

# ***ARMENIA***

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## ***MANAGING FOOD SAFETY AND AGRICULTURAL HEALTH: AN ACTION PLAN***

AGRICULTURE AND RURAL DEVELOPMENT DEPARTMENT AND  
EUROPE AND CENTRAL ASIA REGION

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Yerevan 2007

Agriculture and Rural Development Department &  
Europe and Central Asia Region  
The World Bank  
Washington, D.C.  
March 2007

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## TABLE OF CONTENTS

<b>Foreword</b> .....	v
<b>Acknowledgements</b> .....	vi
<b>Acronyms and Abbreviations</b> .....	vii
<b>Executive Summary</b> .....	viii
<b>1. Introduction</b> .....	1
<b>2. Agriculture and SPS Issues</b> .....	3
Agricultural Production and Trade .....	3
Food Safety and Agricultural Health Issues .....	8
Agricultural Health .....	10
Summary .....	11
<b>3. Capacities for SPS Management</b> .....	12
Basic Trends in SPS Management .....	12
International Agreements .....	12
Institutional Framework .....	14
Laws and Regulations .....	18
Diagnostic Capacity .....	18
Border Procedures .....	20
Emergency Response .....	21
Private Sector .....	21
Summary .....	25
<b>4. Conclusions and Recommendations</b> .....	26
Conclusions .....	26
Recommendations .....	28
Funding of Food Safety and Agricultural Health Management .....	39
Summary .....	43
<b>Appendix 1 Food Processing and Food Distribution Dynamics in Armenia</b> .....	44
<b>Appendix 2 Issues in Food Safety</b> .....	49
<b>Appendix 3 Livestock Health</b> .....	54
<b>Appendix 4 Severity and Risk of Occurrence of Certain Health Hazards</b> .....	57
<b>Appendix 5 Cost Estimates for Action Plan Implementation</b> .....	59
<b>Appendix 6 Glossary</b> .....	65
<b>References</b> .....	70
 <b>Boxes</b>	
Box 1. WTO SPS Measures .....	1
Box 2. Competition in ethnic markets .....	7
Box 3. State noncommercial organizations and state executive establishments .....	14
Box 4. Factory inspections .....	17
Box 5. Armenian live crayfish exports .....	23
Box 6. Poultry industry: Armenians prefer Armenian eggs .....	24
Box 7. Functions to be performed in managing food safety and agricultural health .....	28
Box 8. How can conflicts of interest be avoided? .....	30
Box 9. “Harmonization” with EU regulations .....	31
Box A4-1 Key focus areas for export-related food safety .....	58
 <b>Figures</b>	
Figure 1. Average cow milk yields, kg per cow per year, 1988-2003 .....	3
Figure 2. Total vegetable and tomato areas and yields, 1992-2004 .....	4
Figure 3. Import and export of cheeses, 1992-2003 .....	4

Figure 4. Import and export of eggs, 1992-2003 .....	5
Figure 5. Total imports and exports of agricultural and food products, 1992-2003 .....	5
Figure 6. Armenian diagnosed food-borne disease incidence per 100,000 people .....	9
Figure A1-1. Total volume of retail trade turnover by type of retail outlet .....	47
Figure A2-1. Top five food- and water-borne diseases in Armenia .....	49
Figure A2-2. Top five food- and water-borne diseases, incidence per 100,000 people.....	50
Figure A2-3. Selected zoonotic diseases .....	51
Figure A2-4. Bovine tuberculosis.....	52
Figure A2-5. Botulism and mushroom poisoning .....	53
Figure A3-1. Foot and mouth disease .....	54
Figure A3-2. Bovine anthrax cases .....	55
Figure A3-3. Sheep and goat anthrax.....	55
Figure A3-4. Bovine brucellosis.....	56
Figure A3-5. Ovine/caprine brucellosis.....	56
Figure A4-1. Severity/risk of occurrence of food safety issues in Armenia.....	57
Figure A4-2. Severity/risk of occurrence of food safety issues from an export perspective.....	58

## Tables

Table 1. Agriculture's contribution to GDP, 1998-2004 .....	3
Table 2. Armenia agro-food exports and imports 1997-2004 (\$'000).....	5
Table 3. Armenia's exports and imports of agro-food products to the CIS (\$'000; %) .....	6
Table 4. Composition of exports in 2003 (\$'000; %) .....	7
Table 5. Armenia's exports and imports of agro-food products to EU-15 (in '000 Euros) .....	8
Table 6. Armenian disease incidence per 100,000 .....	8
Table 7. Top ten Armenian internal quarantine pests and diseases.....	10
Table 8. Cattle farm structure and numbers .....	11
Table 9. SPS inspectors in Armenia .....	21
Table 10. Scoring of safety & quality systems of nine better Armenian food processing companies .....	22
Table 11. Estimated costs for the public sector (US\$ '000) .....	39
Table 12. Action plan for SPS management .....	40
Table A1-1. Structure of retail trade outlets .....	46
Table A1-2. Total volume of retail trade turnover by type of retail outlet .....	46
Table A5-1. Breakdown of costs estimates .....	59

## FOREWORD

Growing demand for better quality and safety in food products has posed great challenges to the agriculture sector of the Republic of Armenia. A small country still in transition, Armenia does not have sufficient capacity to manage food safety, agricultural health, and the sanitary and phytosanitary (SPS) issues arising as a result of its accession to the WTO. Improved SPS capacity will help Armenia's agricultural producers and processors to comply with the tightening requirements, obtain access to higher-priced market segments (particularly in the EU) and improve domestic food safety and animal and plant health, thus promoting growth in the agriculture sector and reducing poverty.

The Bank provides support to developing and transition economies preparing action plans aimed at capacity building for management of SPS systems. Among countries in transition, special support has been given to Armenia and Moldova. In 2005, World Bank teams carried out two missions to Armenia. Consultations were held with various government agencies, the private sector, and a number of donor agencies working in Armenia, and information was gathered on food safety and SPS issues. Based on the findings of this mission and additional research conducted by consultants, a draft report was prepared in late 2005. The missions looked at government policies and institutional arrangements concerning food safety and agricultural health as well as at the technical capacities for SPS management in both the private and the public sectors. Tentative results were included in the World Bank's Armenia Rural Sector Note of 2005. Work on the SPS Action Plan continued, and in December 2005, the draft Action Plan was presented at a stakeholder workshop in Yerevan to representatives of the various ministries, the private sector, and donor and international agencies. Feedback from the stakeholders was then used to revise the plan. Feedback from a second stakeholder meeting on November 3, 2006 was used to finalize the report.

This Action Plan aims to provide the Government of Armenia with information about gaps in its capacity that it must address if it is to gain optimal benefits from participation in international trade while better protecting human, animal, and plant health. In practical terms, the plan provides the Republic of Armenia with a strategy for capacity building for management of SPS requirements that can serve as a basis for policymaking, priority-setting, regulatory and institutional reforms, and project investment. This document may also be used by donor agencies working to help fill gaps in capacity through technical assistance.

## ACKNOWLEDGEMENTS

This report was prepared by a team led by Kees van der Meer (former World Bank staff, presently a consultant) and consisting of Don Humpal (consultant, Development Alternatives Incorporated) and Laura Ignacio (consultant, World Bank). Throughout the process of preparation, the team benefited from excellent cooperation from government agencies, the private sector, and other stakeholders. In particular, the feedback from the workshops with stakeholders in December 2005 and November 2006 was very helpful. The team received additional valuable support from Cees de Haan, Xin Qin, Tjaart Schillhorn-Van Veen, Gevorg Torosyan, and Cateryn Vucina Banjanin (consultants). Artavazd Habokyan drafted parts of the text dealing with legal and institutional issues. Ismael Ouedraogo provided an independent review. The team is grateful to members of the country team for their support, especially Artavazd Habokyan and Frauke Jungblut. The team thanks Benoit Blarel and Juergen Voegelé (sector managers ECA) and Sushma Ganguly (sector manager ARD) for their guidance on this project. Funding was provided by the World Bank Netherlands Partnership Program (BNPP).

## ACRONYMS AND ABBREVIATIONS

ASME	<i>Armenian Small and Medium Enterprise Project</i>
BRC	<i>British Retail Consortium</i>
BSE	<i>Bovine spongiform encephalopathy</i>
CAC	<i>Codex Alimentarius Commission</i>
CAE	<i>Caprine arthritis encephalitis</i>
CIS	<i>Commonwealth of Independent States</i>
CODEX	<i>CODEX Alimentarius (standard-setting body for food safety)</i>
DDT	<i>Dichlorodiphenyltrichloroethane</i>
EC list II	<i>European Commission list II procedures for third-country imports</i>
ELISA	<i>Enzyme-linked immunosorbent assay</i>
EPPO	<i>European and Mediterranean Plant Protection Organization</i>
EU	<i>European Union</i>
EUREPGAP	<i>European Retailers Produce Working Group (EUREP) + good agricultural practices (GAP)</i>
FAO	<i>Food and Agriculture Organization of the United Nations</i>
FAOSTAT	<i>FAO Statistical Database</i>
FDI	<i>Foreign direct investment</i>
FMD	<i>Foot and mouth disease</i>
FSU	<i>Former Soviet Union</i>
GAP	<i>Good agricultural practice</i>
GATT	<i>General Agreement on Tariffs and Trade</i>
GDP	<i>Gross domestic product</i>
GMO	<i>Genetically modified organisms</i>
GMP	<i>Good manufacturing practice</i>
GOST	<b>gosudarstvennyy standart</b> , or state standard
GPAT	<i>Global Program for Avian Influenza</i>
Ha	<i>Hectare(s)</i>
HACCP	<i>Hazard analysis and critical control point</i>
Hg/Ha	<i>Hectogram per hectare</i>
IPPC	<i>International Plant Protection Convention</i>
ISO	<i>International Organization for Standardization</i>
MAP	<i>Market access program</i>
MTED	<i>Ministry of Trade and Economic Development</i>
NGO	<i>Nongovernmental organization</i>
OECD	<i>Organization for Economic Co-operation and Development</i>
OIE	<b>Office International des Epizooties</b> or World Organization for Animal Health
PCR	<i>Polymerase chain reaction</i>
PHARE	<i>Poland and Hungary: Assistance for Restructuring their Economies</i>
POP	<i>Persistent organic pesticide</i>
Saniped	<i>Hygienic and Anti-Epidemiological State Inspectorate</i>
SansPins	<i>Sanitary norms and hygienic rules</i>
SAPARD	<i>Special Accession Programme for Agriculture and Rural Development</i>
SEE	<i>State Executive Establishments</i>
SNCO	<i>State Non-Commercial Organization</i>
SPS	<i>Sanitary and phytosanitary measures</i>
SVI	<i>State Veterinary Inspectorate</i>
UN	<i>United Nations</i>
USAID	<i>United States Agency for International Development</i>
WHO	<i>World Health Organization</i>
WTO	<i>World Trade Organization</i>

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## EXECUTIVE SUMMARY

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Like all other countries in the Commonwealth of Independent States (CIS), Armenia operates with a system of standards that include GOST standards and the sanitary and phytosanitary regulations used in the former Soviet Union's centrally planned economy. In January 2005, the GOST standards were *de jure* abolished, but they have not yet been replaced by a system of international standards, thus creating a legal limbo. In practice, many of food safety inspections continue as if the GOST system were still mandatory. Whether Armenia's control system and border procedures are in compliance with international requirements therefore remains an open question. In general, these old standards form obstacles to market access as they are not recognized in market economies. Moreover, the GOST system and its present implementation do not provide optimal food safety and agricultural health protection for the Armenian population and its agriculture.

A growing trend in the management of food safety and agricultural health around the world is being driven, first, by the recognition of the WTO SPS Agreement and, second, by a series of food scandals. The WTO SPS Agreement requires new discipline from regulatory authorities and calls for international harmonization and transparency. The food scandals (involving dioxin, pesticides, salmonella, BSE, hepatitis, and other hazards) and food scares (notably avian influenza) have increased considerably public awareness of food safety issues, especially in OECD countries. Consequently, consumers have asked for better safeguards and greater transparency, and politicians and private enterprises have responded with changes in the management of their systems. The result has been a more holistic approach to safety and quality management throughout the supply chains.

Armenia has reached a critical juncture as a WTO member and growing participant in international trade. A closed border has partly shielded the country's domestic industries from direct competition from Turkey. The export industries have benefited from the slower recovery of the food industries in neighboring states, a relatively secure energy supply, good trade relations with Russia and the Ukraine, and growing (if small in volume terms) interest in traditional products among the Armenian diaspora in the European Union and the United States. Continued growth is threatened by the accelerated pace of development in near neighbor markets, however, and by the increasing consolidation of supply and distribution chains in Russia and Ukraine. The diaspora specialty product niches, too, are being strongly challenged by producers of similar products in Eastern European countries, such as Bulgaria, who have consolidated their food processing industries to meet the demands of EU and USA markets. In addition, developed country imports challenge the premium price segments in domestic markets.

International trends in food safety management include increasing scope of requirements, tighter standards, and demand for independent public and private certification. This is true in both OECD and CIS countries. The requirements of supermarkets and other major buyers of food and agricultural products in Russia, for example, have become important for access to market segments that carry premium prices. While it is easy for many Armenian companies to meet the familiar standards for GOST products, this approach merely channels them into the same market segments already accessed by many other former Soviet countries, almost guaranteeing declining prices and profits. Moreover, Armenia has decided to bring its SPS regulations into convergence with those of the EU. Strategic investment is thus needed to help in the adoption of an operational system of international standards and convergence with EU regulations.

A key constraint to overcoming current food safety threats and to meeting new opportunities for agricultural products is that Armenia's transition from a centrally planned economy to a market economy is not finished. Much of the country's legal, regulatory, and institutional framework is still based on GOST and transposed Soviet sanitary and phytosanitary standards. Public services still use GOST as their *de facto* framework for monitoring, surveillance, and inspection of manufactured and processed products. While basic laws have been changed to facilitate the shift to a system based on international standards, very little has been done to develop and harmonize the regulations and day-to-day practices needed to strengthen the transition to a market-based domestic and export food sector while better protecting the human, animal, and plant health that sustains the industry.

Modernization of the present system of management of food safety, and animal and plant health will be necessary to (i) maintain access to profitable market segments in CIS countries, and (ii) increase access to new export markets through diversification, especially in the EU. Replacement of the present system of GOST and Soviet-era sanitary and



phytosanitary inspections by an up-dated system based on international standards will reduce costs - and hence improve competitiveness - while also improving food safety and agricultural health.

Armenia and many other small countries with low income have difficulties meeting international requirements for market access because of resource constraints. Transition economies face the additional challenges of reforming their systems. They need support from the international community for making these adjustments.

The **direct objective** of this action plan is to provide the Government of Armenia, donors, and international finance organizations with a comprehensive framework for analysis, design, and implementation of capacity building efforts in the area of SPS measures. The **ultimate objective** of improving SPS management is to enable people in Armenia to benefit from growth in international trade, to protect human health by improving the safety of the food supply, and to sustain growth by protecting livestock and crop production against the introduction of pests and diseases. A food safety and agricultural health management system based on WTO principles and good practice for market economies will improve the competitiveness of Armenia's agro-industries, consolidating trends in domestic import substitution and building a solid foundation for diversified growth in regional and extra-regional export markets.

The action plan is based on analysis of information on human health and agricultural health, the economic performance of the agro-food sector, and the capacities of Government and private sector entities to manage food safety and agricultural health. The analysis also aims to bring in good practice recommendations based on experiences from other countries.

The following presents the recommended actions for capacity building for the more effective management of SPS requirements. More detailed discussions can be found in the text in paragraphs 4.18 through 4.62.

**Facilitating coordination.** A coordination team would minimize overlapping of functions and duplication of activities, thus avoiding inefficient use of resources.

- **Action 1:** *Establish a coordination team that includes a project manager and an international SPS coordinator to be supported by specialists in food safety and plant and animal health and a full-time translator.*

**Market opportunities.** Products proven thus far to have export potential include wine and brandy, fish and crayfish, cheeses, and fresh and dried fruits and vegetables. Further opportunities may arise for other dairy and meat products, but the signs of potential for these products are weaker.

- **Action 2:** *Assess Armenia's competitiveness in fish, dairy, and livestock products to determine the potential benefits of investment to seek EU third-country status for these products.*

**Institutional and legal framework.** The organization of public services engaged in managing SPS requires adjustment to reduce the number of agencies involved to make better use of scarce resources and minimize overlapping responsibilities and duplication of effort. The legal void in regulatory standards related to produce and processed foods due to de jure abolition of GOST standards also requires placing a high priority on drafting regulations that meet international requirements.

- **Action 3:** *Develop and adopt an institutional and legislative framework that would eliminate the overlapping responsibilities of various ministries and create a basis for an efficient and effective system of food safety control.*
- **Action 4:** *Assess the best institutional set-up for Armenia - a single agency for food safety or a much improved alignment among the present services - and realign existing roles and responsibilities.*
- **Action 5:** *Adjust law and policy to make Saniped (Hygienic and Anti-Epidemiological State Inspectorate) responsible for food safety in the marketplace, with consolidation of authority for market testing and inspection of all retail food products, as well as for sales points for food and beverages.*
- **Action 6:** *Establish a system of public-private consultation for managing SPS that includes industry, farmer associations, and consumer groups and help prepare meeting agendas.*
- **Action 7:** *Translate into Armenian at least the WTO summary notifications and include a WTO language qualification as a hiring or promotion criterion in SPS-related bodies.*
- **Action 8:** *Assess whether Armenia's SPS control systems and border procedures meet the WTO test of nondiscrimination, with a view towards developing an action plan for bringing these systems into conformity with international requirements, as necessary.*

- **Action 9:** Prepare a work program on regulatory amendments (including resources needed and methods and principles to be applied) with priority placed on regulations for niche products with EU export potential, that is, wine and spirits, processed crayfish, freshwater fish and fish caviar, cow and goat's milk cheeses, and honey, and provide support to the task force.

**Inspection, monitoring, and surveillance.** The prevailing system of monitoring, surveillance, and inspection for food safety, plant and animal health, and agrochemicals loses part of its rationale when placed within the context of international standards and market economy principles.

- **Action 10:** Review all authorized inspection functions, abolish duplicate functions and those not useful in a market economy, improve the transparency of the inspection and certification process, and suppress corrupt inspection practices.
- **Action 11:** Improve governance of inspectorates by formulating procedures to be followed by public inspection services, requiring publication of work plans, periodic reporting, and the conduct and publication of performance audits.
- **Action 12:** Assess and improve programs for human and animal health monitoring. These monitoring programs should provide food safety and animal health managers with information about and directives to focus their efforts on new and evolving priorities.
- **Action 13:** Assess the priorities for funding public veterinary tasks and adjust the program.
- **Action 14:** Provide an official version of the present quarantine list in an IPPC language, including scientific names, and assess its relevance for current needs.
- **Action 15:** Design and recommend a system for pesticide container collection.

**Diagnostic capacities.** Laboratories are often poorly equipped or obsolete and lack programs for upgrading equipment, methods, and staff.

- **Action 16:** Evaluate Armenia's laboratory system and prepare a strategic plan for its development, with special emphasis on consolidation, to improve the likelihood of adequate operations and maintenance funding.
- **Action 17:** Rebalance the funding of laboratory upgrades by reducing staff and allocating cost savings to the operation and maintenance of equipment.
- **Action 18:** Consider consolidating food safety laboratory capacity in the Republican Central Laboratory of the Hygienic and Anti-Epidemiological State Inspectorate (Saniped laboratory), especially the primary responsibility for official pesticide and veterinary material residue testing.
- **Action 19:** Reinforce the central public health laboratory to enable Armenia to deal with the rapidly increasing demands for improved surveillance and monitoring of food safety and agricultural health and to improve the scientific basis for mandatory regulations and voluntary standards.
- **Action 20:** Upgrade facilities and equipment of the central public health laboratory to meet requirements for international ISO 17025 certification.
- **Action 21:** Assess costs and benefits of upgrading plant quarantine testing and laboratory facilities.
- **Action 22:** Rebuild a strengthened pest, disease, and weed seed identification capacity within the Central Plant Protection and Quarantine Laboratory.
- **Action 23:** Recast the National Veterinary Laboratory as a reference laboratory focusing on confirmation of livestock diseases and parasites and on the essential task of ensuring the effectiveness and safety of veterinary vaccines and medicines employed to control disease.
- **Action 24:** Until the Saniped laboratory can be upgraded, contract pesticide residue analysis beyond the organochloride and organophosphate families to a private laboratory with more advanced and precise instrumentation.

