transactions and reduce the risk of opportunistic behavior that is associated with relationship-specific investments by establishing what he refers to as “the self-enforcing range of a contract”. The self-enforcing range of a contract (or relationship) is bounded on the outside by the levels of private enforcement capital that each of the two transacting parties possess. Therefore it is the level of private enforcement capital that determines the size of the self-enforcing range and the extent to which the underlying market conditions of the relationship can change without precipitating opportunistic behavior by either party (Klein, 1996; Gow *et al.*, 2000; Oliver & Gow, 2002).

Private enforcement capital consists of a combination of privately enforceable sanctions that ensure that the partners to a transaction find it economically beneficial to abide by the contractual agreement they have made (Klein, 1996). Private enforcement capital encompasses the two losses – capital loss and reputation loss – that the transacting party incurs upon breach. Capital loss is defined as the discounted present value of all future relational or quasi - rents accruing to non-salvageable relationship-specific investments of the breaching party had the relationship continued (Klein, 1996). Reputation loss refers to the additional costs of exchange that the transacting party will incur in the marketplace due to loss of reputation following a contractual breach. Within this framework, contractual breaches or hold-ups¹ only occur when a sufficiently large unanticipated event shifts the underlying market conditions outside the self-enforcing range, thereby causing the benefits gained from breaching the contractual terms to become greater than the costs incurred by the breaching party. Thus, the parties to a transaction are continuously weighing the costs and benefits of acting opportunistically and breaching the contract: If at any time during the term of the relationship the gains from opportunistic behavior become greater than the costs, or level of private enforcement capital that exists between the parties, then contractual breach will become the economically efficient response (Klein, 1996). But, so long as the market conditions remain within the self-enforcing range hold-ups will not occur; since the benefits of a hold-up are less than the costs to each transacting party (Gow *et al*, 2000).

For exchange to occur within this environment the self-enforcing range must be sufficiently large so that it encourages and supports the optimal level of exchange and investment to take place without constructing written contractual terms that may create the potential for opportunistic

¹ ‘Hold-ups’ are when one party to a contract has incentives to behave opportunistically and ex-post negotiate a contract in an attempt to gain a greater share of the quasi-rents accruing to the relationship-specific investment.

behavior and restrict the relationship in a volatile environment (Oliver & Gow, 2002). By holding a sufficient amount of private enforcement capital, the transacting parties are immediately bound to the exchange relationship by the costs of ex-post exit from the relationship. Therefore an element of private enforcement capital held between parties is a necessary ingredient in establishing a self-enforcing relationship (Oliver & Gow, 2002).

In market exchange situations such as those found in the agricultural sector of transition economies which are characterized by high discount rates and low reputation or trust levels, Cocks and Gow (2002) argue that the use of a third party external enforcement agent or alliance facilitator can be used to provide the necessary linkage between the parties to facilitate exchange transactions. Thereby a self-enforcing relationship is created, even when the reputation of either or both parties to the exchange transaction is severely damaged or faces substantial discounting rates.

Once established the relationship can be further strengthened by either party or the external facilitator through depository investments in the relationship that increase the self-enforcing range and therefore reduce the risk of contract breach by either party.² These investments can come in a number of forms, such as processors providing timely payments to farmers for raw materials or technical assistance to farmers. Farmers can in-turn invest in the relationship by delivering raw materials to specification, or repaying credit on time. Effectively, these investments can be viewed as the building of private enforcement capital between the two parties. Repeated interaction between parties builds private enforcement capital further through improving the bilateral reputation between the parties, signaling trustworthiness to each other and therefore extending the self enforcing range.

² See Gow *et al* (2000) for a complete explanation and empirical example of how this can be achieved.

There are many empirical examples in transition agriculture of private firms successfully solving the market failure (Cocks & Gow, 2002; Dries & Swinnen, 2002; Gow et al. 2000; Foster, 1999; Gow & Swinnen, 1998). In many of these cases the private firm has been in the form of a multinational food company. However where private firms are unable or unwilling to solve the market failure we ask whether a public agency can facilitate the development of self enforcing relationships between private agents already in the sector?

4. Armenian Agriculture

The Armenian agriculture sector underwent massive structural reform following independence from the Soviet Union in 1991. The formerly centrally planned system was privatized and there was widespread price and trade liberalization and institutional reform. In terms of land reform Armenia has implemented one of the most comprehensive programs in the Former Soviet Union (FSU) (World Bank, 1995).

The short and medium term effects of the changes were: large reductions in livestock numbers (Exhibit B); reductions in the planted areas of cereals, fruits, and vegetables (Exhibit C); reductions in crop yields per hectare (Exhibit C); and substantial swings in the usage and efficiency of agricultural land (Exhibit D, Exhibit E). The cumulative effect of these problems was an initial large reduction in agricultural production before recovery from 1993 onward (Exhibit A, Exhibit F).³

While the land privatization process may have been one of the most comprehensive programs in the FSU it has brought with it a number of problems. As at the beginning of 2002, there were

³ It is important to note that many of the trends reflected in the early years of the privatization process were a continuation of trends found in the later years of Soviet rule (Exhibit's A,B,C,D). The transition was compounded further by war with Azerbaijan in the early nineties and the continuing effects of a devastating earthquake in 1988.

334,000 privatized farms in Armenia with an average size of 1.37 hectares. During the privatization process land was allocated based on the number of members in ones family. Most farmers received two to four and in some cases five to six plots of land that were spread far apart from each other. This caused fragmentation of the sector, increased non-productive costs and forced mechanization of agricultural practices to become inefficient (Surukhanyan, *et al*, 2002).

5. USDA MAP in Armenia

The USDA began it's involvement in Armenia in 1992 initially working with Armenian counterparts to develop an extension program. This program was completed in 1995 after which the USDA MAP was formed. The USDA MAP provides marketing, financial, and technical assistance to Armenian farmers and agribusinesses. The project is perhaps best represented by its mission statement:

'MAP will assist farmers and agribusinesses in production, marketing, and exporting food and related products to increase incomes, create jobs, and raise the standard of living for Armenians working in the agro-processing sector. This assistance will come in the form of timely technical, financial, and marketing support to farmers and farmer groups, agribusinesses, as well as education, extension services and applied research throughout the country' (USDA MAP, 2003).

5.1 Armenian Dairy Industry

The dairy industry is the largest agricultural industry in Armenia. There are approximately 450,000 head of cattle in the country – production is consumed both domestically and exported. Imported product constitutes 25 percent of local consumption in dairy products. A looming

threat to the industry is the recent membership to the World Trade Organization that could possibly further flood the local market with imported product.

Like many transition countries the Armenian dairy industry has been hampered with low quality product, subsequent low prices, poor infrastructure, lack of credit, lack of transportation, and low levels of human capital required for modern business and technical management. Development has been further restricted by a lack of hope and despair following the harsh conditions of transition, a lack of trust inherited from the Soviet system, a land market characterized by many small parcels of land scattered across the country, and finally increasing G&S requirements to compete both domestically with imported product and internationally. This is resulting in low profitability for both farmers and processing firms and extreme difficulty for the industry to upgrade sufficiently to meet G&S required by the global food industry.

USDA MAP conducted a survey in late 1998 of farmers all over Armenia. The three principle things that farmers were wanting and felt they lacked were (in order of importance): 1) the need for an accumulation center to deliver products to; 2) transportation; and 3) credit. This combined with the above mentioned problems and threats to the industry was the prompting for the development of farmer cooperatives or marketing associations⁴ by USDA MAP.⁵

5.2 *Cooperative Development*

⁴ They are called associations (instead of cooperatives) to overcome the stigma from the Soviet era of cooperative farms.

⁵ The associations have been established in the dairy, dairy goat, and fruit and vegetable industries. This paper will concentrate on milk marketing associations in the dairy industry. The dairy industry is assisted both at a processing and a farm level by USDA MAP.

The USDA MAP recognized that the formation of an association had to be driven from the villagers themselves and not dictated by a centralized governmental or aid agency plan and that farmers need to come together on the basis of common economic interests (Surukhanyan, *et al*, 2002). Thus talks of forming a milk marketing association begin when representatives from a village approach USDA MAP. This begins the first of a series of meetings between the USDA MAP and village representatives to discuss how the association would work and responsibilities and benefits to each party. This culminates in the village voting for or against forming the association. The major initial attraction to the village is a milk cooling tank that is loaned by USDA MAP for the first four months. The steering committee involved in the initial meetings becomes the board of directors with the mayor often becoming manager and/or president of the association. USDA MAP focuses a great deal of attention on the identification and development of a leader that everyone in the village respects and trusts.