- **Action 25:** *Include as a special category in the monitoring programs of imported food and agricultural products the sampling and testing of products for pesticide residues, veterinary materials, allergens, additives, and colorants.*
- **Action 26:** *Develop a program for sampling imported pesticides and their domestic reformulations and contract their testing to a qualified laboratory.*

**Border procedures.** Complicated import and export procedures increase the transport and handling costs of goods. Duplicate inspections are not uncommon for food imports and plant materials.

- **Action 27:** *Improve veterinary and plant inspection and quarantine border crossing sampling and diagnostic capacity (with pilots for a selected set).*
- **Action 28:** *Establish plant and animal quarantine facilities within Armenia.*
- **Action 29:** *Move the physical location for final SPS clearances on imports to border posts.*
- **Action 30:** *Co-locate inspection services (veterinary and plant quarantine) at the same border post inspection facility.*
- **Action 31:** *Prepare for the progressive elimination of conformity assessment by the Ministry of Trade and Economic Development*

**Risk assessment and economic analysis.** Regulations and investments in capacity building for food safety and agricultural health should be based on considerations of costs, opportunities, and risks. Together these form a scientific basis for SPS management.

- **Action 32:** *Establish a small unit with expertise in risk assessment to provide firm science-based advice to government units responsible for safety management. Some of the unit's expertise can be shared by food safety and plant and animal health services.*
- **Action 33:** *Evaluate inspection, monitoring, and surveillance programs with regard to setting priorities and to attaining cost effectiveness; propose methods for their design and methodology; and formulate a program for the first year.*
- **Action 34:** *Conduct cost-benefit analysis of the current livestock investment strategies of Government and donors.*

**Emergency response.** The present system for stamping out livestock diseases is not sufficiently effective and should be combined with a restocking program using primarily financial tools.

- **Action 35:** *Research and design an improved system to support the stamping out of livestock diseases, with a special emphasis on zoonoses.*

**Information and education.** Awareness-raising and education are important elements in programs to improve food safety and agricultural health. A role may also exist for the domestic retail industry to promote compliance with international private retail requirements for food safety.

- **Action 36:** *Use the media, programs in schools, and training programs for industry workers and farmers to increase public awareness of and education about public health, food hygiene, and food safety. Special attention should be paid to informing farmers about practices for avoiding zoonotic diseases and to educational programs to reduce botulism and mushroom poisoning.*
- **Action 37:** *Design a support project to enhance the role of consumer, trade, and business associations in promoting food safety at the retail level.*

**Private sector.** Most private companies can benefit from assistance to upgrade buildings and processing equipment and for cleaning and disinfection to improve overall quality and safety management systems. The need also exists for supporting the development of coordinated supply chains that may upgrade safety and quality standards. Water quality is a major constraint for food safety and the competitiveness of the food industry.

- **Action 38:** *Improve water treatment for overall hygiene and safety in food processing plants.*

- **Action 39:** *When benefits exceed costs, develop, in cooperation with banks and donors supporting private sector projects, financial tools (lending guarantees and grants) to upgrade coordinated supply chains, buildings, and processing equipment and to introduce HACCP and other management tools needed by modernizing agribusinesses.*
- **Action 40:** *Develop a comprehensive plan for convergence toward international principles of hygiene in food processing, accompanied by timetables and a financing plan.*

**Recommendations involving grants from other programs.** The following recommended actions currently financed by other programs have critical impact on food safety:

- **Action 41:** *Incorporate additional water treatment and handling investments in the Rural Infrastructure Support program. Grants may be needed in some zones to treat wells, improve local water purification and treatment, and provide alternative sources or advanced treatment of water.*
- **Action 42:** *Provide grant financing to design a plan for the safe destruction of persistent organochloride and out-dated pesticides.*

**Funding of recommended actions.** Funding for implementation of the above recommendations would come from government resources and assistance from donor and international agencies. For a more effective disbursement of funds, however, support should be based on program priorities and evaluation of capacity utilization, among other factors. The effectiveness of donor assistance and overall investments depends on governance and regulatory enforcement. In the long term, new efforts could be funded from savings achieved by increasing efficiency, abolishing outdated GOST activities, and phasing out low priority tasks.

**Public and private sector responsibilities.** Institutional capacity in SPS is shaped by the national legal framework and the public and private capacities for regulating and managing food safety and animal and plant health. At the end of the day, the general public, as consumers, are responsible for the final stages of the safe handling and preparation of the foods and beverages they buy and consume. The role of the public sector is to enforce the regulations needed to ensure the basic safety of the food supply, to support private entities with public infrastructure and services, and to inform and educate the public about food safety risks and their management. With regard to plant and animal health, the public sector monitors and identifies pest and disease outbreaks nationally; excludes foreign pests and diseases in imported products; takes quarantine and curative actions; underwrites research into plant and animal health problems; and works with producers, processors, and suppliers to address these problems.

## 1. INTRODUCTION

**1.1. Standards.** At their independence, Armenia and the other Commonwealth of Independent States (CIS) countries inherited the GOST system of standards and the sanitary and phytosanitary regulations used in the central planned economy of the Soviet Union. This system consists of thousands of standards, which are a mixture of technical prescriptions, quality parameters, agricultural health standards, and safety standards. Most of Armenia's health and safety standards are command and control prescriptions not based on transparent scientific criteria. Often these food safety requirements are lower than the standards of the CODEX Alimentarius Commission (CAC or Codex) and other international standards. Veterinary and phytosanitary regulations were equally rigid, even though they were broadly based on principles of the World Organization for Animal Health (*Office International des Epizooties or OIE*) and the International Plant Protection Convention (IPPC), with provisions that often overlapped with GOST rules, causing duplication of effort and turf conflicts among regulatory agencies. GOST standards in general form an obstacle for market access as they are not recognized in market economies. They reduce competitiveness in exports outside CIS markets because they allow producers little flexibility to follow market trends and consumer tastes and involve extensive inspections throughout the production and trade channels. The older GOST standards also specify analytic techniques for official laboratories that are often outmoded and unreliable. Moreover, the GOST system and its present implementation do not provide optimal food safety and agricultural health protection for the Armenian population and its agriculture.

**1.2. With its accession to the World Trade Organization (WTO) in February 2003, Armenia committed itself to the application of international standards.** Upon accession, Armenia undertook the obligation to apply sanitary and phytosanitary (SPS) measures consistent with the requirements of the WTO Agreement. It did not seek recourse to a transition period. Article 3.1 of the Agreements on Sanitary and Phytosanitary measures (*see Box 1*) expresses the aim of harmonizing SPS measures on as wide a basis as possible and states the obligation of members to "base" their SPS measures on standards, guidelines, or recommendations adopted by CODEX in the area of food safety, OIE in the area of animal health, and IPPC in the area of plant health.

### Box 1. WTO SPS measures

**Sanitary and Phytosanitary (SPS) measures** as defined in the WTO SPS Agreement of 1994 can be taken to protect human and agricultural health (animal health and plant health) against risks of hazards related to trans-border trade of agricultural and food products. The measures should be taken in a transparent way, be based on science, avoid discrimination, and avoid unnecessary interruption of trade. There are four situations in which sanitary and phytosanitary (SPS) measures apply:

- Protection of human or animal health arising from risks coming from additives, contaminants, toxins, or disease-causing organisms in foods, beverages, or feedstuffs;
- Protection of human life or health from risks arising from diseases carried by animals, plants or products thereof, or from the entry, establishment or spread of pests;
- Protection of animal or plant life or health from risks arising from the entry, establishment or spread of pests, diseases, or disease-carrying organisms; and,
- Prevention or limitation of damage caused by the entry, establishment or spread of pests and diseases.

Source: WTO SPS Agreement.

**1.3. Yet, the system of GOST standards has not yet been replaced by a system of international standards.** In January 2005, the GOST standards were *de jure* abolished, but since few international standards have been developed, a legal limbo has resulted. In fact, many inspectors continue to use GOST standards for their daily work. One reason is the vested institutional interest in the continued use of the GOST standards, including the requirements for exports to CIS countries. The other is the enormous amount of work and expertise needed to review the thousands of GOST standards, study the alternative standards of the CODEX, the EU, and other countries, and replace or abolish the old standards. Importantly, a major adjustment of inspection procedures and testing capacities will also be needed to introduce a new and operational regulatory and voluntary standards system. Inconsistencies between Armenian law and the international standards for veterinary (OIE) and phytosanitary (IPPC) regulations also require substantial adjustment efforts.



**1.4. Armenia faces challenges in changing market requirements.** All over the world, market access requirements, especially for food safety, are tightening. Acceptable levels for contaminants are decreasing and the number of requirements is increasing. The sampling and testing frequencies for imported products in the United States, the European Union, and many other countries are also increasing. This also applies to requirements in Armenia's traditional markets. Several other CIS countries, including Russia, are negotiating WTO membership and aiming at convergence with EU standards. Other transition economies have entered the European Union or are pre-accession countries. Moreover, retailers and food processors are tightening their private standards as they modernize consumer markets. It is expected that the market segment accepting GOST standards will gradually decline and will offer lower prices as compared to other segments. Hence, Armenia's lack of an operational system of international food safety and agricultural health standards increases its risk of reduced market access and loss of competitiveness. For these reasons, transformation of the standards system and adjustment of the safety requirements deserve high priority.

**1.5. The action plan aims to help Armenia successfully implement a food safety and agricultural health management system based on WTO principles and good practice for market economies.** The **direct objective** of this action plan is to provide Government, donors, and international finance institutions a comprehensive framework for analysis, design, and implementation of interventions in the area of sanitary and phytosanitary measures. It is based on analysis of information on human health and agricultural health, economic performance of the agro-food sector, and capacities of the Government and private sector entities to manage food safety and agricultural health. Such a system will improve competitiveness and allow for diversification into more demanding premium-price market segments. The **ultimate development objective** of this action plan is to raise the living standards of the people of Armenia by enabling them to participate fully in the benefits of international trade while adequately protecting human health by ensuring a safe food supply and by protecting livestock and crops from the introduction of pests and diseases.

**1.6. An action plan for food safety and agricultural health cuts across many professional fields**—legal, enforcement, scientific disciplines, trade, commerce, diplomacy, and so on—and involves many stakeholders. Therefore, preparation of the action plan requires taking stock of many issues, analysis of data, and consultation with stakeholders. Since the views and interests of stakeholders—public and private—are not necessarily the same, rounds of consultation are necessary to obtain the relevant information, formulate priorities, identify main decision points, and build consensus where possible.

**1.7. This action plan aims to provide guidance for completing the transformation to a system of food safety and agricultural health protection that will enable Armenia to gain optimal benefits from participation in international trade.** Chapter Two starts with an overview of the performance of Armenia's agricultural sector and information about the current human, animal, and plant health situation. Chapter Three describes the evolving institutional, legal, and regulatory system covering food safety and animal and plant health. Chapter Four offers conclusions, recommendations, and an action matrix. Priorities are suggested, but the overall plan and prioritization deserve further consideration and dialogue with stakeholders both inside and outside the Government<sup>1</sup>.

<sup>1</sup> A stakeholder consultation workshop was held in Yerevan in December 2005, with follow-up consultations with ministries, academia, and the donor community.

## 2. AGRICULTURE AND SPS ISSUES

### Agricultural Production and Trade

**2.1. Armenia was quick to recover from the usual shocks experienced by transition economies.** The break-up of the Soviet Union had major implications for the Armenian economy. Supply chains collapsed and output in most sectors shrunk. Loss of assured input and output markets in the former Soviet Union (FSU) severely affected the farm and agro-processing industries. Yet, in recent years, the Armenian economy has grown annually by double-digit rates (Table 1). The agricultural sector's contribution to GDP has fluctuated, but it was on average significant. After independence, agriculture employed nearly three times as many people as it had before, largely due to the collapse of nonagricultural income sources rather than to the economic attractiveness of the agricultural sector. The growth in the sector has been driven by productivity gains largely attributable to liberal market mechanisms, private ownership of land, domestic demand, export increases, and irrigation improvements. Despite its decreasing contribution to GDP, agriculture has maintained its central importance for overall employment (46 percent in 2003) and rural incomes (52 percent in 2003).

**Table 1. Agriculture's contribution to GDP, 1998-2004**

	1998	1999	2000	2001	2002	2003	2004
Gross Domestic Product, % change over the previous year	7.2	3.3	5.9	9.6	12.9	13.2	10.1
Gross Agricultural Product growth, % change over the previous year	12.9	1.3	-2.5	11.6	4.4	4.3	14.5
Agriculture's contribution to GDP growth, %	3.8	0.5	-0.3	2.7	1.1	1.0	3.1

Source: National Statistics Service and Central Bank of Armenia.

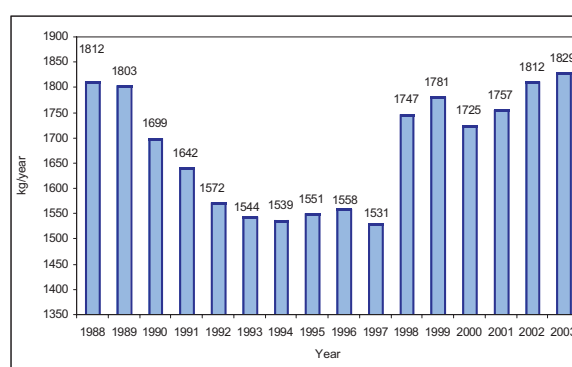
**2.2.** As such, agriculture serves two important functions in the economy: it is an important contributor to the country's economy, and it serves as the key safety net for large parts of the rural population. For Armenia's rural households, agriculture still has a strong subsistence orientation.

**2.3.** Crops contribute more than half of Gross Agricultural Output Value. The climatic conditions in Armenia are appropriate for growing temperate fruit and vegetable crops, potatoes, and cereals. Cereals remain the primary crops for subsistence-oriented farm households. Typically, wheat is the main food item in rural families, and production of wheat provides a safety net for poor rural households.

**2.4.** Livestock production in Armenia consists of production of milk and meat from cows, sheep, and meat. Cattle-breeding is Armenia's dominant livestock production activity, and milk is the most important livestock product. Milk and milk products serve as the main source of protein for Armenians, and poor rural households consider them safety-net items. After privatization, a dramatic decline in yield per cow occurred (Figure 1). Only after 1997 did yields recover, and in 2003 the average yields rose above the pre-transition level. Still, yields are very low compared with international standards.

**2.5. Since independence, the composition of Armenia's agriculture has shifted considerably.** Marketed production is less than half the overall output on average, although commercialized farming has started to pick up. (For information on food processing, see Appendix 1.)

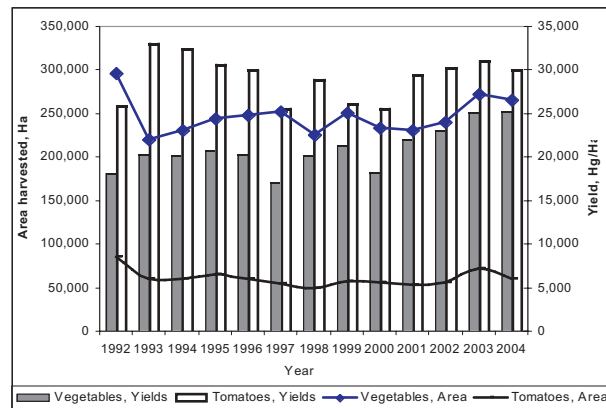
**Figure 1. Average cow milk yields, kg per cow per year, 1988-2003**



Source: National Statistics Service, various publications.

2.6. Following the transition in the early 1990s, processing plants were downsized as supplies of raw materials decreased. These trends have more recently been reversed, with fruit and vegetable yield and production increasing due to investment in and rehabilitation of processing facilities; strengthening FSU markets for tomato paste, canned fruit, and vegetables; and new markets for processed fruits and vegetables (Figure 2). Vegetables, especially tomatoes, have become cash crops for farmers in Ararat valley. The increased demand from processors for quality tomatoes, especially for tomato paste production, is being met by new varieties of tomatoes with high solids content, resulting in high processing yields.

**Figure 2. Total vegetable and tomato areas and yields, 1992-2004**

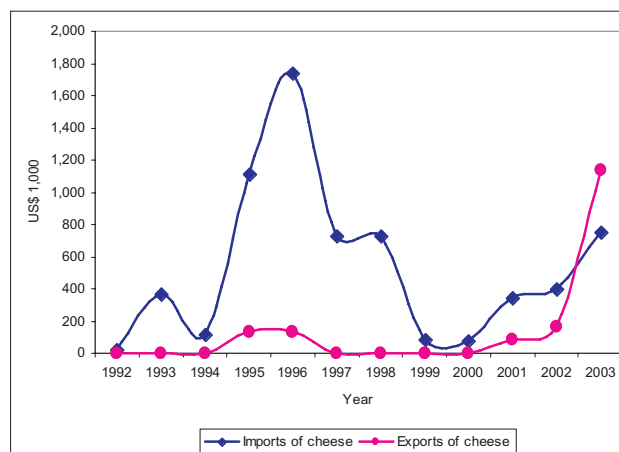


Source: FAOSTAT.

2.7. Potatoes present a considerable potential for commercialized agriculture. The domestic demand for potatoes and potato products is increasing, and export may become feasible due to Armenia's earlier growing season relative to Georgia's. Potato production is expected to continue to increase and export to develop as improvements are made in transport and handling infrastructure, processing facilities, and wholesale markets.

2.8. The increase in domestic demand for dairy products is largely the result of increased disposable income among the population. As incomes increase, it is likely that demand in this sector will further increase as a whole and also that market differentiation based on quality and price will occur. Any major expansion of the sector, however, will rely on exports, for which there is a clear current demand. Armenia is well placed to compete in the Russian market if it can supply cheeses of high and consistent quality to high-end specialty markets. Figure 3 shows that the value of cheese imports was high in the mid 1990s then declined rapidly and increased again. In recent years, cheese exports have increased and now exceed imports. The curves reflect the domestic industry's initial collapse, subsequent recovery through import substitution, and recent expansion through exports. The growing imports in recent years may reflect diversification of demand because of increased income.

**Figure 3. Import and export of cheeses, 1992-2003**



Source: FAOSTAT.

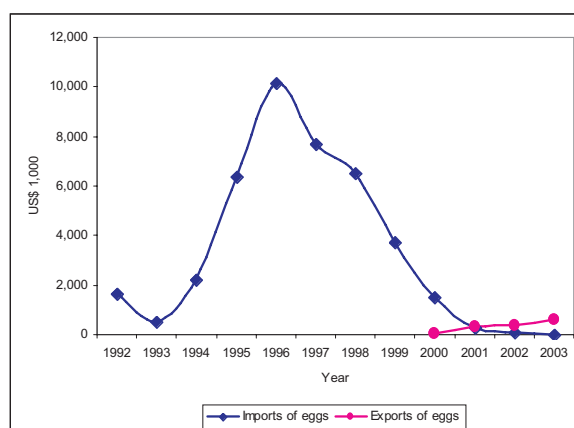


**2.9.** Egg production shows a similar trend (Figure 4). In the mid 1990s, considerable quantities of eggs were imported, followed by complete import substitution of eggs and, in recent years, even expansion into egg exports.

**2.10. The Armenian consumer market has diversified.** With recovering income levels, consumers are demanding more varied and higher quality foods, and Armenian producers have been able to meet the domestic demand for agro-food products (domestic market, Appendix 1 ). Increased production capacity and product quality are the major drivers of this multi-year trend. Producers in the dairy, poultry, and meat sectors have been able to meet the domestic demand for fresher foods and for foods carrying the label “grown with no preservatives,” thus successfully substituting their products for imports (see Box 6). Thus, agro-food imports from CIS and EU-15 countries (major exporters to Armenia) have been fairly stable over recent years while Armenia’s agro-food exports have increased (Figure 5 and Table 2). The exception was in 2004, when grain and meat imports increased following the poor harvest of 2003.

**2.11.** Imports of food products not produced in Armenia have increased, including products of tropical origin and processed breakfast foods, snacks, confectionary, and juices. Armenia has little comparative advantage in grain production, so it is expected that with reduction of poverty and the growth of commercial vegetable and fruit farming the already significant volume of imported grain will further increase.

**Figure 4. Import and export of eggs, 1992-2003**



Source: National Statistics Service, various publications.

**2.12. Agricultural performance is thus reflected in increased exports and stabilized imports** (Figure 5). The leading products undergoing export increase were alcoholic beverages, crayfish, cheeses, and fresh fruits and vegetables. Food and agricultural exports from Armenia have accounted for about 12 percent of Armenia’s rapidly growing export sales over the past several years (Table 2). The share of total imports of food and agricultural imports is about 20 percent, lower than in the late 1990s. Fresh food products, which include eggs, fruits, vegetables, and fish, account for the majority of the value of Armenia’s total food and agricultural exports. In industrial countries, these fresh products have a high income elasticity of demand, and in many cases they have not been restrained by traditional agricultural trade barriers<sup>2</sup>.

**Table 2. Armenia agro-food exports and imports 1997-2004 (\$'000)**

	2004	2003	2002	2000	1999	1997
<b>Exports</b>						
Agro-food	77,660	76,859	55,115	26,407	14,934	22,890
Total	668,673	634,929	349,810	284,796	219,835	213,183
Agro-food %	12	12	16	9	7	11
<b>Imports</b>						
Agro-food	275,768	211,926	190,099	208,828	208,434	234,512
Total	1,230,663	1,186,099	921,003	828,208	805,614	752,936
Agro-food %	22	18	21	25	26	31

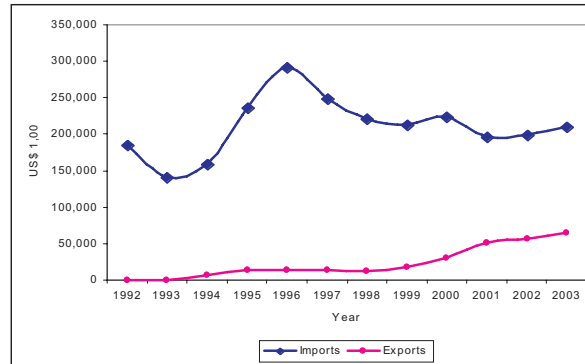
Source: UN COMTRADE Data.

Note: No data available for 2001 and 1998.

<sup>2</sup> Unnevehr, L. and N. Hirschorn, "Food Safety Issues in the Developing World," World Bank Technical Paper No.469.

**2.13. Trading partners.** Agro-food exports were directed primarily to Russia (meats, dairy products, fresh vegetables, spirits), EU-15 countries (fish, canned fruit and vegetables, spirits) and Ukraine and Georgia (all types of agro-food exports). Russia continues to be Armenia's main trading partner, absorbing about 75 percent of Armenian agro-food exports. Although the share of the Commonwealth of Independent States (CIS) in overall Armenian exports has declined over the past years, reaching around 19 percent<sup>3</sup> in 2003, the share of food and beverage exports remains strong at almost 90 percent on average (Table 3 and Table 4). CIS countries, especially Russia and Georgia, remain the main markets for Armenia in terms of food and beverage exports. There is little export to the European Union and the United States, partly because of distance but more importantly because many Armenian exporters cannot meet these markets' quality and safety standards and quantities supplied are small. Access to CIS markets and other markets is less demanding.

**Figure 5. Total imports and exports of agricultural and food products, 1992-2003**



Source: FAOSTAT.

**Table 3. Armenia's exports and imports of agro-food products to the CIS (\$'000; %)**

	2004	2003	2002	2000	1999	1997
<b>Exports</b>						
Total Agro-food	77,660	76,859	55,115	26,407	14,934	22,890
Of which CIS Countries	67,606	68,437	48,943	24,056	12,535	20,551
Agro-food %	87	89	89	91	84	90
<b>Imports</b>						
Total Agro-food	275,768	211,926	190,099	208,828	208,434	234,512
Of which CIS Countries	75,702	48,624	72,613	16,671	14,061	16,742
Agro-food %	27	23	38	8	7	7

Source: UN COMTRADE Data.

Note: No data available for 2001 and 1998.

**2.14. Armenian exporters can fairly easily access the Russian and other CIS markets because of shared history and extensive ethnic networks.** The use of common GOST-based standards facilitates market access among CIS countries and retards market access to OECD countries. Armenia shares many of the same GOST standards with the CIS countries, but that will change. Russia's WTO membership is still under negotiation and its accession date is far from certain. In the meantime, Armenia's regional trading partners, especially Ukraine and Russia, will increasingly cause their SPS standards to converge with those of the EU. Over the next five years, their systems are likely to become hybrids of old GOST and updated EU standards. Rapid development of modern retail systems in Russia will most likely also affect market requirements. In Russia, international supermarket chains are already taking market share from smaller shops. Just as in OECD countries, suppliers will have to meet the protocol requirements of main retailers. These requirements will be more comprehensive than public food safety requirements and can be met only by using up-to-date packing and processing facilities.

<sup>3</sup> Statistical Yearbook of Armenia, 2004.

**Table 4. Composition of exports in 2003 (\$'000; %)**

	Value Exported to CIS	Value Exported to Others	CIS Share (%)
Alcoholic and non-alcoholic beverages and vinegar	57,289	2,817	95.3
Preparations of vegetables, fruit, nuts, or other parts of plants	5,783	1,936	74.9
Coffee, tea, and other spices	1,766	58	96.8
Milk and dairy produce; eggs; natural honey; edible products of animal origin	1,486	416	78.1
Tobacco and manufactured tobacco substitutes	1,243	2,163	36.5
Edible fruit and nuts; peel of citrus fruit or melons	1,113	37	96.7
Meat and edible meat offal	473	3	99.3
Preparations of meat, fish, or crustaceans, mollusks, or other aquatic invertebrates	301	31	90.6
Animal and vegetable fats and oils	173	0	99.8
Live animals	143	30	82.6
Fish and crustaceans, mollusks, and other aquatic invertebrates	108	3,036	3.4
Edible vegetables and certain roots and tubers	30	63	32.6
Sugar and sugar confectionary	84	0	99.9
<b>Total value of all agricultural and non-agricultural exports</b>	<b>1,291,058</b>	<b>5,564,934</b>	<b>18.8</b>

Source: Statistical Yearbook of Armenia, 2004.

**2.15.** One major factor for the development of Armenia's trade and domestic market would be the opening of the border with Turkey. Turkey would be a trading partner very closely aligned with EU standards and with major chain store operators who will be able to put substantial pricing pressure on similarly packaged products.

**2.16.** With progress in domestic processing and storage, the potential will increase for exports of Armenian vegetables and vegetable products (especially dried or frozen vegetables) to traditional CIS markets. The improvement in ground transportation through Georgia and the existence of regular flights to Moscow will provide an opportunity for Armenian producers to export high-value early season vegetables, such as tomatoes, eggplants, and peppers, to fresh produce retail markets in Georgia and Russia, especially if these producers can improve post-harvest handling and increase greenhouse production.

**2.17.** While exports to CIS markets normally include traditional food products and beverages, such as cheeses, fresh vegetables and fruits, canned foods, and so on, exports to European Union consist of non-traditional items, such as fish and crayfish and dried fruits and vegetables. Armenian producers have been able to identify the niche markets (Box 5), and with donor support, they have received registration and certification for supplying value-added products to the EU.

**2.18.** Armenian exporters have an advantage in the supply of products consumed by the Armenian diaspora throughout the region and around the world. These include products such as the Cornelian cherry and preserved young walnuts in heavy syrup, as well as specialty regional cheeses such as Lori cheese. Food import requirements in various markets are changing rapidly, however. Most of Armenia's exports to the United States are handled by Armenian importers who provide labels and handle much of the regulatory paper work required by the US customs and the Homeland Security inspectors. Consumption of these products is common to many immigrants from other CIS countries, and these countries often produce the same or similar products (Box 2).

#### **Box 2. Competition in ethnic markets**

There is competition in the US for the Armenian diaspora and CIS immigrant market and private standards for traditional products and their packaging have gotten tougher over the last five years. One of the leading US importer/distributors of processed food products from the CIS is Armenian-American and has expressed a good deal of exasperation with the variable quality of product from Armenia. His main supplier of typically Armenian products is now a firm in Bulgaria.

Source: The authors.

**2.18.** Exports to the European Union remain few (see Table 5). Although a few individual producers and processors have succeeded in exporting agro-food products from Armenia to European markets, most companies cannot meet EU importers' requirements for quality, safety, and volume. Yet, the EU market offers opportunities for a range of products and specialties for which prices are relatively attractive. With increased quantities and quality and improved safety management, more Armenian exporters will be able to diversify into markets for special products.

**Table 5. Armenia's exports and imports of agro-food products to EU-15 (in '000 Euros)**

	Fish and Crustaceans, Mollusks, and Other Aquatic Invertebrates		Edible Vegetables and Certain Roots and Tubers		Edible Fruit and Nuts; Peel of Citrus Fruit or Melons		Preparations of Vegetables, Fruit, Nuts or Other Parts of Plants		Beverages, Spirits, and Vinegar	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
1995	0	0	0	11	0	2	0	89	24	2,103
1996	0	0	0	396	0	5	959	1,310	43	9,196
1997	117	11	3	201	0	14	1,283	793	43	5,276
1998	252	335	0	421	2	0	0	1,879	37	1,866
1999	197	891	0	195	0	0	0	1,198	49	549
2000	188	4	0	261	14	0	12	823	144	431
2001	94	0	66	380	15	0	61	1,442	361	663
2002	1,441	0	54	755	0	13	126	1,715	371	735
2003	2,526	1	45	582	2	0	66	1,224	216	607
2004	1,616	7	49	580	2	9	42	1,543	386	794

Source: Comext at <http://fd.comext.eurostat.cec.eu.int/xtweb/> Note: Reporter EU-15.

**2.19.** For most products, however, no Armenian companies are currently able to supply the volume of fresh produce exports required to warrant investment in the comprehensive and stringent EurepGAP or British Retailer Consortium's code of practice. Moreover, many fresh and processed food companies in Armenia lack the infrastructure and organization needed to meet the basic requirements for Good Manufacturing Practices (GMP) as recognized in the European Union (the reference standard chosen by the Armenian government for harmonization purposes) or in the United States. Many of these companies occupy buildings bought during the privatizations of the 1990s, and these are now obsolete, with poor layouts, insufficient water supplies, often totally inadequate toilet and sanitary facilities for workers, and generally poor solid and liquid waste management.

## Food Safety and Agricultural Health Issues

### Food safety

**2.20.** Table 6 summarizes Armenian statistics on food- and water-borne illnesses<sup>4</sup>. These statistics come from reports from polyclinics, hospitals, and other public health agencies, which are required to report accidents and diseases to the Ministry of Health. The statistics provide information on new cases reported each year and on the incidence level of the disease<sup>5</sup>. The figures reported probably understate actual food- and water-borne disease incidence by many times<sup>6</sup>. The table shows that food- and water-borne diseases account for about 8 to 18 percent of new infectious and parasitic disease cases diagnosed each year.

**Table 6. Armenian disease incidence per 100,000**

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Registered diseases	19,796	21,121	18,199	15,932	17,203	15,624	13,979	16,195	18,838
Infectious, parasitic diseases	1,312	1,816	1,666	1,829	1,814	1,719	1,608	1,754	1,874
Food- & water-borne	198	239	200	231	326	135	n/a	n/a	n/a
Food- & water-borne % of infectious parasitic diseases	15	13	12	13	18	8	-	-	-

Sources: Statistical Office of Armenia, "Socio-economic Situation of the Republic of Armenia for January-December 2003," and calculations made for this study.

<sup>4</sup> This section is a summary of the more detailed information found in Appendix 2.

<sup>5</sup> Armenian statistics report food- and water-borne disease as food-borne disease, with footnotes detailing attribution of illness to food- or water-borne causes when epidemiological investigations have been done.

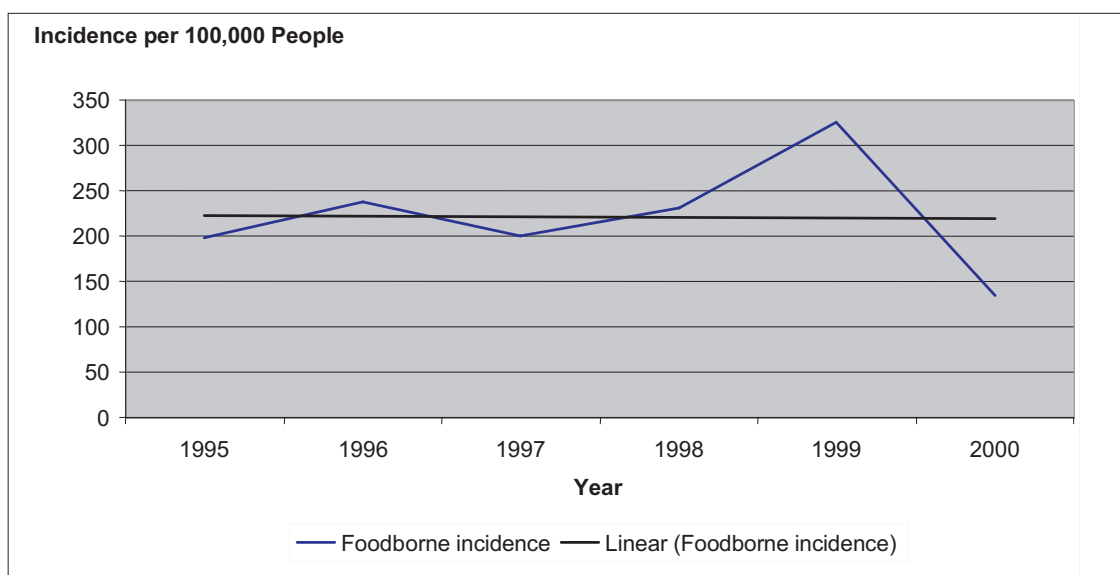
<sup>6</sup> Public health monitoring programs are weak in Armenia. Many food poisoning victims do not seek medical attention until symptoms appear to be life threatening. In the cases of some parasitic infections, it may take a few years before people find the symptoms serious enough to report to a doctor. The official statistical calculations over-report the actual population numbers. In countries with advanced food-borne disease monitoring systems, for example, in the United States, food-borne disease incidence rates may be as high as 30,000 cases per 100,000 people or nearly a 1 in 3 chance that food poisoning will occur in any individual in a given year. Paul S. Mead, Laurene Slutsker, Vance Dietz, Linda F. McCaig, Joseph S. Bresee, Craig Shapiro, Patricia M. Griffin, and Robert V. Traux, 1999, "Food-Related Illness and Death in the United States," *Emerging Infectious Diseases* 5 (5):607-625.

**2.21.** Figure 6 presents the overall statistics on food-borne disease incidence in Armenia. It shows a multi-year diagnosed disease incidence average of about 225 cases per 100,000 people (labeled “Linear” in the figure). This rate converts to about 7,227 cases a year. If one assumes that this figure understates actual cases by a factor of ten, then the actual level would be about 72,300 cases a year, and this estimate likely still understates the true incidence of food-borne illnesses in Armenia. Assuming that a week’s worth of wages is foregone on each occurrence, about \$6.82 of a salary of \$30 per month, the annual direct loss of income would be about \$493,000. Direct treatment costs would probably double this figure to nearly \$1,000,000 per year.

**2.22.** These diseases are dominated by cases of unidentified infectious enteritis, Shigella, and Hepatitis A, which are likely to be highly correlated with contaminated water supplies, but they are also transmitted by contaminated uncooked or undercooked foods. Where drinking, washing, and irrigation water are contaminated, normal levels of household and personal hygiene will not provide adequate protection against contamination of food and direct infection. Despite improvements in water treatment and water distribution in some Armenian cities over the past decade, statistics still show major recurring problems with water contamination throughout the country. Nonetheless, all of the food processors interviewed during this study claimed that their municipally supplied water was of the highest quality or that any detected problems were quickly solved.

**2.23.** Three zoonotic diseases (transmission from animals to humans) are of primary concern to public health authorities in Armenia. Salmonellosis cases are often closely linked to the poultry industry. Brucellosis usually derives from consumption of infected milk. Echinococcosis is caused by a dangerous, sometimes life-threatening, tapeworm prevalent in areas throughout the world with a substantial sheep population. Salmonella and brucellosis diagnoses have declined over time, probably due to improvements in poultry and dairy cattle hygiene management and the increasing proportion of milk that is pasteurized.

**Figure 6. Armenian diagnosed food-borne disease incidence per 100,000 people**



Source: Statistical Office of Armenia, 2004. Calculations made for this study.

**2.24.** The Public Health and Epidemiological Inspection staff noted two major food safety issues: botulism caused by improper home-canning of low-acid foods and the consumption of poisonous mushrooms. *Marze-* (or regional) level staff broadcast TV messages regarding low-acid, canned-food safety, but the number of cases seems to be on the increase in Armenia, where households seek low-priced home-style vegetable preparations.

**2.25. Environmental health hazards.** Two main issues cause concern regarding environmental health hazards: metal contamination of soil and water and persistent organochloride pesticides (POPs). Armenia mines lead, copper, and cadmium, although public health officials believe that heavy metals contamination of food or water is not a problem. The use of organochloride pesticides (DDT, Dieldrin, Aldrin, and so on) has been banned since the 1970s, but monitoring samples suggest continued use at least until the early 2000s with residue levels two to three times greater than international standards<sup>7</sup>. Also, there is concern that the metal containers of outdated pesticides in the Ararat Valley storage site have corroded and are leaking.

<sup>7</sup> United Nations Economic Commission for Europe, 2000, Environmental Performance Review #10, Armenia.

## Agricultural Health

### Plant health

**2.26. Internal plant quarantine pests.** As a landlocked country surrounded by ancient agricultural areas, Armenia shares the pest and disease complexes of the region. It maintains a list of a number of crop pests and diseases that it seeks to restrict through internal quarantine. Distributions of these organisms are mapped, and the plant protection service regulates the movement of plant materials from those areas to other parts of the country, although control of plant material movement in Armenia is seen as a difficult task<sup>8</sup>. Table 7 lists these quarantine pests and diseases as provided by the State Inspection for Plant Protection and Quarantine<sup>9</sup>. Plant diseases and pest outbreaks are reported, but the data do not appear to be regularly collated and analyzed on a nationwide scale.

**2.27.** Because of phylloxera, grape planting materials are among the most heavily controlled. Phylloxera is a plant louse that inhabits the roots of the grape vine. Armenia has only one zone of phylloxera infestation, located in the northwestern part of the country, neighboring the Republic of Georgia. Most of Armenia's wine and brandy grape production is in western and southern Armenia. Traffic check points are used to inspect and block the transport of bare-rooted grape vines, root stock, and budwood from the phylloxera zone. The transport of wooden trellis stakes from the northwestern zone of infestation is also prohibited, because phylloxera can be transported from one zone to another on reused stakes. The national concern about phylloxera extends to the introduction of new rootstock.