Once the village votes for the association the legal process of registering the association begins and a site and building are identified and renovated. The milk cooling tank is located in a central location where village members can bring their milk. The village finds and negotiates their own upstream market, USDA MAP will only get involved if need be as a facilitator.

By loaning the tank to the association for the first four months USDA MAP facilitates the payment of expenses (including payment to association members), allows management to gain experience in a new market environment, and allows the current members and the village to see if the association is worthwhile. The benefits gained from a rent free tank builds immediate private enforcement capital between the association and USDA MAP. The self enforcing range of the relationship between the association and members is widened through timely payment to

members as is the self enforcing range between the processor and the association through timely delivery and improved quality. Generally the numbers of farmers increases substantially over the initial period as they see that members are being paid.

Once the first four months are past and the association is a registered legal entity they begin paying the leasing payments for the milk cooling tank. A leasing company ‘Agroleasing’ – formed and owned by USDA MAP – leases the milk cooling tank to the association. Ownership of the tank stays with Agroleasing until the lease is repaid. The interest rate is between five and ten percent compared with 15 percent to 35 percent in Armenian banks with a repayment period of three – five years.

5.3 Developing Sustainability

Seminars are conducted by USDA MAP consultants and specialists from the Armenian Agricultural Academy on milk quality at the farm level, dairy herd management, herd health, cow feeding, and calf rearing. Over the winter of 2002/2003 an Artificial Insemination program was initiated using imported genetics from the United States. These factors make it easier for farmers to meet G&S thus widening the self-enforcing range between the association and processing firm.

When the farmer brings the milk into the collection center he/she watches it being tested and then signs a book to say that the test is accurate and that they witnessed it. The length between testing stretches from daily to weekly to randomly as private enforcement capital is built between the farmers and the association. One association and some processing firms are incorporating quality into their payment schemes to create financial incentives to increase quality.

Lack of credit in Armenia due to reluctance by Armenian banks to lend to businesses outside of the capital Yerevan, high collateral requirements, and high interest rates has restricted the ability of farmers to invest in inputs for production. This prompted USDA MAP to facilitate the formation of mutual liability, no collateral 'credit clubs' with groups of farmers to purchase inputs such as fertilizer, forage, seeds, livestock etc. Production loans are granted that are repaid within one year or less, upon which new loans are granted. Members deposit funds into the credit club annually up to the point that they can use their own funds to fund further investment and USDA MAP can withdraw their involvement. Thus, the external facilitation of USDA MAP allows farmers a sustainable credit source that would otherwise be unavailable.

USDA MAP staff constantly stress the importance of leadership, transparency, and building trust as critical to the sustainability of the program. They realize they can provide a great deal of technical, marketing, and financial assistance but if the associations are to be sustainable there needs to be a self enforcing range sufficiently wide to prevent opportunistic behavior and exit of members from the association. To achieve this requires strong leadership, governance, democracy, transparency, and the development of trust between the association and the members and between the members themselves. Strong leaders are identified, there is coaching on how to conduct democratic board meetings, and on transparency and interaction with members. USDA MAP has monthly visits with each of the associations to assess and assist with finances, milk records, and the preparation of the monthly accounts.

Social capital among various associations and processing companies was recently developed through a conference of milk marketing associations. This was an opportunity for association board members and processing firms to get to know each other and share their problems and

successes. Plans are in place for forming a national association of milk marketing associations as are discussions for forming a national association of dairy quality and starting an Armenian quality accreditation scheme.

There are now approximately 2,000 farmers with 2,200 cows delivering milk to 17 collection sites operated by eight milk marketing associations. Some of the associations are planning to offer additional services to their members such as input supply. Several associations have leased trucks for milk transportation which gives them more marketing options. One association in the north of the country has returned to its members the equivalent of 1/3 of the cash flow of the communities supplying the milk (accounting for the role of barter in the economy). A spillover effect of this has seen the mayor of one of the villages carrying out renovations on the local school with the additional taxes collected.