**Table 7. Top ten Armenian internal quarantine pests and diseases**

Potato Canker or Wart	<i>Synchytrium endobioticum</i>
Phylloxera	<i>Viteus vitifoliae radicolae/ Daktulosphaira vitifoliae</i>
Fire blight	<i>Erwinia amylovora</i>
Dodder (epiphytic parasitic weed)	<i>Cuscuta spp</i>
Potato cyst nematode and cyst nematode	<i>Globodera rostochiensis,</i> <i>Globera pallida</i>
Colorado potato beetle	<i>Leptinotarsa decemlineata</i>
Peach twig borer	<i>Anarsia lineatella</i>
Cottony cushion scale insect, oyster shell scale	<i>Icerya purchasi and</i> <i>Lepidosaphes ulmi (L.)</i>
California scale (also called San Jose scale)	<i>Quadraspidiotus perniciosus</i>
Russian knapweed	<i>Acroptilon spp.</i>

**2.28.** Pernod Ricard, the owner of the Armenian Brandy Company has been attempting to bring in Western European rootstock that is resistant to some, but not all, phylloxera races. To date, Armenian authorities have blocked its introduction until a protocol can be developed to test the rootstock and grafted varieties in the phylloxera infested area. The theory is that if the rootstock is resistant to all races of phylloxera found in the infested area, its use outside that area would create reservoirs of non-susceptible vineyards that would block rapid spread of the pest during an outbreak. The delay in the implementation of resistance testing will slow the introduction of new rootstock with the potential to boost productivity, thus increasing the costs of improving overall production.

### Animal health

**2.29.** Livestock operations fragmented after independence from a few hundred collective farms to hundreds of thousands of small farms; Table 8 shows the effect in the cattle sector. The general impression prevails in Armenia that the reduction in livestock concentration has probably reduced the incidence and prevalence of livestock diseases and parasites in the national herd. On the other hand, a major reduction in the number of veterinarians and veterinary technicians has occurred in Armenia, leading to a notable decline in the surveillance and intervention capacity of the government. Some of this decline has been taken up by the private sector, which has hired veterinarians and veterinary technicians for larger farming operations and cooperatives and for livestock processing companies.

<sup>8</sup> Integrated Pest Management TDY Report (from 16 March to 6 April 2003), by Dr. Donn T. Johnson, IPM Specialist, to Republic of Armenia - World Bank International Development Association (IDA) and Ministry of Agriculture -Agricultural Reform Support Project Implementation Unit in Armenia (ARSP) and USDA/MAP.

<sup>9</sup> Statistics on plant health are scarce; therefore, the discussion in this report is almost entirely qualitative.



**2.30.** Armenia lies in a region in which many reportable infectious and potentially epidemic animal diseases are endemic<sup>10</sup>. Testing and vaccination is mandatory for seven livestock diseases, although these efforts are frustrated by budget shortfalls and sometimes by the active resistance of smallholders who do not want their animals tested because they fear the diseased animals will be slaughtered with little or no compensation to them or because they fear that low quality vaccines will infect their animals. The economic pressure on poor small producers to use or sell all of their animal output is intense.

**Table 8. Cattle farm structure and numbers**

	1986	1998	Decrease (%)
State Livestock Farms	253	--	--
Private Farms	--	320,000	--
Number of Cattle	860,000	560,000	35
– of which cows	320,000	257,000	20
Cattle per Farm	3,400	1.75	99.95

Sources: Agriment International BV, 1999, Dairian 1, Dairy Sector Improvement Armenia, Sector study, Final Report; prepared for Senter, The Hague, Netherlands.

**2.31.** The head of the Veterinary Inspection Service cites bovine brucellosis as his service's highest priority. A significant reservoir of brucellosis in cattle is apparently not being reduced by veterinary and quarantine practices. While the gross numbers suggest that the entire cattle herd is being tested at least once or twice a year, it is more likely that the more accessible animals are being tested twice a year and the less accessible ones once or not at all.

## Summary

**2.32.** In recent years adjustments have been made in the composition of agricultural commodities due to (i) changes in consumer demand; (ii) deterioration of Soviet-era processing facilities and rupture of market linkages between processors and producers; (iii) high input costs and inability of deprived farm households to finance the production of capital intensive crops; (iv) lack of agricultural skills of new farmers who emerged after privatization; and (v) for some crops, growth in commercialized farming. The growing diversification of agricultural production is driven by the trends in income, exports, and imports.

**2.33.** Armenia has the following SPS concerns:

- *Food safety* Food- and water-borne diseases are likely to be caused by undercooked foods and contaminated water. The primary zoonotic diseases affecting public health can be alleviated by better poultry and dairy cattle hygiene management, milk pasteurization, and public education.
- *Plant health* The regulation of the entry of planting materials is critical to avoid pest infestation. In the case of a new grape rootstock, however, the advantages of regulation must be weighed against those of increased grape productivity. Solving this standoff requires implementation of effective resistance testing.
- *Animal health* The private sector is both a help and an obstacle to the management of animal health. The problem of a decline in the surveillance and intervention capacity of the government due to a major reduction in the number of veterinarians and veterinary technicians has been met by the private sector, which has hired its own veterinarians and veterinary technicians. On the other hand, testing and vaccination efforts may be hindered by smallholders who do not want their animals tested for fear they will not be properly compensated for the destroyed animals or that low quality vaccines will infect their herds.

<sup>10</sup> An expanded description of Armenia's livestock health situation is given in Appendix 3. Armenian statistics on animal health officially reported to the OIE are used in this report.

### 3. CAPACITIES FOR SPS MANAGEMENT

#### Basic Trends in SPS Management

**3.1.** The approach to management of food safety and agricultural health is changing in many countries. Two factors are driving these approaches. First, the WTO SPS Agreement is bringing new disciplines to regulatory authorities and requires international harmonization and transparency. Second, a series of food scandals (dioxin, pesticides, salmonella, BSE, hepatitis, and others) and food scares have contributed greatly to public awareness about food safety, leading consumers to ask for better safeguards and more transparency. In response, politicians and private enterprises have been making changes in their systems' management. These changes include:

- The traditionally fragmented, decentralized management of the state human, animal, and plant health systems is giving way to a more holistic approach to the management and functioning of the whole system of food safety and agricultural health;
- Inward-looking styles of public management are under pressure to provide more accountability and transparency, use science-based measures, and reduce conflicts of interest within systems through separation of institutional responsibilities for policy setting, implementation, and monitoring;
- A shift from a dominant reliance on government controls and inspections principally of end products to a more balanced system of prevention controls that engages the private sector throughout the supply chain to address quality and safety management;
- The former narrow orientation toward the interests of the state regulatory services is giving way to a more balanced system that addresses the impact of the total regulatory system and individual measures on the cost of doing business and competitiveness;
- Priority setting based on the power of involved bureaucracies is being reduced and policies and investment priorities are increasingly being established based on probabilities and cost/benefit analyses through the risk analysis approach; and
- Public and private sector requirements are increasing in scope and intensity.

**3.2.** These changes are most prominent in OECD countries, but they are gradually being adopted in developing and transition economies. These changes entail costs as well as benefits, however, and developing and transition economies often find it difficult to mobilize the investments needed to make them.

#### International Agreements

**3.3.** As a WTO member, Armenia's sanitary and phytosanitary measures should be consistent with international standards and guidelines set by the CODEX for food safety; OIE for animal health; and IPPC for plant health.

**3.4.** *Food safety* deals mainly with efforts to eliminate or minimize human exposure to filth, adulterants, food- and water-borne diseases (for example, bacterial, viral, protozoal, and parasitic diseases), and physical contaminants, and to regulate human exposure to permitted or unavoidable residues of chemical substances (such as pesticides, heavy metals, antibiotics, hormones, and other drug or animal feed additives), natural toxins (mycotoxins, and so on), and food additives and preservatives. These factors affect both domestic and global market access. Internationally, food safety standards are defined by CODEX Alimentarius, although increasingly even more stringent standards are being applied by private sector buyers or organizations that establish codes of practice for private buyers, such as EUREPGAP<sup>11</sup>. Agricultural health relates to the protection of animal or plant life or health from pests, diseases, and disease-carrying organisms. It deals mainly with the protection of the importing country from the introduction of plant pests and animal diseases. Agricultural health standards include lists of plant pests, defined under the aegis of the International Plant Protection Convention, and lists of animal diseases, defined by the World Organization for Animal Health, that are contagious and capable of having a severe impact on international trade (the so-called list A diseases), such as Foot and Mouth Disease, Classical Swine Fever, Newcastle Disease, and Avian Influenza. Food safety and public health concerns overlap with trade regulations (primarily concerned with animal or plant products that may

<sup>11</sup>Euro-Retailer Produce Network Working Group's Good Agricultural Practice code, <http://www.eurepgap.org>.



transmit diseases to humans). A country's capacity to monitor and control food- and water-borne disease is an indicator of its capacity to regulate, monitor, and control the safety of food exports and imports.

**3.5 Armenia is a member of the CODEX Alimentarius Commission** and a local contact point of CODEX has been established, though many authorities expressed their dissatisfaction with its lack of activities<sup>12</sup>. Armenia's Food Safety Law is in compliance with WTO requirements. Article 5.2 of the law stipulates that traded food should comply with sanitary rules and hygienic norms set by Armenian legislation, while in case of absence of those rules and norms those set by CODEX should apply. Paragraph IV.2.e of Resolution No. 682-N of April 14, 2004, "About approval of the strategy of sustainable development Agricultural sector in Armenia," prescribes that norms designed by CODEX should be the base for further development of national norms and standards related to food safety. Sanitary norms and hygienic rules or "SanPins"<sup>13</sup> were drafted to comply with the norms set in the CODEX Alimentarius.<sup>14</sup> A CODEX Alimentarius National Commission is still to be established (with the help of the Strategy for Sustainable Development of Agricultural Sector<sup>15</sup>) under the Ministries of Agriculture, Health, and Trade and Economic Development.

**3.6. Armenia became the member of the OIE in 1997.** A new law covering veterinary practice was presented in 2005 by the Ministry of Agriculture to the National Assembly. It provides better compliance with the OIE requirements than did the old law. Procedures of animal identification and registration oriented to EU practice are introduced in the new law, while the old law did not make specific reference to these issues. The State Veterinary Inspectorate of the Ministry of Agriculture is responsible for the implementation of norms and rules of the OIE.

**3.7. Armenia is a signatory of the International Plant Protection Convention and seeks to become a full member in 2006.**<sup>16</sup> The country is also a member of the European and Mediterranean Plant Protection Organization (EPPO). The Ministry of Agriculture's Plant Quarantine and Farming State Inspectorate is the technical contact point for work with these and other international and bilateral phytosanitary organizations. The Law on Plant Protection and Plant Quarantine reportedly takes into account the main concepts and requirements of the 1997 revised text of the IPPC treaty.

**3.8.** Although Armenia is a member of CODEX and OIE, with IPPC membership pending, Armenian technical specialists rarely participate in the standards setting bodies of CODEX and OIE. This means that Armenia does not gain from the experience of regulatory reform and changes in enforcement in process in other FSU countries. Armenia should participate in the activities of the standards setting organizations relevant to its national interest.

**3.9. Bilateral cooperation.** Armenia intends to bring its SPS regulations into line with those of the EU. This decision parallels those made by its large regional trading partners in food products, such as Russia and Ukraine. Armenia has also entered into general bilateral trade agreements with Georgia that are intended to improve the efficiencies of trade through Georgia's Poti and Batumi seaports, major import and export trans-shipment points for Armenia. Armenia has a functioning trading relationship with Iran, providing an entry point for products from South and Southeast Asia.

**3.10.** The Constitutional Court examines international agreements for their compliance with the Constitution before submitting them to the National Assembly for ratification.<sup>17</sup> According to the Constitution, international agreements enter into force only after ratification by the National Assembly or by the President of Armenia.

<sup>12</sup> The mission preparing this report was unable to establish contact. USAID is currently supporting the revival of a National Codex Committee.

<sup>13</sup> SanPins, which deal with food safety issues includes sanitary rules and hygienic norms (Decree of the Minister of Health No. 181 (23 March 2003)) on the following:

- a. Hygienic requirements presented to the security and nutritious values of food materials and foodstuffs (Sanitary rules and hygienic norms N 2-III-4.9-01-2003);
- b. Hygienic requirements presented to the producers of meat and meat products and similar decrees addressing the production of bread, bakery and sweet products, milk and milk products, ice cream, nonalcoholic drinks and mineral water (Sanitary rules and hygienic norms N 2-III-4.1-07-2003);
- c. Hygienic requirements presented to grocery stores and similar decrees addressing wholesale food markets, retail food outlets, and catering organizations (Sanitary rules and hygienic norms N 2-III-4.4-03-2003); and
- d. Storage dates and conditions of quick-deteriorating foodstuffs (Sanitary rules and hygienic norms N 2-III-4.4-1).

<sup>14</sup> From an interview with the deputy head of Hygienic and Anti-epidemiological State Inspectorate of Ministry of Health, Mrs. Marietta Basilisyan, 2005.

<sup>15</sup> Drafted by the Ministry of Agriculture and approved according to the Resolution No. 682-N (14 April 2004).

<sup>16</sup> The head of Plant Quarantine and Farming State Inspectorate, Mr. Mekhak Ghazaryan, informed the team in 2005 that preliminary Agreement was reached that Armenia would become a member of the IPPC from 2006. The major obstacle for membership of Armenia to IPPC until that time was lack of budget for membership fees.

<sup>17</sup> According to Articles 100.2 and 100.1 of the Constitution and Articles 5.2 and 5.6 of the Law on the Constitutional Court.

## Institutional Framework

**3.11.** The main mandates to implement laws on food safety and agricultural health fall on:

- The Ministry of Trade and Economic Development (National Institute of Standards and Metrology, CODEX, and WTO Contact Points).
- The Ministry of Agriculture (Plant Quarantine and Farming State Inspectorate and State Veterinary Inspectorate). Article 11 of the Law on Food Safety and Resolution No. 149 (4 April 2000) assigned the Ministry of Agriculture to implement state control over food safety issues<sup>18</sup> related to the enforcement of veterinary and plant quarantine norms.
- The Ministry of Health (Hygienic and Anti-Epidemiological State Inspectorate).

**3.12.** The current laws distinguish between State Executive Establishments (SEEs) and State Non-Commercial Organizations (SNCOs). Policy preparation and mandatory public inspections must be carried out by State Executive Establishments, whereas both mixed public/private agencies and private companies can be contracted to provide monitoring and research services (Box 3). In the Ministry of Agriculture, the central and Marze laboratories have been placed under the administrative control of SNCOs to provide testing and laboratory services independent from those of the inspectors. The heads of these agencies are independent from the Veterinary and Plant Protection and Quarantine inspectorates. They can contract services from private laboratories, and they can sell the services of their laboratories to better utilize their capacities.

### Box 3. State noncommercial organizations and state executive establishments

A SNCO or, as defined by the law, “State organization” is a non-profit organization with the status of legal person and is established to operate in the areas of public health, social welfare, sport, education, science, culture, environmental protection, and others.<sup>19</sup> The Government is the sole authorized founder of SNCOs. The establishment of SNCO can be done through the foundation of a new organization, reorganization of a state agency, or reorganization of an enterprise with 100 percent state ownership. The SNCO holds ownership rights for the property allocated to it and is responsible for its own liabilities. The Law on State Non-Commercial Organizations of the Republic of Armenia was adopted to bring state-controlled organizations and enterprises under a common legal umbrella and to design clear rules for their operation. These organizations provide diverse services to the public, in addition to those related to implementation of public administration, design of public policy, and inspection and law enforcement. Thus, public museums, theatres, musical halls, athletic complexes, libraries, schools, universities, research institutions, laboratories, and hospitals were reorganized into SNCOs. Monitoring, research, laboratory testing and measuring, diagnostics, vaccine distribution, animal registration, and other similar activities in the field of human, animal, or plant health protection have been passed to SNCOs. SNCOs may be involved in commercial activities and the accumulated surplus above costs may be directed towards implementation of objectives designated by the statute of SNCO. Meanwhile, all ministries, the President, and government-affiliated agencies and bodies, municipalities, legislative, and judicial organizations assigned to implement public administration duties were reorganized to State Executive Establishments (SEE).<sup>20</sup> SEE do not have the status of legal persons, cannot provide commercial services to the public, and can be financed only from the state budget. State agencies that design policy (Ministries) in the field of human, animal, or plant health protection have the legal status of SEE. Inspectorates and standards setting organizations are defined as detached or “separated” divisions within the Ministries, to increase their independence. While these principles are clear, their application is not. SNCOs compete with one another and with private laboratories for “voluntary” service contracts where they have overlapping capacity, for example, physico-chemical analysis of water samples. Processors hire the rural staff of underfunded SEEs as “part-time” advisors to perform services beyond their official functions. Interviews suggest that one-third or more of the operating budget shortfalls of some SEEs in the SPS are covered by fees for “voluntary services,” that is, fees beyond those mandated by the state to be turned over to the Treasury for required inspections and certifications, and by some diversion of cash payments from official fees when payment authorizations for services are delayed or refused by central authorities. SNCOs, from time to time, order services from the SEEs, blurring the principles of separation of functions. These are practical solutions to public finance problems, but these solutions create their own governance problems over time.

*Source:* Project team.

<sup>18</sup> The Ministry of Agriculture was assigned in charge of veterinary medicine (Resolution No. 92 (9 February 2000)) and plant protection and plant quarantine (Resolution No. 512 (24 August 2000)); but Resolution No. 149 (4 April 2000) gave the Ministry state control over food safety issues related to the enforcement of veterinary and plant quarantine norms.

<sup>19</sup> Law on State Non Commercial Organizations (23 October 2001).

<sup>20</sup> Law on State Executive Establishments (23 October 2001).

**3.13. The Law on Agrarian State Inspectorates** (15 May 1996) and Resolution No. 250 (8 July 1997) define the activities and responsibilities of the Agrarian State Inspectorates.<sup>21</sup> Later the Government adopted several resolutions describing the statute and structure of each of the Agrarian State Inspectorates.<sup>22</sup>

**3.14. SPS Enquiry Point** The Department of WTO and EU Affairs of the Ministry of Trade and Economic Development, in consultation with other state executive establishments with relevant jurisdiction, prepares state policy relating to WTO. With regard to the SPS agreement, the Hygienic and Anti-Epidemiological State Inspectorate of the Ministry of Health, the Plant Quarantine and Farming State Inspectorate, the State Veterinary Inspectorate of the Ministry of Agriculture, and the Bioresources Management Agency of the Ministry of Nature Protection are the SPS enquiry points.<sup>23</sup> In practice, however, the existing level of collaboration between the Ministries of Health and Agriculture is considered very weak by authorities in both ministries. Additionally, the WTO Notification Agency and TBT Enquiry Point<sup>24</sup> are operating as separate subdivisions of the Ministry of Trade and Economic Development. The lack of translators and, subsequently, small numbers of available detailed translations of international agreements are seen as a major problem for the implementation of international agreements in the field of human, animal, and plant health protection.

### Food safety

**3.15.** The Law on Guarantying Sanitary-epidemiological Security of the Population defines the authorities and responsibilities of the Government of Armenia, the Hygienic and Anti-epidemiological State Inspectorate, local government bodies, and private organizations and citizens in the field of sanitary-epidemiological safety. The law names the **Hygienic and Anti-epidemiological State Inspectorate** (Saniped) as the state body authorized to carry out sanitary-epidemiological control in Armenia.<sup>25</sup>

**3.16** The Hygienic and Anti-Epidemiological State Inspectorate operates within the system of the Ministry of Health.<sup>26</sup> The Inspectorate has regional subdivisions in all Marzes, districts of Yerevan, border points, as well as in the Armenian Nuclear Power Plant.<sup>27</sup> The Inspectorate checks the implementation of sanitary, hygienic, and anti-epidemiological rules and norms and enforces measures where the laws are broken, including stopping the operation of plants and processing lines and the interdiction of production, distribution, and consumption of products.

**3.17.** Testing Centers, under the jurisdiction of the Hygienic and Anti-Epidemiological State Inspectorate, operate in all Marzes and in the majority of districts of Yerevan. These SNCO Testing Centers conduct research and laboratory testing and measure bacteriological, parasitological, radiation, and chemical pollution levels, with the aim of protecting public health.<sup>28</sup>

**3.18.** Using the facilities of the Testing Centers, scientific-research and laboratory networks of the Ministry of Health, other state agencies, and private organizations, the Inspectorate performs analyses of (i) additives and special biologically active materials in food and foodstuffs; (ii) utilization of new technologies for processing and production of novel food products; (iii) polymers and other materials, packaging, and containers used in the production of food and foodstuffs; and (iv) fertilizers, regulators of plant growth, and plant protection chemicals and biological measures. It then disseminates its findings to organizations and citizens. The Inspectorate also orders analyses and laboratory testing of air, water, land, and materials for public health purposes.

**3.19.** Three research institutes operate in the field of hygienic and anti-epidemiological control under the jurisdiction of the Ministry of Health: the “Scientific-Research Institute of Epidemiology, Virology and Medical Parasitology after A.B. Aleksanyan” SNCO,<sup>29</sup> the “Scientific-Research Institute of Hygiene of the Environment and Preventive Toxicology” SNCO,<sup>30</sup> and the “Scientific-Research Institute of General Hygiene and Professional Disease after N.B. Hakobyan” SNCO.<sup>31</sup>

<sup>21</sup> The Law on Agrarian State Inspectorates defined the establishment of the Land Inspectorate, State Farming Inspectorates, the Cattle-Breeding State Inspectorate, and the Farm Machinery State Inspectorate.

<sup>22</sup> For example, Resolution No. 1915-N (21 November 2002), this had been partially modified by the new Law on Veterinary.

<sup>23</sup> WTO Document G/SPS/ENQ/16, 5 December 2003.

<sup>24</sup> WTO Document G/TBT/ENQ/24, 9 March 2004.

<sup>25</sup> Resolution No. 1316-N (15 August 2002) establishes the statute and the structure of Hygienic and Anti-epidemiological State Inspectorate.

<sup>26</sup> Article 7 of the Law on Guarantying Sanitary-Epidemiological Security of the Population (16 November 1992).

<sup>27</sup> Resolution No. 1316-N (15 August 2002).

<sup>28</sup> Resolution No. 1741-N (31 October 2002).

<sup>29</sup> Resolution No. 1213-N (1 August 2002).

<sup>30</sup> Resolution No. 1211-N (1 August 2002).

<sup>31</sup> Resolution No. 1306-N (22 August 2002).

## Plant health

**3.20.** In 2002, the Plant Quarantine State Inspectorate was created within the Ministry of Agriculture.<sup>32</sup> In February of 2005, this inspectorate merged with the State Farming Inspectorate<sup>33</sup> and the **Plant Quarantine and Farming** (also translatable as Land Management) **State Inspectorate** was established.<sup>34</sup> The Inspectorate inspects and enforces measures in the field of plant quarantine, pest and pesticides control, and related areas. The inspectorate has regional subdivisions in all Marzes and in all land and air border points. The Plant Quarantine and Diagnostics Laboratory is an integral part of the Inspectorate. (A separate Farming and Plant Quarantine Scientific Center operates under direct control of the Ministry of Agriculture.<sup>35</sup> This center formerly performed a broad range of plant protection and quarantine research, but its activities have declined.) The Inspectorate receives funding for salaries, travel, and operational and other costs from the Ministry of Agriculture.

**3.21.** In 2002, the **Plant Quarantine Service** was established as an SNCO<sup>36</sup> with the legal status of a state closed joint-stock company.<sup>37</sup> The Plant Quarantine State and Farming Inspectorate assigns the general management structure and appoints the Director of the Service. It supervises the activities of the Service and is in particular charged with suspending orders and decrees of the director of the Service where they contradict Armenian legislation; it also approves the annual reports of the Service. The Service has regional subdivisions in all Marzes and in all border points, including a specialized fumigation group and quarantine laboratory in Yerevan.

**3.22.** The Service detects and monitors plant quarantine organisms and their spread area and implements quarantine activities. The results of detection and monitoring are provided to the Plant Quarantine and Farming State Inspectorate, which enforces applicable inspections. The Service also implements research and laboratory activities to prevent the transport of plant quarantine and dangerous non-quarantine organisms on imported and exported goods. The Service has its own budget and bank account and has the right to engage in commercial activities, in particular with regard to examining, disinfecting, and fumigating plants and plant products.

## Animal health

**3.23.** The **State Veterinary Inspectorate** (SVI) inspects and enforces measures in the field of veterinary control in Armenia.<sup>38</sup> The Republican Anti-epizootic and Diagnostic Centre SNCO under the Ministry of Agriculture diagnoses animal diseases (including those of birds, fish, and bees) and conducts laboratory analyses of animal feed, water, and foodstuffs of animal origin. Both the Inspectorate and the Centre have regional subdivisions in all Marzes and at all border entry points

## Metrology

**3.24.** In 2002, the **Department of Standardization, Metrology and Conformity Assessment** was created within the Ministry of Trade and Economic Development (MTED). Subsequently, the **Accreditation Agency** and the **Quality Inspectorate** were established as two “separate” bodies also within the MTED.<sup>39</sup>

**3.25.** The **Quality Inspectorate** regulates metrology and adherence to mandatory requirements and conformity assessment rules during the production, distribution, utilization, storage, and transportation of products.<sup>40</sup> The inspectoral functions are enforced through territorial authorities of the Quality Inspectorate; regional control departments were established in all Marzes of Armenia and in five districts of Yerevan.

**3.26.** The **Accreditation Agency** was created to prevent conflicts of interest between the accreditation and certification responsibilities within the MTED. It performs accreditation of certification organizations and accreditation of test-

<sup>32</sup> Resolution No. 1988 (21 November 2002).

<sup>33</sup> The State Farming Inspectorate was established according to the Law on Agrarian State Inspectorates (15 May 1996) and Resolution No. 2161-N (26 December 2002).

<sup>34</sup> Resolution No. 101-N (13 January 2005).

<sup>35</sup> Resolution No. 631-N (14 April 2004).

<sup>36</sup> Resolution No. 1913 (21 November 2002).

<sup>37</sup> Reorganization was implemented to provide compliance with the Law on State Non Commercial Organization (23 October 2001).

<sup>38</sup> The State Veterinary Inspectorate was created by the new Law on Veterinary (24 October 2005). It replaced the Veterinary and Cattle Breeding State Inspectorate.

<sup>39</sup> Resolution No. 2042-N (19 December 2002).

<sup>40</sup> Resolution No. 524 (23 April 2003).

ing and metrological laboratories.<sup>41</sup> In 2004, MTED was declared the National Body for Conformity Assessment, which designs the state policy in the field of conformity certification and conformity declaration.<sup>42</sup> The Conformity Assessment Law stipulates that any legal person may become a certification body, provided it does not produce or distribute products for which it makes conformity assessment.<sup>43</sup>

**3.27.** In 2004, the **National Institute of Standards**, with the legal status of a closed joint-stock company<sup>44</sup> was assigned as the authorized state body to implement policy in the field of standardization. It is operating under the jurisdiction of the MTED.<sup>45</sup> Designing policy in the field of standardization remains within the Department of Standardization, Metrology and Conformity Assessment of MTED. The National Institute of Standards adopts national standards and examines and designs the organizational and methodological measures for implementation of the national, intergovernmental, and international standard schemes.

### Other responsibilities

**3.28. The Ministry of Nature Protection** regulates the harvest, import, and export of gathered and wild products, including fish and crayfish whether from wild capture or from aquaculture farms. It enforces the national Red Book that prohibits trade in protected flora and fauna.

**3.29. The Ministry of Foreign Affairs** is the institution responsible for monitoring the process of implementation of international agreements. Institutional constraints, however, particularly the lack of experts in the field of SPS and underdevelopment of monitoring mechanisms and expertise within the Ministry of Foreign Affairs, do not allow for effective monitoring.

**3.30.** There are overlapping authorities among the concerned ministries and among the agencies at the Marze and at local levels. This is reflected in a confusing array of inspection practices (Box 4), at least partially the result of what appears to be incomplete review of laws to determine whether they are constitutional and consistent with established hierarchies of authorities and provisions, a failure to eliminate conflicts between existing and newly authorized laws and regulations, and weakness in examining the financial and operational implications of new laws.

### Box 4. Factory inspections

On one extreme, a very powerful company indicated that they simply stop the inspectors at their gate and refuse to let public health or agriculture inspectors regulate the entry of their product onto the retail marketplace. At the other extreme, a company that is seeking international third party auditor certification of its management practices, attempts to comply with all legal inspection requirements. When a new agency showed up to inspect their facility, they contacted their lawyer and discovered that Armenian law has provided dozens of inspection authorities at all levels. They receive inspections at least twice a year from forty-one agencies from the national, Marze, municipality, and district authorities, or an average of 1.5 inspections daily. It has two staff members assigned full-time to work with inspectors.

*Source:* The authors.

**3.31.** In the case of the authorization for exports of live crayfish to the European Union, the European Commission recognized Saniped<sup>46</sup> (Hygienic and Anti-Epidemiological Inspectorate) as the competent authority to certify exports, rather than the Veterinary Service, which has the legislative authority to certify animal products. This gives rise to complexities in the regulatory system that lead to overlap and internal conflict among ministries.

<sup>41</sup> Resolution No. 508 (23 April 2003).

<sup>42</sup> Resolution No. 1031 (22 July 2004).

<sup>43</sup> Article 13 of the Conformity Assessment Law (26 May 2004).

<sup>44</sup> Resolution No. 2042-N (19 December 2002) was issued to reorganize the National Institute of Standards from a closed joint-stock company into an SNCO.

<sup>45</sup> Article 2 of the Law on Standardization (9 November 1999, amended 26 May 2004) and Resolution No. 1038-N (22 July 2004).

<sup>46</sup> The Hygienic and Anti-Epidemiological Inspectorate has been selected by the European Commission as the competent authority to inspect and certify the export of live crayfish to EU member states because it was judged to have the best regulatory capacity in Armenia for this product.



## Laws and Regulations

**3.32.** The main laws related to sanitary and phytosanitary measures are the Law on Food Safety (8 December 1999), the Law on Plant Protection and Plant Quarantine (20 March 2000), and the Veterinary Law (26 October 1999).

**3.33.** The **Law on Food Safety** provides general hygienic and safety requirements relating food activities, particularly concerning the production and reproduction, importing, exporting, exchanging, keeping, packaging, selling, and use of products. The “SanPins” (a collective term for Armenia’s sanitary-epidemiological regulations and norms) is important within Armenia’s system of sanitary rules and norms.<sup>47</sup> SanPins limits the maximum quantities of toxic components, additives, and contaminating substances in food products, based on scientific data and hazard assessment as conducted by scientific institutions.

**3.34.** The **Law on Plant Protection and Plant Quarantine** defines the legal, economic, and organizational principles of state control in the field of Plant Protection, designs the responsibilities of the Ministry of Agriculture, and regulates relations between the Plant Quarantine and Farming State Inspectorate and farms, enterprises, organizations, and individuals. The Law regulates phytosanitary controls during import or export of plants or products of plant origin. The Law also allows consideration of the phytosanitary conditions and requirements of an importing country when issuing phytosanitary certificates.

**3.35.** The new 2005 **Veterinary Law** defines the legal, economic, and organizational principles of state control in the field of veterinary medicine, including provisions for the regulation of disease prevention in animals, for the protection of the human population from diseases common to man and animals, and for the assurance to the population of quality products according to veterinary and sanitary conditions. It introduces for the first time the concept of notifiable diseases, and it has legally empowered the SVI with responsibility for monitoring and control of these diseases. The Law regulates relations between the State Inspectorate and enterprises, organizations, entrepreneurs, and individuals. The law establishes procedures of state veterinary inspection during the import or export of animals and products of animal origin.

**3.36.** In 2004, several important regulations in the field of veterinary control were adopted:

- Veterinary state control during international and inter-governmental transportation of stock-breeding load (Resolutions No. 1228-N (19 August 2004)).
- Implementation of veterinary-sanitary testing of the meat and of the products originating from the slaughter of animals (Resolution No. 426-N (31 March 2004)).
- Numbering and registering livestock and farm animals (Resolution No. 59-N (29 January 2004)).

**3.37.** Armenia also has **National Agrarian Rules**<sup>48</sup> for both animal and plant health. These rules deal with the protection of the human population from diseases common to man and animals; the prevention and eradication of contagious and noncontagious animal diseases; and transportation, conservation, use, and destruction of veterinary medicaments and disinfectants. The rules also define the list of plant pests, weeds, and diseases of quarantine significance; the list of objects and goods of quarantine significance; and the list of chemical and biological agents permitted for use.

## Diagnostic Capacity

**3.38.** SNCOs have been established for "monitoring" activities, which often means government laboratories. One of the rationales for this is that the separation of laboratories from the direct control of the inspectorates reduces the opportunities for corruption and improves the government's ability to control work flow. The directors of the SNCO submit an annual budget request to the Ministry of Agriculture’s finance department, including an estimate of independent service revenues they will use to defray their operating costs. Salaries, rent, and travel costs are paid from the overall budget of the Ministry. Fees for mandatory analyses are all set by government at rates far below their true cost. In the case of the Veterinary Laboratory SNCO, unofficial control of the laboratory is retained by the Chief Veterinary Officer through the approval of expenditure, defeating the intended independence of the laboratory.

<sup>47</sup> World Trade Organization, Report of the Working Party on the Accession of the Republic of Armenia, Wt/Acc/Arm/23, 26 November 2002.

<sup>48</sup> Resolution No. 17 (11 March 1998).

**3.39.** The official laboratories that provide diagnostic analyses to the three inspection services have fundamental problems in their basic infrastructure, operations, and maintenance. All are struggling with outdated buildings; difficult to clean and sanitize laboratory work area; old and degraded ventilation systems; poor power supplies; and lack of heating and air-conditioning needed to maintain stable temperatures for analytic purposes and for laboratory workers' comfort. Donors have begun to help improve aspects of these laboratories, and the Armenian Government is investing in some refurbishment of facilities. Most laboratories are saddled with out-of-date equipment and methods. All labs substantially underutilize their human resources, with the central labs (with the exception of the Plant Quarantine and Diagnostics Laboratory) being the most over-staffed. This provides substantial human capacity to respond to emergencies, but some central laboratory staff might be more usefully employed at the Marze and border post levels.

**3.40.** Some private laboratories (although all have some government ownership) such as Ex-Labs, have attracted good talent and have been able to develop a growing laboratory service practice while charging fees for services generally higher than those of public sector laboratories. The private laboratories generally have strong microbiological sections; effective if not yet comprehensive physico-chemical sections; and solid sample handling and record-keeping practices. The Yerevan State University has a food safety laboratory in its Department of Biology that has a strong microbiology section, and the university plans to build a modern analytic physico-chemistry section.

### **Food safety**

**3.41.** The Ministry of Health's Hygienic and Anti-Epidemiological Inspection Service inspects and samples a wide variety of products in the marketplace. Specialized tests are done at the Central Testing Center of Hygienic and Anti-Epidemiological State Inspectorate in Yerevan. The lab has a microbiology section, a serology section, a physico-chemical section, a virology section, and an infectious disease section. Most of the equipment dates from the Soviet era. The microbiology section seems well organized, but the hoods and ventilation system are outdated.

**3.42.** The physico-chemical section also has mainly Soviet-era equipment. It does calorimetric and spectrometric analysis and has a large bank of gas chromatographs, each dedicated to one type of analysis. Pesticide residue analysis is limited to organic chlorides and to organo-phosphates at the parts per thousand to parts per million level, using GOST standard methods. It has no capacity to do routine testing for the carbamate family of insecticides and pesticides. The lab can analyze radionuclides and metals. The virology section concentrates on disease testing using serological and ELISA methods. It collaborates with UN/WHO on measles and rubella control. It is perhaps the best-equipped section with two laminar flow hoods with UV sterilization equipment, but it has no polymerase chain reaction (PCR) capacity.

**3.43.** The staff estimates that 80 percent of their work is microbiological and 20 percent is physico-chemical. Mandatory analyses are performed at state fixed schedules while "voluntary" (that is, service for fee) testing is done at commercial rates.

**3.44.** The Central laboratory has facilities that, while out-of-date, have provided continuity of analytic capacity that, at the very least, provides a consistent set of data on food-borne and zoonotic diseases. Its microbiological and serological diagnostic capacity has been retained along with basic physico-chemical analyses at GOST standard level. The laboratory has added some modern methods and equipment for the diagnosis of viral diseases.

**3.45.** Basic microbiological and physico-chemical analysis is done at the Marze laboratories, with a heavy weighting towards microbiology, microscopy, and some ELISA testing for viral diseases. A typical Marze laboratory is subdivided into areas for sample preparation, microbiology, and physico-chemical subsections, with a separate administrative area and a break room. If the regional branch in Artashat is representative of other labs and regional inspectorates in Marze capitals, they are well-organized. They appear to be staffed to handle the peak demands that a public health emergency might require.

### **Plant health**

**3.46.** The Central Plant Inspection and Quarantine laboratory has only the most basic of equipment, completely insufficient space, and an outmoded sample handling and record-keeping system. It is, however, one of the few laboratories in the country at which work-load and staffing appear to be in balance. The laboratory is very poorly equipped, with much equipment either lost or broken during its three moves in the past five years. The lab can perform basic visual examination with stereoscopes and microscopes, but it is not equipped to use standard methods for microbiological investigations. It has a competent staff of six that is stymied in their daily work by the lack of basic equipment

and reagents. The total cold and frozen storage space is one kitchen refrigerator. At peak periods the laboratory handles about ten samples per day. Even in its current shrunken state, this seems to be an underutilization of laboratory capacity.

**3.47.** This laboratory is unlikely to be able to maintain a legal chain of custody for inspection samples. It has sample logs and a general procedure of holding samples with important quarantine pests or diseases for three months and general samples for one month. Inspection reports and samples are kept in a storeroom called the archive. The archive has six floor-to-ceiling shelves on which a few samples are scattered here and there among the numerous folders of inspection reports stored there. It is clear that the sample storage policy is simply ignored in practice. If the policy were being followed, a minimum of 300 samples would be in storage at any one time. The same room contains broken computer equipment, air conditioning equipment, and a centrifuge needing repair.

**3.48.** Discussions with private sector exporters indicate that the laboratory is considered to be in a rebuilding phase and that its current location and building are improvements over earlier quarters. These exporters have confidence in the diagnostic capacities of the laboratory staff, and they indicate a need for better laboratory capacity at the more remote southern Marzes and border posts. Two new border posts have been designed, one at the main border crossing with Georgia in the north and one at the main border crossing with Iran in the south. An equipment list adapted from the new EU import border posts in Latvia has been developed for these two laboratories.

**3.49.** The Director also sees a need for a mobile laboratory to support teams working on pest outbreaks and to provide support for the extension work on plant protection that the field staff is meant to provide.

**3.50. *Pesticide testing.*** No capacity exists for the Plant Quarantine and Diagnostics Laboratory to do pesticide testing. It has zero physico-chemical capacity and none of the instrumentation needed for even basic testing for active ingredients. Apparently, the former central laboratory and research station for pest control had extensive facilities for pesticide testing, but this equipment was not transferred to the new location. The Director of the Plant Protection Service would like to reestablish a pesticide testing laboratory to regulate pesticide imports (see paragraph 4.42), as required by Armenian legislation, but this testing should probably be outsourced to a laboratory already equipped with the basic chromatographic and spectrometric equipment needed. The Director would also like to establish a pesticide residue testing facility, but the selection of an existing public or private sector laboratory would make more sense than would building a new laboratory from scratch.