6. Conclusion

Due to increased competition in differentiated and branded product markets private firms are being forced to enact increasingly tighter supply and process grades and standards. While producers in developed countries have the resources to meet these requirements, in developing countries these changes have tended to exclude small firms and farmers from participating in market growth, because of the implied investment requirements (Reardon *et al*, 2001). This is leading to already disadvantaged farmers in these countries being forced to produce basic subsistence food crops and become further excluded from the opportunity to join the global food industry.

In this paper we have argued that one possible mechanism to overcome this problem and assist small capitally constrained and financially distressed farmers to access these markets is the use of a third party facilitator. Where previous research has empirically shown that this problem can be privately solved with firms that have sufficient capital resources, our analysis provides a unique empirical example of how a public aid agency can facilitate where initially the private firms were either unable or unwilling to do so.

Before the efforts of USDA MAP Armenian dairy farmers were prejudiced by the Soviet era style of cooperation and biased by the economic hardships they faced (Surukhanyan, et al, 2002). The USDA MAP as an external facilitator has been critical in building sufficient private enforcement capital amongst farmers and between farmers and processing firms to create a self enforcing range sufficiently wide that sustainability will be possible once USDA MAP withdraws. What is critical to the long term sustainability of the USDA MAP program is the integrated approach to assistance covering milk quality, dairy management, credit, leadership development, and training in association governance, management and accounting that builds private enforcement capital between farmers and the association and between the association and processing firms. Through USDA MAP involvement in establishing milk marketing associations the Armenian dairy industry is on its way to overcoming the dual market failure problems and is providing impoverished Armenian farmers the opportunity to meet the stringent G&S required to join the global food economy.

References

- Bolger, S. (2001). Quality and contractual choice: a transaction cost approach to the Polish hog market. *European Review of Agricultural Economics*, 241-261.
- Cocks, J. & Gow, H.R. (2002). Supplier Relationship Development in the Food Industry of

- Transition Economies: The Role of Independent Facilitators. *Paper presented at the 2002 Conference of the Food Distribution Research Society - Emerging Business Models. Miami, Florida, USA.*
- Dirven, M. (2001). Dairy Cluster in Latin America in the Context of Globalization. *International Food and Agribusiness Management Review*, 2: 301-313.
- Dries, L., Swinnen, J.F.M., (2002). Globalization, European Integration, and the Transition of the Polish Dairy Sector. *PRG working paper*, K.U.Leuven
- Farina, M.M.Q., & Reardon, T., (2000). Agrifood Grades and Standards in the Extended Mercosur: Their Role in the Changing Agrifood System. *American Journal of Agricultural Economics*, 82(5): 1170-1176.
- Foster, C. (1999). The impact of FDI in the upstream and downstream sectors on investment in agriculture in the NIS. *Paper presented at the OECD expert meeting on Agricultural Finance and Credit Infrastructure in Transition Economies, Moscow, Russia, 198 – 211.*
- Gow, H.R. & Swinnen J.F.M. (1998). Up and downstream restructuring, foreign direct investment, and hold-up problems in agricultural transition. *European Review of Agricultural Economics*, 25, 331-350.
- Gow, H.R., Streeter, D.H. & Swinnen, J.F.M. (2000). How private contract enforcement mechanisms can succeed where public institutions fail: the case of Juhockur a.s. *Agricultural Economics* 23: 253-265.
- Gow, H.R. & Swinnen J.F.M. (2001). Private Enforcement Capital and Contract Enforcement in Transition Economies. *American Journal of Agricultural Economics*, 83(3): 686-690.
- Jones, E., & Hill, L.D., (1994). Re-engineering Marketing Policies in Food and Agriculture: Issues and Alternatives for Grain Grading Policies. Re-engineering Marketing Policies for Food and Agriculture. *D.I. Pad berg, ed., Food and Agriculture Marketing Consortium, FAMC 94-1, College Station: Texas A&M University.*
- Klein, B. (1996). Why Hold Ups Occur: The Self-Enforcing Range of a Contractual Relationships. *Economic Enquiry*, 34: 444-463.
- Oliver, L.D. & Gow, H.R., (2002). Successful Alliance Establishment and Evolution in a Volatile Business Environment: The Case of Cellars of Canterbury. *Paper presented at the 2002 American Agricultural Economics Association meetings, Long Beach, California, USA.*
- Reardon, T. & Farina, E. (2002). The Rise of Private Food Quality and Safety Standards: Illustrations from Brazil. *International Food and Agribusiness Management Review* 4: 413-421.
- Reardon, T., Codron, J., Busch, L., Bingen, J., & Harris, C. (2001). Global changes in Agrifood Grades and Standards: Agribusiness Strategic Responses in Developing Countries. *International Food and Agribusiness Management Review*, 2:421-435.
- Reardon, T. & Barrett, C.B. (2000). Agroindustrialization, globalization, and international development: An overview of issues, patterns, and determinants. *Agricultural Economics* 23: 195-205.