### **Animal health**

**3.51.** The Republican Veterinary Anti-epizootic and Diagnostic Center (the national veterinary laboratory) currently performs a large number of analyses with outmoded equipment and facilities and doubles as a municipal veterinary diagnostic laboratory. The EC Food Security Program provided assistance to upgrade the laboratory's sero-monitoring program in 2003 to improve monitoring of notifiable OIE diseases, such as foot and mouth disease and pig pest.

## **Border Procedures**

**3.52. *Food safety*** The inspection directorate of the Ministry of Health does no routine sampling and testing of imported products before they enter the domestic market (see paragraph 4.41). The exceptions are the importers of concentrates (such as soft drink manufacturers) and of some food additives who, as a matter of corporate policy, request testing and certification by the Ministry of Health before they release their products to the market.

**3.53. *Plant health*** Phytosanitary certificates are given for exports by the Plant Quarantine and Farming State Inspectorate. These inspections are generally carried out by the Marze level inspectors. Phytosanitary certificates accompanying imported plant materials must be verified and approved by an inspector. An unusual feature of the system is that only provisional phytosanitary clearances for imported plant materials are issued at the border, paralleling the practices of the customs authorities. Imported plant materials must be brought to an authorized customs clearing site near Yerevan before final inspection, sampling, and clearance is given. If the plant material is seed for planting, an additional inspection and approval is made by the Ministry of Agriculture. Phytosanitary clearance is supposed to be issued within 24 hours of inspection and sampling to permit the release of imported products.



**3.54.** Samples are visually examined, placed in bags, and carried to a Marze level office for examination. The Marze inspectors use manual sampling equipment that is functional, but most of it is old and worn. Sample containers for logging a chain of custody appear to be in short supply, and ordinary plastic shopping bags are used for grain samples. When a possible quarantine problem is detected, the sample is transferred to the central laboratory in Yerevan for confirmatory examination.

**3.55. Inspection staff** Table 9 indicates the numbers of experienced staff members in Armenia's agencies with responsibility to implement SPS laws regarding inspections, some quarantine operations (especially of livestock), and laboratory analyses. The agencies are organized to enforce GOST standards, sanitary and phytosanitary regulations, and in some cases, WTO and EU-consistent standards. Staff numbers, while reduced since 1992, are generally still adequate. Bottlenecks appear to be not due to numbers but to capital and operating budgets and training.

**Table 9. SPS inspectors in Armenia**

Service	Inspectors	Inspectors in Marzes	Inspectors at Border Posts	Percentage at Border Posts
Hygienic and Anti-Epidemiological State Inspectorate	460	177	0	0%
State Veterinary Inspectorate	24 to increase to 77	16	8 variable at 8 posts	10 %
Plant Quarantine and Farming State Inspectorate	46	24	22 at 7 posts	47%

Source: Interviews with Inspectorate Service Chiefs, February 2005.

**3.56.** In 2005, a state budget was provided for the construction of three combined border checkpoints and for basic laboratory equipment for the Plant Quarantine and Farming and Veterinary State Inspectorates.

**3.57.** The inspection services appear to be woefully underfunded. This starves the performance of official functions, creates a conflict between official duties and more highly remunerated services, and induces a climate ripe for corruption. With only two exceptions, the companies visited reported that they routinely paid inspectors fees well in excess of the officially listed charges for inspections that led to certifications, whether of facilities, processes, products, imports, or exports. It is hard to arrive at any other conclusion than that corruption is an integral part of the regulatory process in Armenia.

## Emergency Response

**3.58.** The Plant Quarantine and Farming State Inspectorate is responsible for monitoring and responding to pest outbreaks. They issue alerts to their regional staff based on pest population outbreak models developed with the Agrometeorology Institute and on outbreaks reported by farmers to district and regional staff. The Inspectorate's capacity to respond to emergency outbreaks is limited. One example of this occurred in 2003 when Armenia experienced a major outbreak of the Italian locust *Calliptamus italicus*, one of a series of outbreaks of this species that started in the late 1990s in Kazakhstan. Armenian specialists estimated that 40,000 ha would need to be treated to prevent an even larger outbreak in 2004. Unfortunately, the Armenian budget supported the treatment of only about 8,000 ha, or only 20 percent of the area that should have been treated to control the outbreak. Fortunately, mild early spring weather in 2004 followed by a killing frost hindered locust swarm development. The FAO helped Armenia and other affected CIS states, establishing a locust monitoring and treatment program in 2004. The EC Food Security Program has continued to supply support to locust (and rodent) control campaigns. Recourse to donors is usual because none of the smaller CIS states have the capacity to mount a self-funded campaign against outbreaks of locusts, which are an international problem in semi-arid and arid environments around the world. Armenia is affected by both the Italian locust and occasionally by the migratory locust *Schistocera gregaria*, when the latter invades in outbreaks via Turkey.

## Private Sector

**3.59.** Many medium- and large-scale Armenian agribusinesses have their own process control and quality assurance laboratories. Examples of such companies include wineries, canneries, and dairy companies. Several of these laboratories are accredited.

**3.60.** Most exporting companies have significant deficiencies in buildings, processing equipment, and production process systems, and they risk losing market access if they don't upgrade (see Appendix 1 ). A 2004 survey of food processing companies of all types found fewer than a handful that could meet international third-party ISO or HACCP certification requirements (Deeb and Graf, 2004). Most firms scored very low on more than 19 separate measures of their food safety systems (Table 10). None of the firms had an operating traceability system permitting individual units from a lot to be traced from the retail market shelf back to the farm and field or pasture on which the primary product or animal was raised. During visits to some of the same firms in early 2005, it was clear that export-oriented firms are accelerating their efforts to comply with tightening public and private standards but that many are still constrained by the poor facilities that they occupy and by loose controls over their raw material procurement and processing operations.

**3.61.** Armenian companies occupy many different points on the path to ISO and HACCP certification. Most are using an incremental approach, improving their facilities, equipment, and practices as their business volumes grow. Only the most recently constructed facilities meet enough of the underlying Good Manufacturing Practices (GMP) to successfully implement a HACCP program. This does not mean that other companies' food products are unsafe, because many of them use processes incorporating well-established, and effective command-and-control techniques. It does mean that many older facilities will not be able to meet private sector food safety requirements more stringent than the minimum public standards for entry into sophisticated markets. It also means that where HACCP requirements are mandatory, for example, processed fish products exported to the United States, Armenian companies must invest in new facilities to avoid finding themselves disqualified from the market place over time.

**3.62.** Some Armenian firms have shown themselves capable of meeting foreign importer quality standards once the national regulatory system has been strengthened for a specific product. A good case in point is the export of live crayfish. Exports hovered around US \$250,000 in sales for years. With EU funding, technical assistance was used to establish an entire value chain, including the identification of a competent authority for inspection and certification that would pass muster with the European Commission. With the regulatory problems solved, live crayfish exports have undergone a meteoric rise from a couple of hundred thousand US dollars to about three million (Box 5).

**Table 10. Scoring of safety & quality systems of nine better Armenian food processing companies**

	Average Score	
HACCP	2	
Traceability	0	
Internal audits	1	
Control of out-of-spec products	2	
Product design & testing	2	
Process controls	3	Key to Scoring
Physical hazards	2	
Chemical hazards	3	0 - No evidence of a food safety system
Quality controls & tests	2	1 - Basic elements of food safety, little
Microbial controls & tests	2	Implementation
Pest controls	2	2 - Basic elements of food safety, some
Grounds	2	implementation, but no documentation
Building design	3	3 - Basic elements of food safety, with
Building condition	3	implementation and documentation
Equipment maintenance	3	4 - Higher elements of a food safety system,
Staff amenities	2	with good documentation
Sanitation	3	5 - Advanced food safety system, with
Waste management	2	good documentation
Personnel training	3	
<b>Overall average</b>	<b>2.2</b>	

Source: Deeb and Graf, 2004.

**3.63.** Commercial poultry (see Box 6) is a turn-key industry and provides a dramatic example of private investment in veterinary services. This experience is echoed in modified form by dairy and cheese processors who interact more

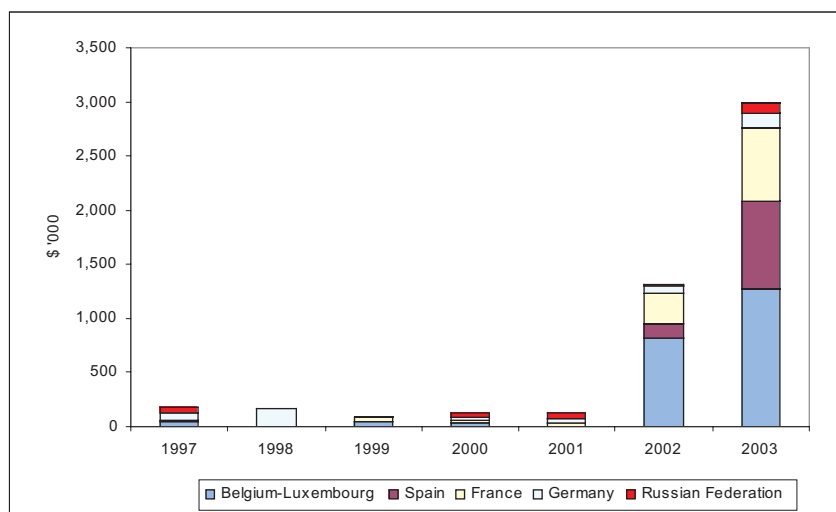
directly with the public veterinary service. The dairy processors and cooperatives have found that they must develop a program of intensive veterinary supervision to ensure the safety and quality of their raw milk supply. They take advantage of public services (testing and vaccination) when available, but they cannot rely upon them given the large endemic pools of disease and the uncertainties in the amount and timing of public finance supporting the public services. Large processors hire their own veterinarians and assistants and provide weekly services to their small farm and cooperative suppliers. Some small volume processors top-up the salaries of local state veterinary inspectors to increase the number of farm visits from twice yearly to monthly. While it is risky to generalize from just a few examples, this phenomenon, if wide-spread, could easily lead to misperceptions on the rate of testing, with a relatively small proportion of the national herd being tested 4 times per year giving the mistaken impression that the testing was close to universal. In addition, quality controls are enforced by formal and informal contracts with farmers that allow rejection of low-quality milk and premiums for higher quality.

**3.64.** A few firms are shifting their entire export strategy to align with private codes of practice. One firm in the dried fruit and vegetable market is working with cooperatives to establish an organic and fair-trade certified brand. The shift in strategy has required a major re-working of their processing site to meet basic GMP requirements. It will also require the establishment of an internal quality control laboratory to test both raw materials and finished products. This company hopes that the organic and fair-trade premiums paid will cover the investment costs and enable it to build a consistent if small specialty market share in countries in which its standard product would be driven out by lower-cost Turkish products.

#### Box 5. Armenian live crayfish exports

The figure below shows the progression of live crayfish exports from Armenia, notably the rapid increase of exports to EU destinations following the EC authorization of export procedures. While Russian and other CIS destinations represent the historic center of these exports, their importance is dwarfed by the rapid expansion of export sales to Europe.

##### Live crayfish exports from Armenia



Source: NSS.

The EU, USA, and Japan are the three so-called major markets for traded fisheries products. In 2001, Armenia did not yet have an agreement with the EU regarding fisheries products, even though the Ministry of Foreign Affairs had been negotiating an agreement since 2000. In 1998 and 1999, several Armenian shipments of crayfish had entered the EU, but two sample shipments of live crayfish were refused entry.<sup>49</sup>

<sup>49</sup> Robin Rackowe, April 2001, Seafood Processing and Marketing Identification, Report prepared for the USAID-financed ASME project.

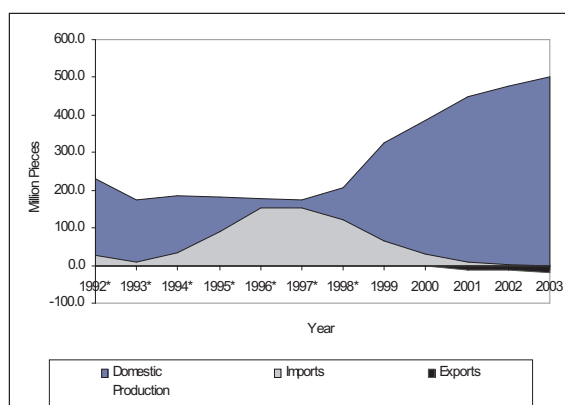
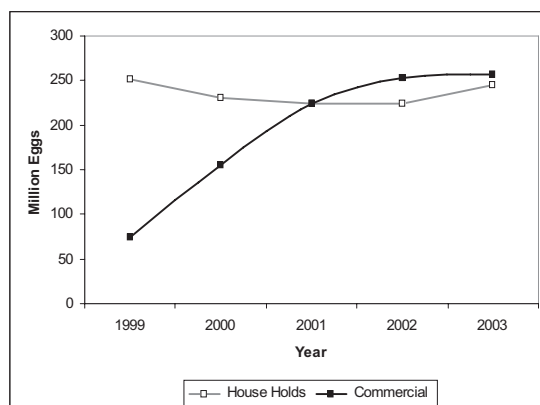
Armenian exporters were provided assistance and restarted exporting to Europe, triggering an inspection visit by the EC. The European Commission's Food and Veterinary Office undertook a mission to Armenia resulting in the designation of an Armenian Competent Authority, the State Hygienic and Epidemiological Inspection, to provide certification that only live, wild capture crayfish would be exported, that two establishments would be delisted (denied export certificates), and that approved establishments would be regulated according to Council Directive 91/493/30.<sup>50</sup> The Ministry of Health received donor assistance to upgrade its regulations and certification processes. Individual crayfish firms received assistance from other donor projects to upgrade their facilities and practices. Two firms are currently working to establish HACCP systems. By August 2004, four firms were approved for export of live crayfish to the EU under EC list II procedures. Armenian exporters occupy a niche in the EU for live crayfish. This enables them to compete on a market dominated in the cooked and frozen segment by low-priced Chinese crayfish. Frozen crayfish from China dominate all export markets around the world. Armenian exporters would like to export cooked, frozen crayfish, but they will need both a competent authority through which to obtain another level of certification authority and to beat Chinese prices or US, Spanish, and Turkish quality.

Source: The authors.

#### Box 6. Poultry industry: Armenians prefer Armenian eggs

The poultry industry benefited largely from zero duty on animal feed, the general income tax and VAT exemption for agricultural production, and some natural protection because of transport costs to a landlocked state. The ability to build production rapidly is also much greater than it is for larger, longer gestation cycle livestock such as sheep, goats, or cattle. The growth of commercial poultry production has increased the yield of eggs per hen from 85 to 165 over the 1999-2003 period. It has also increased the per capita domestic egg availability from 80 to 156.<sup>51</sup>

##### Household and commercial production of eggs



Source: Statistics from Statistical Yearbook of Armenia 2004 and FAOSTAT.

After independence, domestic egg production declined and apparent demand increased as eggs and poultry became cheaper sources of protein than red meat. Imports expanded to fill demand until 1997, when increases in domestic production on commercial farms began to squeeze the relatively low quality, predominantly Iranian eggs out of the market. Today, Armenia no longer imports whole eggs, and it has started to export in small volumes to neighboring countries.

The private operators say that they operate essentially independently of state veterinary services. They have hired veterinarians and veterinary assistants, carry out their own monitoring programs using ELISA tests in their own mini labs, vaccinate their own animals, and get international experts in to solve production and disease management issues.

<sup>50</sup> European Council, Food and Veterinary Office, 2003, Final Report of a Mission Carried Out in Armenia from 2 to 8 April 2003 Assessing the Condition of Production of Fisheries Products for Export to the European Union.

<sup>51</sup> Data on domestic production from Statistical Yearbook of Armenia 2004, Agriculture Chapter. Import and export data and production data for the pre-1999 period is from FAOSTAT 2004.

They report little confidence in either the veterinary services of the Ministry of Agriculture or in the expertise of the Armenian academics in universities, whom they believe to have mainly out-of-date skills. Because their primary market is domestic, the commercial farms are not concerned that the weak national veterinary service or veterinary inspectors will damage their business. They are also fortunate that Armenia has not had an outbreak of a major poultry disease since 1988.

*Source:* The authors and OIE disease statistics.

**3.65.** With USAID funding, both the USDA Market Access Program (MAP) and the Armenian Small and Medium Enterprise Project (ASME) provide technical assistance and training on food safety issues to export-oriented private firms. Private sector programs are also supported by the World Bank, the European Union, and a number of bilateral donors.

**3.66. *Retail trade*** The retail trade in Armenia is still very much in transition (see Appendix 1). Compliance with official food safety regulations is spotty. The retail trade is probably still too atomistic in ownership to embrace private codes of food safety practice. The fundamental priority is for the retail trade to come up to today's Armenian public health standards. The trend in retail is toward broader consolidation of retail food operations, which should lead to greater differentiation of store brand identity and greater acceptance of the retail food safety codes of practice.

**3.67.** With weak players in retail, Armenian processors are leading the way in setting quality standards and branding their products. Trade and business associations are weak in terms of developing or pressing for universal codes of practice. Very little horizontal cooperation exists concerning food technology or food safety practice.

**3.68. *Public-private interaction*** Regulations are written with little consultation with the general public or industry and very little transparency in their development. The broadest level of consultation occurs in inter-ministerial commissions. During interviews, the leaders of the inspection services were asked if they interacted with industry, industry associations, or consumer associations during the development of regulations. The response was universally one of surprise. The regulators saw no reason to consult with industry groups or consumer representatives on standards or regulations. The consumer unions, however, have begun to lobby the ministries for regulations. Industry associations have also drafted laws (an agrarian code for farmers, wine industry appellation d'origine code, and so on) that they are attempting to have ratified by Parliament or through Presidential decree. An institutionalized form of stakeholder consultation in law and rule development is definitely lacking, creating an environment in which narrow-interest legislation is likely to flourish. Little private or public interest seems to exist, however, for changing existing systems.

## Summary

**3.69.** Adjustments must be made in Armenia's institutional and regulatory SPS framework to enable it to follow the growing trend in food safety and agricultural health management. A more holistic approach would establish monitoring of the entire supply chain and would require accountability, transparency, and use of science-based measures.

**3.70.** Armenia has the basic legal framework for SPS management but most of the design and promulgation of regulations has yet to be undertaken. Lack of clarity leads to overlap in functions and responsibilities and to internal conflict among the involved ministries and between central and regional offices. Moreover, confusion persists over which regulations should be followed because GOST standards have not been properly removed and replaced.

**3.71.** Diagnostic capacities in the three fields have fundamental problems in basic infrastructure, operations, and maintenance, as well as substantial underutilization of human resources. Most of the core facilities charged with food safety and agricultural health were designed and built to GOST standards. The structures' materials make it difficult to clean and sanitize laboratories or to provide much more than basic to moderate bio-safety when handling infectious agents. Failures in basic infrastructure components, such as ventilation systems on chemical or microbiological hoods, are evident. Despite the apparent flaws and malfunctions in these laboratories, some are able to obtain national ISO 17025 (Good Laboratory Practice) certificates.

**3.72.** The deficiency in funding creates a conflict between official duties and more highly remunerated services and induces a climate ripe for corruption. In the private sector, most exporting companies do not meet GMP and HACCP requirements and would require upgrades to gain access to Western markets.

**3.73.** The private sector has started investing in food safety process control. Because of the small scale of the enterprises and outdated buildings and processing equipment, however, it still has a long way to go, and outside support will be important in many cases.



## 4. CONCLUSIONS AND RECOMMENDATIONS

### Conclusions

**4.1. The system of GOST standards, although *de jure* abolished, is still widely used and has not yet been replaced by a system of international standards,** although the fundamental laws of the Ministries of Health, Agriculture, and Trade and Economic Development are in place. Despite Armenia's accession to the WTO in 2003, its ministries have only very recently begun to replace the GOST standards of the former Soviet Union with new regulations that meet WTO requirements. The Ministry of Health has promulgated one regulation with 21 parts to replace part of the GOST standards. The Ministry of Agriculture has not yet enacted regulations to replace GOST standards. Its new veterinary law still lacks important provisions in governance. And, substantial work remains to be done to align phytosanitary law with IPPC standards. The backlog of work necessary to replace the thousands of GOST standards with international standards and to harmonize new regulations with those of international partners outside the CIS states will require years of work and specialized support. At the field level, GOST standards are used by inspectors in their day-to-day work.