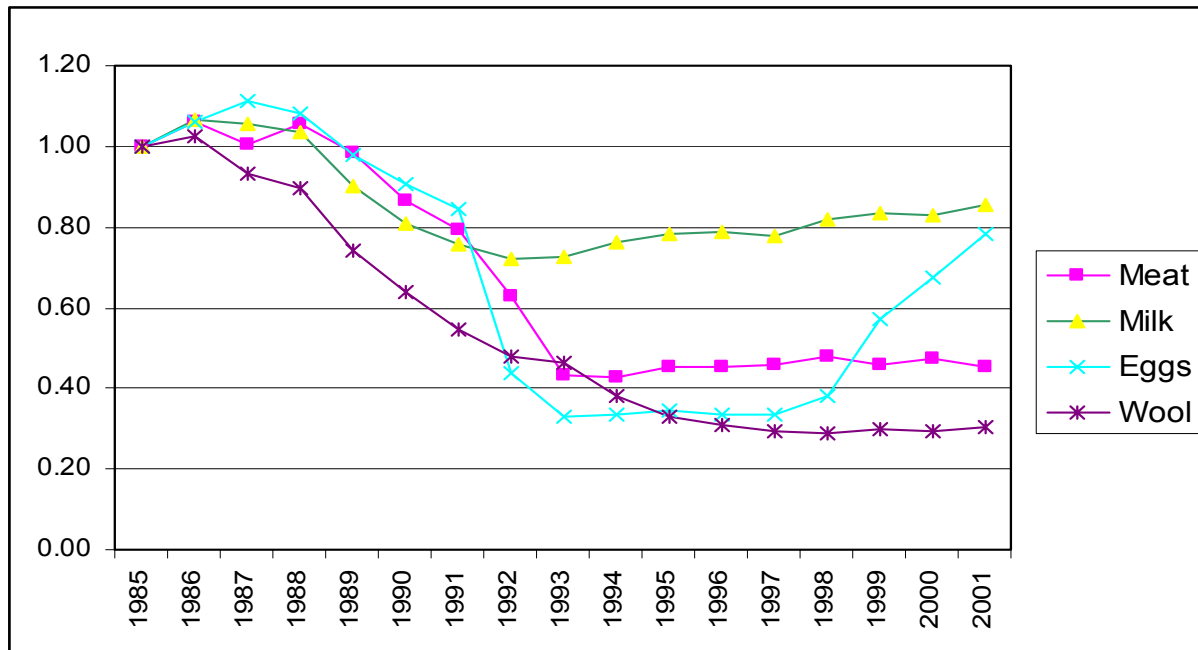
Suroukhanyan, R., Vardanyan, F., Abrahamyan, L., Alexandryan, M., & Vanyan, A. (2002). Innovative Approaches to Farm Enterprise Development, Cooperation and Partnership Arrangements for Improved Livelihood in Armenia. *Paper presented at the FAO Workshop, Prague, Czech Republic, October 13-16, 2002.*

USDA MAP, 2003. Retrieved March 7, 2003 from the World Wide Web:
<http://www.usda.am/mission.html>

World Bank, (1995). Armenia Agricultural Policy Update. Retrieved from the World Wide Web October 25, 2002: http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/1995/12/29/000009265_3961214152019/Rendered/PDF/multi_page.pdf

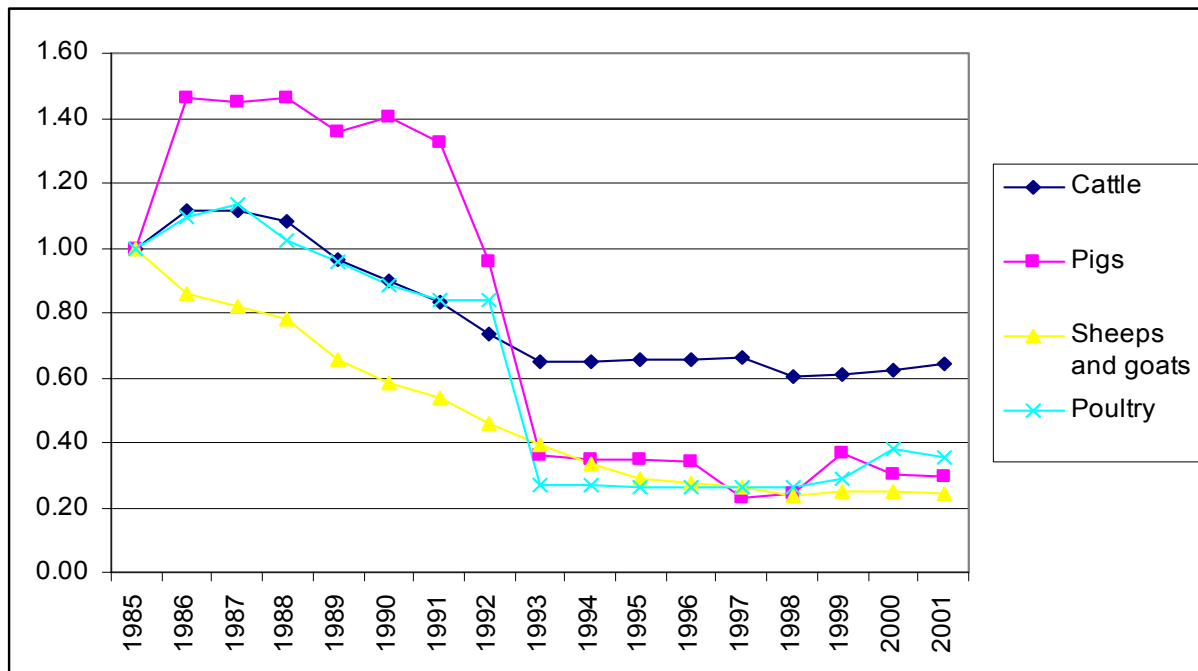
Exhibits

Exhibit A: Change in Animal Production 1985 – 2001



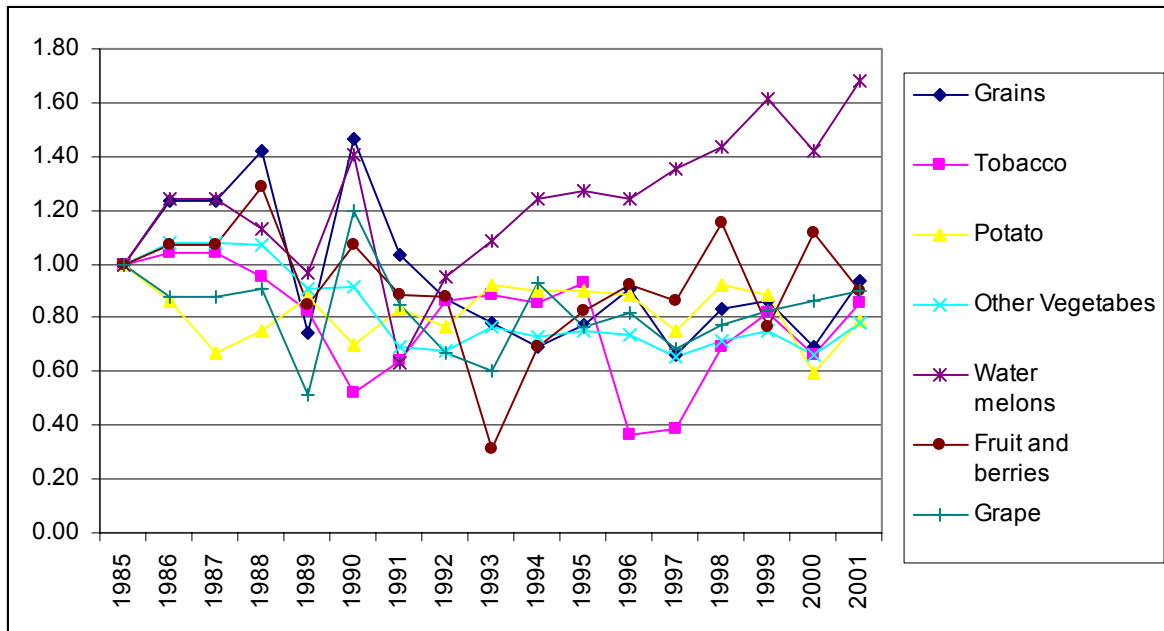
Source: Ministry of Statistics of Republic of Armenia