**4.2.** The legal void created by the conflict between *de facto* GOST standard application and *de jure* abolishment of GOST standards for SPS inspection of processed products permits free-wheeling interpretation of regulatory authority and system by all parties, reducing the credibility of Armenian regulatory authorities domestically and in better-regulated export markets.

**4.3.** Mandatory regulations for food, crop, and livestock production and processing by law must be developed and submitted to the Ministry of Justice to ensure consistency in the body of Armenian law. Ministries and local authorities continue to regulate by direct decree and administrative order, however, further reducing the credibility of the regulatory enforcement process and potentially making it difficult to defend Armenia's regulatory actions if they are challenged before the WTO or in national courts.

**4.4.** The European Commission is providing assistance to Armenia to accelerate its convergence with selected regulations of the EU, following priorities established by the Armenian Government. This investment will be productive to the extent that it helps remove contradictory regulations and strengthens the process of orderly technical and judicial review.

**4.5. Armenia has for the most part achieved the correct economic fundamentals for agricultural growth.** Domestic producers are able to compete with foreign producers and in some cases (eggs, for example) have eliminated foreign competition and successfully developed some exports. Yet a large potential for meeting domestic and foreign demand remains underdeveloped. Effective SPS management constitutes one of the remaining obstacles for realizing market opportunities while improving human health (through food safety) and animal and plant health.<sup>52</sup>

**4.6. Agriculture and food exports are pre-dominantly focused on CIS countries and for the foreseeable future will remain so.** This does not mean that market requirements will stay as they are. The Russian Federation and several CIS countries are planning to join the WTO and to revise their regulations for consistency with those of the EU. In five years time, these countries are likely to have a mixture of EU and GOST requirements. Moreover, rapid development of modern retail in Russia and or CIS will bring much tighter private sector requirements. As a result, market segments that accept GOST standards will likely experience depressed prices. Diversification of exports and capture of high-value markets in CIS, the European Union, and the United States is highly desirable and will require significant upgrading of buildings, equipment, work processes, and supply-chain organization.

**4.7. Responsible agencies focus in only a limited way on food safety and agricultural health issues.** The Hygienic and Anti-Epidemiological Inspectorate focuses its efforts on marketplace and manufacturing facility inspection and follow-up of reported food poisonings to determine their cause and to organize public health service response. It does no border checks or targeted checks on imported food products. The main food safety concerns are summer season gastro-enteritis and salmonellosis, vibrio cholera in faulty water supply systems, staphylococcus aureus infections from poor personnel hygiene in food service establishments, zoonotic disease (undulant fever), mushroom poisonings, and botulism in home-canned, low-acid foods (vegetables). More than through investment in laboratory equipment or regulatory reform, these issues are best addressed by, among other efforts, infrastructure improvements in water supply; public health inspections of food establishments and their employees; in-factory personnel hygiene training and monitoring; reinforced quality control of veterinary vaccination campaigns; and public education and awareness campaigns (for example, concerning food safety awareness and seasonal public awareness during periods of high risk).

<sup>52</sup> See World Bank (2005) for a broad picture of remaining constraints.

**4.8.** The Plant Quarantine Inspectorate focuses on ten internal quarantine pests (insects, diseases, and noxious weeds), on plant quarantine pests of countries to which Armenia exports, and on inspection of imports for the presence of organisms on the national plant quarantine list.

**4.9.** The Veterinary Health Inspectorate is most concerned about the outbreak of zoonotic diseases, such as brucellosis, tuberculosis, and salmonellosis, and devotes a large amount of its resources and efforts to vaccinations against these diseases. Despite these activities, troubling outbreaks of zoonotic disease in herds may have been caused by ineffective vaccines or by the reintroduction of disease through use of improperly prepared vaccines.

**4.10. Inspection and laboratory procedures are deficient.** The sample chains of custody are subject to high levels of individual discretion on the part of the inspectors. High levels of discretionary power among inspectors open possibilities for rent-seeking. Factory and laboratory surveys permit the conclusion that some official certifications were obtained without reference to the state inspection infrastructure or required procedures. To date no agency conducts systematic monitoring and surveillance of agrochemicals entering the country and the market. Budgetary allocations to inspectorates appear to be insufficient, creating a climate in which inspectors may be easily corrupted. Failure to enforce anticorruption provisions, especially related to bribes to obtain documents and certifications, further erodes the credibility of Armenia's food and agricultural safety enforcement capacity.

**4.11. Food- and water-borne disease control requires greater attention to construction of buildings, environmental codes, and the regulatory environment.** Major areas requiring attention are building design and construction, water supply and in-plant treatment, industrial cleaning and sanitation, solid and liquid waste management, and personnel hygiene training and supervision. The rate of improvement of the water and sanitation system will determine how quickly the incidence of water-borne diseases will decline. Individual companies can isolate themselves from a contaminated water supply by investing in in-plant water treatment and can avoid contributing to pollution loads by investing in wastewater treatment.<sup>53</sup> Individual farm and factory water and sanitation investments will payoff by establishing good agricultural practice (GAP) and good manufacturing practice (GMP) which are the bases for HACCP, EUREP-GAP, BRC, and Organic and Fair Trade certifications. When they are in place and operating correctly, good water and sanitation practice allow improved market access and provide an insurance policy for a firm's reputation and for consumer and importer confidence in its products.

**4.12. Regulatory reform and harmonization require broader mechanisms for consultation and information.** Harmonization of regulations with both international requirements and national realities requires genuine stakeholder consultation. Currently SPS regulations are developed by the state agencies. Officials are surprised that the international regulatory organizations expect them to obtain public stakeholder input as part of the regulatory process. Part of the problem relates to an opaque information culture and public and private interest groups that seek to outflank the regulatory process by obtaining presidential, parliamentary, or ministerial decrees that benefit their agency or company.

**4.13. Food safety concerns are of increasing importance to consumers.** Armenian consumers prefer Armenian food products, not because they believe that Armenian food producers and manufacturers are more concerned about their needs and health, but because they believe that Armenian farmers are too poor to use many chemicals to produce crops and livestock. Therefore, they believe that both fresh and processed Armenian products are more "natural" or "organic" than imported food stuffs.<sup>54</sup> The current system of public monitoring of markets for agro-chemicals and food safety cannot substantiate such claims, however. Both regulators and processors believe that consumers are potentially the most important regulators of markets but that they often lack the information they need to make the best buying decisions.

**4.14.** Consumer unions and NGOs are raising concerns about food safety and food additives, such as preservatives, colorants, and transgenes. Consumer associations have pressured some industries to improve food labeling (production dates, expiry dates, ingredients lists, and so on.) and to change some of their production practices; however, these consumer groups are not universally trusted. Their dependence on grants rather than membership fees leads to questions about their independence, their ability to set an Armenian agenda, and their ability to operate once grants are depleted. Further, their operations are frequently seen as lacking the transparency that they seek from government and the commercial sector. Some processors indicate that a consumer association's seal of approval would help build mar-

<sup>53</sup> Savings from investment in water treatment and potential reuse may be realized where water is costly and the company's processes are water-intensive (such as in fruit and vegetable canning); water recycling (as in sugar extraction) or reuse (as in grey water for irrigation) is possible; or if economically useful by-products from water used in processing (such as whey water from cheese manufacturing) can be recovered.

<sup>54</sup> Consumers and processors alike express great apprehension about GMO-ingredients and food additives in processed foods, an issue beyond the scope of this report.

ket share and might result in a 10 to 15 percent price premium, but others believe consumer union staffs were as likely to ask for bribes as were state officials. Politically motivated attacks on some coffee roasters reportedly occurred in the past, for example. Generalized distrust of state agencies, private companies, and NGOs makes it difficult to identify an independent third party who could be seen as using only science to inform the public on food safety issues.

**4.15. Priorities** A comprehensive realignment of all SPS programs will require much time and effort by the Government. This report recommends that the Government focus its assistance on groups of export commodities with good potential for growth, using the experiences from each investment to promote broader change over time. Likely commodities for investment activities to bring regulations, inspection, and certification processes up to EC standards include processed crayfish, fresh water fish (trout and salmon x trout hybrids), and caviar; cow and goat's milk cheese; wine and brandy; and honey. Russia, Georgia, the European Union, the Gulf States, and the United States are target markets for these products.

**4.16.** Health hazards should be considered from two perspectives, domestic health protection and export promotion, each of which can lead to different priorities. Food safety and agricultural health interventions must be based on risks, benefits, and costs. Program priorities should likewise be guided by the frequency of occurrence and severity of these health hazards. Considering these two factors (see Appendix 4 ) the priority health issues identified for exports are food- and water-borne diseases and pesticide residues.

## Recommendations

**4.17.** The reform of the food safety and agricultural health system is now high on the agenda of the Armenian Government, the private sector, consumers, and donors. It should be pointed out that such a system-level reform will have long-term, far-reaching impact on the country's food safety and on the development of the agro-food sector. The reform also involves many stakeholders and multiple agencies within the Government, each with its own objectives and priorities. Therefore, such a process is very different from the day-to-day operation of existing food safety and agricultural health systems (see Box 7 for a description of various functions in food safety and agricultural health management). A clear vision, careful planning, and strong leadership will be crucial to the success of these reforms. This section makes recommendations about the specific actions to be taken.

### Box 7. Functions to be performed in managing food safety and agricultural health

**Policy making** roles are different in a reform process and in ongoing business.

A **reform program**, such as replacing a GOST-based system with a system based on international standards is costly and can take 5 to 6 years, with changes in division of responsibilities of ministries and services. Such a program requires decision-making by the Prime Minister, the Cabinet, and the parliament on the principles to be used to guide reform and on a plan of action. Given the technical and political complexity of the issues, a task force of high level professionals with a clear mandate is needed to act as the main engine for the work to be done by the various ministries and agencies involved. The task force should report to the Prime Minister. Also needed are government decisions on how best to fund the successive steps. This will involve close cooperation between the task force and the Ministry of Finance and donors.

Policy tasks in **ongoing business** carried out by various ministries include dealing with day-to-day and year-round risks, decision-making regarding inspection programs, and targeted interventions. Policy development also involves determining the volume and priorities in standards setting (where risk assessment is to be performed by different units). Policymaking is only effective if it includes decisions on funding the capacities needed to implement the laws and policies established.

**Implementation** includes ongoing efforts toward inspection, surveillance, enforcement of rules, and certification. These tasks fall to the inspection services, surveillance units, laboratories, and law enforcement entities. In some countries, such as Lithuania and Canada, a single agency conducts food and veterinary controls. In other countries, these duties are implemented by various agencies, in which case a clear delineation of responsibilities and an effective mechanism for coordination are required.

**Evaluation** is the ongoing business conducted by auditing units of the government and sometimes by special committees.

*Source:* These recommendations derive from the information gathered for and presented in this report.



### Setting up coordination

**4.18.** To facilitate the implementation of the action plan, a coordination team consisting of a project manager and an SPS coordinator, recruited internationally, is recommended to oversee the proper and efficient use of resources, including the participation of the various stakeholders, the involvement of the donors, avoidance of overlap in tasks and projects, and good preparation for and follow-up of missions by international specialists. The project manager and SPS coordinator are to be supported by government specialists in food safety and plant health and a full-time translator.

- **Action 1:** *Establish a coordination team that includes a project manager and an international SPS coordinator to be supported by specialists in food safety and plant and animal health and a full-time translator.*

### Market opportunities

**4.19.** Reform measures undertaken in the 1990s have resulted in readjustment and rapid recovery of growth of Armenia's food and agriculture sector, with increased integration with the international economy. Products with proven export potential so far include wine and brandy, fish and crayfish, cheeses, and fresh and dried fruits and vegetables. Further opportunities may develop for other dairy and meat products, but the signs of the potential for these products are weaker. CIS countries, especially Russia, the Ukraine, and Georgia, still buy almost 90 percent of Armenian agro-food exports. Armenia has successfully built and exploited niche product access for live crayfish in the European Union and of preserved fruits and vegetables and cheeses to the United States and the EU, a strategy that should be followed by other products for which Armenia appears to have competitive advantage. Volumes of exports to the EU and the USA are constrained because many Armenian producers cannot meet these markets' quality and safety requirements and because low productivity renders some products uncompetitive.

**4.20.** Any major expansion of the livestock sector will rely on exports. However, it is not clear that extensive public investment in the primarily subsistence livestock subsector for meat is to Armenia's comparative advantage. For most livestock products, neither producers nor Armenian authorities meet the EU requirements for third-country recognition. A more zonal or compartmentalized, subnational approach to livestock investments may be of greater benefit than one that imposes the high costs of EU livestock regulation on the entire domestic industry, especially if the CIS states continue to be the main export focus.

- **Action 2:** *Assess Armenia's competitiveness in fish, dairy, and livestock products to determine the potential benefits of investment to seek EU third-country status for these products.*

### Institutional realignment and legislative framework

**4.21.** The institutional and legislative framework needs improvement. Most of the design and promulgation of regulations under the fundamental laws in public health, animal and plant health, and norms and standards must still be undertaken. The Ministry of Health has made more progress than has the Ministry of Agriculture in developing regulations.<sup>55</sup> The clarification and alignment of responsibilities between government agencies deserve first priority. Currently many institutions are involved in SPS management, despite severe budgetary limitations, and the overlap of responsibilities leads to too many inspections. Particular attention should be paid to avoiding conflicts of interest in the reorganization of the food safety and agricultural health institutions (see Box 8). To make better use of scarce resources, Armenia may wish to consider two options. The first is the creation of a single authority for SPS that would combine the food control functions of the Ministry of Agriculture, the Ministry of Health, and Ministry of Trade and Economic Development. The other is to clearly define the responsibilities of each agency and to eliminate duplication, overlapping responsibilities, and other cost inefficiencies once new technical regulations and voluntary standards are introduced.

- **Action 3:** *Develop and adopt an institutional and legislative framework that would eliminate the overlapping responsibilities of the various ministries and create a basis for an efficient and effective system of food safety control.*
- **Action 4:** *Assess the best institutional set-up for Armenia - a single agency for food safety or a much improved alignment among the present services - and realign existing roles and responsibilities.*

<sup>55</sup> With the exception of the WTO Notification Office, the Ministry of Trade and Economic Development leadership was not available to meet with the mission, so this report cannot provide a comparison with the other two ministries.

**Box 8. How can conflicts of interest be avoided?**

Conflicts of interest can undermine the credibility of food safety and agricultural health management systems. Three examples can illustrate this point. A basic issue in food safety is the potential conflict between supporting producers and protecting consumers. If these functions reside in one institution, risk arises of a crisis in consumer trust, especially in event of a food safety hazard. Because of this, virtually all countries assign these functions separately, supporting producers to the Ministry of Agriculture and protecting consumers to the Ministry of Health.

A second issue is the desirable division of responsibilities within the Government among units involved in policy making, implementation, and evaluation. Inspection services should not set policies, only implement them, and evaluation of food safety and agricultural health management should be independent of both policy making and implementation.

The third issue involves separation of the roles of risk assessment and risk management in standards setting and adoption of measures. Risk assessment should be independent and science-based; it is often charged to specialized teams in research institutes. Risk management is a function for government agencies given responsibility for deciding what risks are acceptable and how to handle calamities. Because transparency is needed for maintaining trust in regulators by consumers and trading partners, risk communication constitutes a separate special role.

*Source:* These recommendations derive from the information gathered for and presented in this report.

**4.22.** Armenia's current division of responsibilities between public health and veterinary services is not in line with common international practice. The Ministry of Health's Saniped seems to be the most logical point at which to consolidate food safety monitoring and surveillance. Saniped has good human resource capacity and the best laboratory facilities in the country at both the central and the Marze level, although these laboratories need reinforcing and upgrades in infrastructure, equipment and methods, and training in the new methods. Saniped is the public health contact for the WTO, and it leads the commissions that draft the horizontal laws for mandatory regulations of food products. It would make sense to consolidate municipal market laboratories within Saniped, with an adjustment and consolidation of staff to include veterinarians, after reassessment of monitoring and surveillance needs. Veterinary inspection would continue at the level of abattoirs, quarantine points, border points, and meat-packing facilities, but it would be discontinued elsewhere, for example, at all market points post-abattoir. The new law on the veterinary service would require adjustment to consolidate and streamline food safety enforcement.

- **Action 5:** *Adjust law and policy to make Saniped responsible for food safety in the marketplace, with consolidation of authority for market testing and inspection of all retail food products, as well as for sales points for food and beverages.*

**4.23.** At the time of its accession in 2003 to the WTO, Armenia adjusted its legislation in order to comply with international requirements, and fundamental laws assigning the responsibilities of the Ministries of Health, Agriculture, and Trade and Economic Development are in place. Gaps remain, however, in basic domestic food safety and SPS laws, and the various ministries have only very recently begun to replace the older standards with new regulations that meet WTO requirements. The process of regulation has serious deficiencies, with central ministries developing laws, regulations, and decrees with little consultation of stakeholders. In addition, major interest groups may formulate legislation or regulations for direct action by parliament or presidential decree. Service directors and technical specialists who receive WTO SPS notifications in English or French often ignore them until a translation in Russian is provided by Russia or regional CIS bodies.

- **Action 6:** *Establish a system of public-private consultation for managing SPS that includes industry, farmer associations, and consumer groups and help prepare meeting agendas.*
- **Action 7:** *Translate into Armenian at least the WTO summary notifications and include a WTO language qualification as a hiring or promotion criterion in SPS-related bodies.*

**4.24.** The abolition of GOST standards as the mandatory system in January 2005 created a legal limbo because no alternative has been put forward to replace it. Moreover, in practice many of the food safety inspections continue as if the GOST system were still mandatory. Below the national level, municipal and district agencies have broad authority to regulate the domestic food industry and retail markets as they see fit. It is an open question whether Armenia's control system and border procedures comply with international requirements.

- **Action 8:** *Assess whether Armenia's SPS control systems and border procedures meet the WTO test of nondiscrimination, with a view towards developing an action plan for bringing these systems into conformity with international requirements, as necessary.*

**4.25.** Strategic investment is needed to adopt an operational system of international standards and eventual convergence with EU regulations. Armenia has made the decision to make its food safety and SPS regulations consistent with those of the EU (see Box 9 for a discussion on different approaches to EU standards and regulations). Thousands of technical GOST, veterinary, and phytosanitary rules will need to be assessed for compatibility with international standards' principles and for their contribution to market and private sector development, in particular in the food and agriculture sector. Ultimately, these rules must be abandoned, replaced, or changed to voluntary standards. New bylaws based on international standards' principles and EU regulations must be developed, and the operating implications of the revised regulatory rules for quarantine and inspection must be signaled, with corresponding changes made in daily enforcement practice as revisions are incorporated into field staff operating manuals. Since this task is likely to require several years of work, a plan is needed that sets priorities (see paragraph 4.15). Priority should be given to products with the greatest export potential, and consideration should be given to phased subnational application to zones or compartments (for example, delimited geographical regions within a country, down to the firm level in some cases).

- **Action 9:** *Prepare a work program on regulatory amendments (including resources needed, and methods and principles to be applied) with priority placed on regulations for niche products with EU export potential, that is, wine and spirits, processed crayfish, freshwater fish and fish caviar, cow and goat's milk cheeses, and honey, and provide support to the task force.*

### Inspection, monitoring, and surveillance

**4.26.** The costs of doing business with the present GOST-based inspection system are high. Far too many inspections of all kinds are carried out in the food industries, many of which contribute very little to the health of the public. Although the formal and informal costs of inspections are a financial burden for businesses, many inspections use Soviet-era GOST regulations that do not reflect the present requirements for public safety or the needs of a market economy. Inspection and monitoring programs have become more numerous but independent scrutiny and assessment of their functioning is inadequate. It may also be true, as domestic producers believe, that importers face fewer problems with regulatory authorities than do national manufacturers. Although these problems do not appear to be stopping development of domestic industry, they certainly retard it.