Exhibit B: Change in Livestock Numbers 1985 – 2001



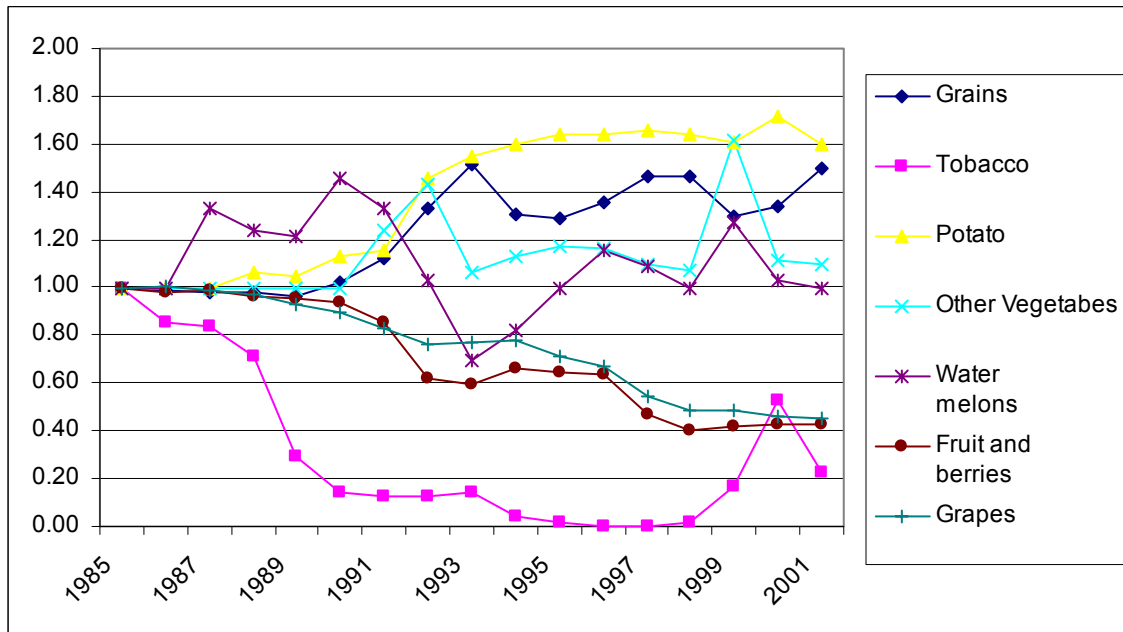
Source: Ministry of Statistics of Republic of Armenia

Exhibit C: Change in Crop Yields 1985 – 2001



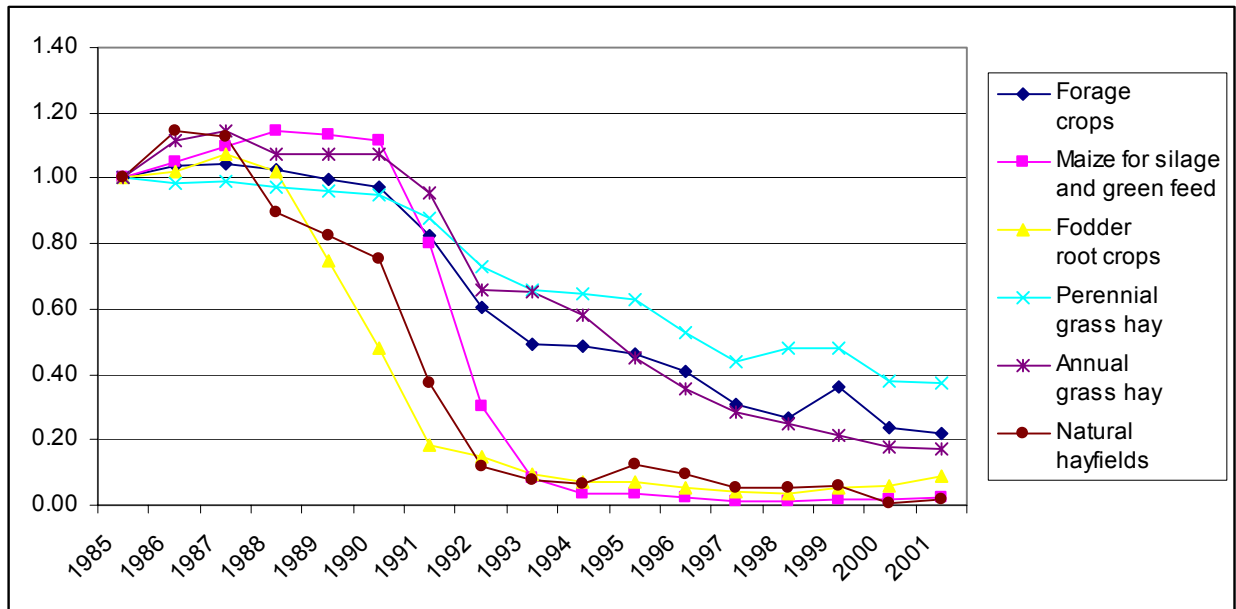
Source: Ministry of Statistics of Republic of Armenia

Exhibit D: Change in Crop Areas 1985 – 2001



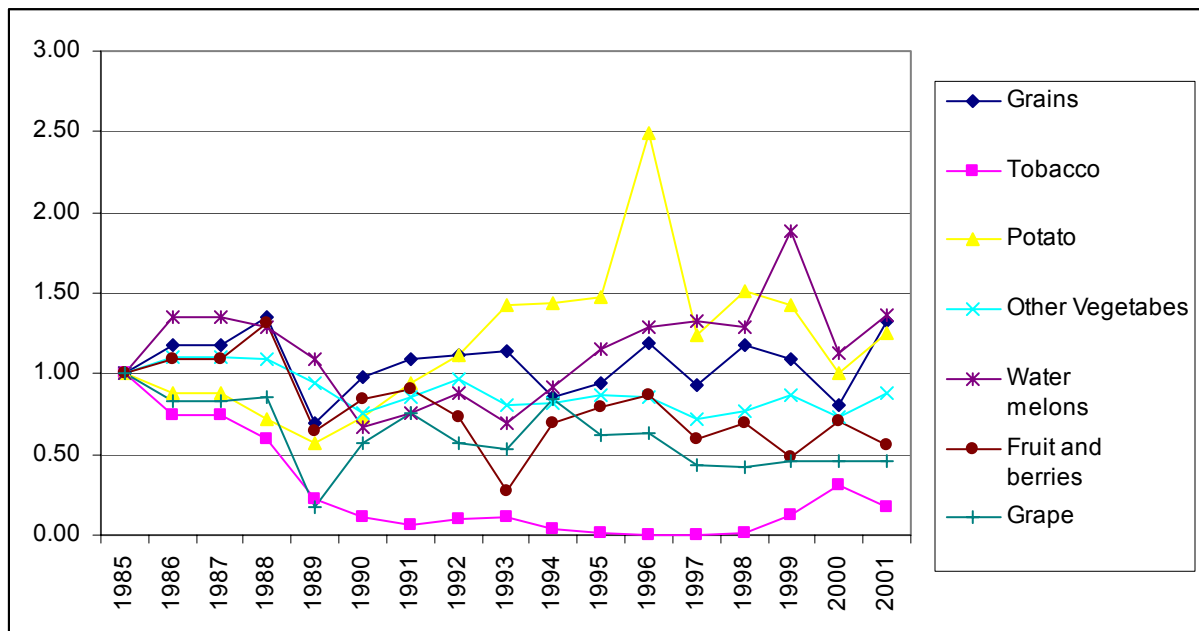
Source: Ministry of Statistics of Republic of Armenia

Exhibit E: Change in Forage Crop Areas 1985 – 2001



Source: Ministry of Statistics of Republic of Armenia

Exhibit F: Change in Crop Production 1985 – 2001



Source: Ministry of Statistics of Republic of Armenia