- **Action 10:** *Review all authorized inspection functions, abolish duplicate functions and those not useful in a market economy, improve the transparency of the inspection and certification process, and suppress corrupt inspection practices.*
- **Action 11:** *Improve governance of inspectorates by formulating procedures to be followed by public inspection services, requiring publication of work plans, periodic reporting, and the conduct and publication of performance audits.*

### Box 9. "Harmonization" with EU regulations

The term "harmonization" with regard to EU sanitary and phytosanitary regulation can mean many things. New EU member states must **adopt** the *acquis communautaire*, which is the complete body of laws and regulations of the European Commission, including those for food safety and the agricultural sector. This is a major and expensive task requiring many years of work to complete. EU accession countries receive extensive technical and financial support from the EC for this kind of "(full) harmonization." Lithuania, for example, received € 30 million under PHARE and € 44 million under SAPARD.

Countries that are not accession candidates need not make such massive adjustments and do not receive support on the same scale. These countries aim at selective **convergence** with some EU food safety, phytosanitary, and veterinary regulations when doing so is in their interest based on cost-benefit analysis. If the country seeks only to export to the EU, it must **comply** with the EU import requirements, obtaining, for instance, "third-country status" for animal products.

*Source:* These recommendations derive from the information gathered for this report.

4.27. Following these results, the State Veterinary Inspectorate of Armenia needs a strategy for animal diseases adapted to each type of disease and its significance in Armenia. From a public health perspective, brucellosis and tuberculosis lead the list of animal diseases of concern for human health; these are followed by salmonellosis and parasitism by helminth worms dominated by Echinococcosis (this last is likely to remain primarily a concern in rural areas). Despite these clear priorities, however, current activities of Veterinary Inspectorate do not target these diseases. Present surveillance and monitoring programs range in intensity from twice yearly inspections of cattle to occasional testing of sheep and goats. An overall strategy to combat zoonoses in Armenia would necessarily include a much strengthened and targeted surveillance, vaccination, deworming, and intermediate host control strategy. A slight rebalancing of effort is needed to address what appears to be an increase in transmission of diseases and parasites from small ruminants to humans.

- **Action 12:** *Assess and improve programs for human and animal health monitoring. These monitoring programs should provide food safety and animal health managers with information about and directives to focus their efforts on new and evolving priorities.*

#### **Monitoring and surveillance in the livestock sector**

4.28. High rates of testing to monitor disease status and of vaccination to damp down outbreaks are standard elements in Armenia's livestock health management programs, as undertaken by both the Government and the private sector. While the gross numbers suggest that the entire cattle herd is being tested at least once or twice a year, however, it may be the case that the more accessible animals are tested twice a year and the less accessible ones once or not at all.

4.29. The lesson is that testing hundreds of thousands of animals once or even twice a year provides statistics but does not result in improved animal - or human - health, unless testing is followed up with good sanitary control measures that are consistently applied every day and every year throughout the food chain - from farm to fork. A corollary is that exporters of milk and meat products must establish their own farm-to-factory disease prevention, surveillance, and management program if they wish to meet importing country requirements beyond those of their near neighbors in the region, even though animal product exports currently represent only a tiny part of animal product sales in Armenia.

4.30. While the number of veterinarians and veterinary technicians working in the Armenian public service has declined, size of the national herd has also declined by about the same magnitude, and, according to interviews, private employment of veterinary staff by milk, meat, and poultry producers and processors has grown. Animal health issues have much to do with the lack of public and private resources devoted to surveillance, suppression, and management of animal disease. The European Union is supporting a major effort to establish a National Animal Disease Surveillance System in Armenia, in coordination with FAO and a joint FAO-SANCO project.

4.31. Frequently, the view is reported that some (the statistics suggest many) rural smallholders feel that diseased livestock products can be sold into the urban markets without unduly affecting their own lives and livelihoods. Alternatively, these producers may be seen to simply have no choice. The scope and depth of Armenia's animal health problems suggest that progress in changing attitudes and levels of investment in animal health in both the public and the private sector will take place slowly, most likely beginning with the larger producers and the cooperatives supplying processors.

- **Action 13:** *Assess the priorities for funding public veterinary tasks and adjust the program.*

4.32. Armenia has more than 120 insects, diseases, and weed species on its plant quarantine list. Unfortunately, the official list uses Armenian common names and does not include translations of the listed species' scientific names. Armenia uses this list to inspect imported plant materials.

- **Action 14:** *Provide an official version of the present quarantine list in an IPPC language, including scientific names, and assess its relevance for current needs.*

#### **Pesticide management**

4.33. A pesticide container collection and destruction policy and corresponding enforcement provisions would be important supports to the growth of the fruit and vegetable industry.

- **Action 15:** *Design and recommend a system for pesticide container collection.*

## Diagnostic capacities

**4.34.** Each SPS body in Armenia has its own system of central and regional laboratories. This system appears to be over-staffed in terms of operations costs and overstaffed relative to work load. In addition to these fundamental problems, roles are duplicated in overlapping testing capacity. Both the veterinary labs and the regional Testing Center of the Hygienic and Anti-Epidemiological State Inspectorate, for example, test meat for infectious diseases and parasites in municipal markets. Overlapping responsibilities tend to result in operating inefficiencies, overregulation by the State, and imposition of additional costs on the private sector. It might be desirable to develop central control (reference) laboratories with adequate equipment and staffing. The narrowing of roles would encourage consolidation of resources, which could then be used to make the adjustments needed for international accreditation. It would also be desirable to indicate areas in which private sector laboratories could undertake an increasing role in certification functions.

**4.35.** Possibilities for consolidation of laboratory and inspection services should be considered. Little interest in or political will toward consolidation seem to exist, however. Armenia currently employs far too many staff in its public laboratories relative to the amount of work required. The work load is not likely to increase substantially, especially if automated equipment is purchased. Redeployment of personnel to Marzes and border points would make sense given the current low volume of sampling and analyses performed at central laboratories.

- **Action 16:** *Evaluate Armenia's laboratory system and prepare a strategic plan for its development, with special emphasis on consolidation, to improve the likelihood of adequate operations and maintenance funding.*
- **Action 17:** *Rebalance the funding of laboratory upgrades by reducing staff and allocating cost savings to the operation and maintenance of equipment.*

**4.36.** The Central Laboratory of the Hygienic and Anti-Epidemiological State Inspectorate needs strengthening if it is to become the reference laboratory for analyzing pesticide residues, veterinary material residues, mycotoxins, and food additives and ingredients as well as for rapid method microbiological, serological, and virological investigations.

- **Action 18:** *Consider consolidating food safety laboratory capacity in the Republican Central Laboratory of the Hygienic and Anti-Epidemiological State Inspectorate (Saniped laboratory), especially the primary responsibility for official pesticide and veterinary materials residue testing.*
- **Action 19:** *Reinforce the central public health laboratory to enable Armenia to deal with rapidly increasing demands for improved surveillance and monitoring for food safety and agricultural health and to improve the scientific basis for mandatory regulations and voluntary standards.*

**4.37.** The central public health laboratory has an ISO 17025 Certification (Good Laboratory Practice) for the entire laboratory, given by the National Standards Institute; although given the condition of the physical facility, lack of safety equipment, gas fittings, reagent storage, and level of internal checks, among other factors, this lab would be unlikely to meet ISO 17025 certification requirements if the audit were performed by an internationally-recognized, third-party auditor. This does not mean that the analyses performed by the central laboratory provide unreliable or inaccurate results. The senior staff in the laboratory is highly qualified and experienced. It does mean that substantial improvement in infrastructure and management procedures would be needed before this facility could be recognized outside Armenia as a reference laboratory.

- **Action 20:** *Upgrade facilities and equipment of the central public health laboratory to meet requirements for international ISO 17025 certification.*

**4.38.** The Central Plant Inspection and Quarantine laboratory should be redesigned and reequipped for its role as national identifier of pests and diseases and as the arbitrator of infestation detections and quarantine actions. The central laboratory, sample repository, and record-keeping system need to be rebuilt; border posts should be equipped to permit rapid communication and sample transport to the central laboratory when needed; and Marze inspectors require better sampling tools, sampling plans, and sample handling procedures. The IPPCs ISPM standards can be applied. Upgrades to bring the central laboratory facility to near Good Laboratory Practice levels (EU audit levels) should be required before new equipment is provided to any key operating unit.



- **Action 21:** *Assess costs and benefits of upgrading plant quarantine testing and laboratory facilities.*
- **Action 22:** *Rebuild a strengthened pest, disease, and weed seed identification capacity within the Central Plant Protection and Quarantine Laboratory.*

**4.39.** The assistance provided by the EC Food Security Program (see paragraph 3.51) to the Republican Veterinary Anti-Epizootic and Diagnostic Center has been a helpful step toward reestablishing the veterinary laboratory as a reference laboratory. It seems unlikely, however, that Armenia's public budget can support the rehabilitation and sustained operation of central public reference laboratories with overlapping capacities. Outsourcing some analyses to private or regional laboratories should be explored.

- **Action 23:** *Recast the National Veterinary Laboratory as a reference laboratory focusing on confirmation of livestock diseases and parasites and on the essential task of ensuring the effectiveness and safety of veterinary vaccines and medicines employed to control disease.*

**4.40.** Pesticide residue testing From an SPS perspective, Armenia needs a comprehensive pesticide residue detection capacity in the public and the private sector. From a public investment perspective over the short to medium term, the best home for an official crop and food pesticide residue laboratory is with the Hygienic and Anti-Epidemiological State Inspectorate, with the National Standards Institute laboratory serving as the back-up. Projected work-loads, staff training needs, equipment needs, and facility upgrades should be evaluated to ensure that the public health laboratory meets international and national SPS standards. Work-load projections for a consolidated pesticide residue detection laboratory should be estimated based on requirements of trading partners and risk management. Until that laboratory is upgraded, pesticide residue analyses beyond the organochloride and organophosphate families should be contracted out to a private laboratory with more advanced and precise instrumentation. The private sector laboratories will upgrade their capacity as demand for their analytic services increases due to growth in export volume.

- **Action 24:** *Until the Saniped laboratory can be upgraded, contract pesticide residue analysis beyond the organochloride and organophosphate families to a private laboratory with more advanced and precise instrumentation.*

**4.41.** Regulators and processors expressed a number of concerns about the quality of imported foodstuffs, beverages, and ingredients. They also expressed concern that imported food products could contain genetically-modified organisms or potentially allergenic components or additives. Imported food and agricultural products should be included in the monitoring process (see paragraph 3.52). This probably would not require a permanent border inspection by Saniped, and at least some outsourcing of testing to private laboratories should be considered.

- **Action 25:** *Include as a special category in the monitoring programs of imported food and agricultural products the sampling and testing of products for pesticide residues, veterinary materials, allergens, additives, and colorants.*

**4.42.** *Testing pesticide formulations* The Plant Quarantine and Farming State Inspectorate is legally charged with monitoring pesticide formulations. The Plant Quarantine laboratory does not have the capacity, however, to test pesticide formulations for compliance with labels and grades (see paragraph 3.50). This task should be assigned to a laboratory with the necessary equipment. The National Standards Institute's laboratory is reported to have some of the capacity needed for pesticide formulation testing. Testing of imported pesticides is required by Armenian law, but developing a public center or unit to do these tests appears to be an unnecessary expense. A program of monitoring pesticides in the market and testing of pesticide formulations for compliance with labels and grades should be set up only if benefits will outweigh costs.

- **Action 26:** *Develop a program for sampling imported pesticides and their domestic reformulations and contract their testing to a qualified laboratory.*

**4.43.** Donor assistance toward upgrading laboratories should require reciprocal investments from the public and private sectors. Thus, improvements in laboratories should be incorporated into organizational restructuring and in clear mandates for involved agencies. This means:



- o The governmental or private agency would be required to meet basic Good Laboratory Practice infrastructure requirements (building materials, water and power supply, safety equipment for fires, chemical decontamination, and effective ventilation systems) before a central laboratory was provided with equipment;
- o Supply of equipment and training would be in modular tranches and based on program priorities for food safety; animal health and quarantine; and plant health and quarantine; and
- o Tranches of expenditure would be based on evaluation of capacity utilization, accuracy of diagnosis, and the effectiveness of follow-up action to correct the diagnosed problems.

### Border procedures

**4.44.** Establish a planting material and animal quarantine policy that meets international standards. Seek to reduce the costs of these facilities by using the infrastructure of specialized research institutes.

**4.45.** Border post inspection and animal quarantine procedures are justifiable for the protection of Armenia's herd from imported diseases. No quarantine system can completely eliminate the introduction of animal diseases, particularly in a landlocked country bordering countries with vastly different levels of sanitary regulation and enforcement. As a first step, quarantine procedures for imported breeding stock should be strengthened. A design effort will be needed to prioritize animal quarantine reinforcement coordinated with border post inspections and the establishment of strong chains of custody and improvement of conditions for livestock, semen, or embryos held in quarantine facilities.

**4.46.** The border posts will need to develop improved methods: sampling techniques; sample preservation; chain-of-custody procedures for samples; sample protection from loss and tampering; documentation and recordkeeping; and efficient and timely transfer of samples from national producers and from border posts to the central laboratory. If tests on the early season watermelon imports from Iran show that acute pesticide poisoning is a problem, then pesticide residue levels would likely be high enough to warrant quick-testing at the southern border posts for specific pesticide residues.

- **Action 27:** *Improve veterinary and plant inspection and quarantine border crossing sampling and diagnostic capacity (with pilots for a selected set).*

- **Action 28:** *Establish plant and animal quarantine facilities within Armenia.*

**4.47.** Complicated import and export procedures increase the transport and handling costs of goods and foster rent seeking. Import procedures are complicated and require duplicate inspections. Border posts are able to provide only temporary customs and SPS clearances until goods arrive at the central customs terminal in Yerevan, where they undergo a second SPS inspection before customs clears the shipment and releases it. If donors invest in bringing border posts up to EU standards, single point-of-entry clearance for customs and SPS should be made a condition.

- **Action 29:** *Move the physical location for final SPS clearances on imports to border posts.*

- **Action 30:** *Co-locate inspection services (veterinary and plant quarantine) at the same border post inspection facility.*

**4.48.** Depending on the product, plants and materials processed from plants may be subject to inspections by the Quality Inspectorate of the Ministry of Trade and Economic Development to obtain a conformity decision. This inspection essentially duplicates the inspection done by the Plant Quarantine and Farming State Inspectorate.

- **Action 31:** *Prepare for the progressive elimination of conformity assessment by the Ministry of Trade and Economic Development.*

<sup>56</sup><<http://www.fao.org/docrep/v9723t/v9723t08.htm#process%20of%20risk%20analysis>>.

<sup>57</sup> S. Slorach, R. Maijala, and H. Belveze, An integrated approach to food safety covering the whole of the food chain and beyond: Sweden, Finland and the European Commission, Paper submitted to the Pan-European Conference on Food Safety and Quality, Budapest, February 2002.

### Risk assessment and economic analysis

**4.49.** Central to the management of food safety and agricultural health under WTO principles is the process of *risk analysis*. The phrase has acquired a more specific definition in the context of SPS management. Risk analysis involves three elements: risk assessment, risk management, and risk communication.<sup>56</sup> Risk assessment requires identification and characterization of hazards, an evaluation of likely exposure to the hazard, and an estimate of the adverse effect of exposure. Risk management adopts preventive or control options given the risk assessment findings. Risk communication provides the public and private sector and trading partners with information to prevent, minimize, or control the identified risks. The entire risk analysis process is an iterative one, requiring interaction between the risk assessors and risk managers.<sup>57</sup> Separation of these functions is essential to the integrity of the analysis.

**4.50.** Economic assessment is complex, given that often insufficient data are available. Investment and operational costs are often direct and tangible, whereas cost related to risks of outbreaks and rejections are uncertain by nature. Benefits from health and trade are often also uncertain, as they can only be realized in the future. Investments may have multiple uses and benefits that spill over to other areas. Problems with noncompliance for a particular product or market may have negative commercial impact on other products and markets. Benefit-cost assessments must be targeted at specific products and policy interventions. In the absence of quantitative data, qualitative assessments can take into account the incidence of health hazards, their impact, the likelihood of events, and the actual or potential size of production and international trade involved. Usually SPS requirements are not the only obstacle blocking market access; therefore SPS improvements may be necessary but not sufficient.

**4.51.** Armenia should form a small taskforce for risk assessment. The regular staff in the Ministries of Agriculture and Health falls far short in numbers and in knowledge and expertise (market economic principles, risk assessment, economic evaluation, and language skills) to perform this work adequately within a period of 3 to 5 years. Armenia's task force should be supported by international expertise, for example, regarding adoption of EU-level import sampling programs or development of risk-weighted sampling programs for imports.

- **Action 32:** *Establish a small unit with expertise in risk assessment to provide firm science-based advice to government units responsible for safety management. Some of the unit's expertise can be shared by food safety and plant and animal health services.*

**4.52.** Current monitoring, surveillance, and inspection programs are insufficiently based on risk assessment and costs and benefits. Outdated GOST standards still provide the rationale for most inspections and monitoring, meaning the enforcement strategy is not science-based. While there are exceptions, especially in the case of human or animal disease outbreaks, enforcement is also insufficiently linked to priorities in food safety and animal and plant health, eroding its credibility. The feedback from monitoring and surveillance could be better used to set priorities for managing food safety and animal and plant health programs.

- **Action 33:** *Evaluate inspection, monitoring, and surveillance programs with regard to setting priorities and to attaining cost effectiveness; propose methods for their design and methodology; and formulate a program for the first year.*

**4.53.** The Republic of Armenia and donors are making important investments in livestock systems to bring regulatory systems into EU compliance, but important issues remain unresolved having to do with the likely payback for those investments: weaknesses in applying existing policies to stamp out animal diseases; weak quarantine capacity; and very weak capacity to deal with the economic impacts of SPS requirements and avian flu now on Armenia's borders in Turkey and other neighboring states.

- **Action 34:** *Conduct cost-benefit analysis of the current livestock investment strategies of Government and donors.*

## Emergency response

**4.54.** Armenia's existing policies of stamping out diseases by selective culling and destruction of highly infectious animals must be reinforced-especially for brucellosis and bovine (and related ovine and caprine) tuberculosis, as well as other highly infectious livestock diseases in Armenia - to avoid outbreaks that would require individual herds to be destroyed in emergency situations. Control of brucellosis and of tuberculosis are key indicators to importing countries of the safety and the level of management applied to local and national herds. They already figure as key criteria for producers of milk products, primarily cheese and ice cream, exported to the European Union and United States. Foot and mouth disease (FMD) is important from an agricultural health perspective, but since Armenia does not export beef or live animals, its eradication need not be given much priority since it poses little danger to human health under most circumstances.

**4.55.** Also, the present system for stamping out diseases is ineffective and should be combined with a restocking program using primarily financial tools. In emergency outbreaks, the Ministry of Agriculture sometimes compensates stock-raisers for destroyed cattle. Livestock owners, however, have no confidence in the compensation system, and they avoid reporting disease outbreaks.

**4.56.** Moreover, the basic system should operate for animal and product destruction, as well as for rendering or BMB (Bone Meal and Blood) processing and the back-end disposal of waste and biohazard materials at the local level. The centralized incinerators used in Soviet times are no longer operational and are too distant from the livestock producers. This provides support for the State Veterinary Inspectorate's call for the construction of incineration pits in some areas. The request requires additional examination, however, to determine if permanent incineration pits are a better option than cruder dug incineration pits. Also, most slaughter of cattle, sheep, goats, and pigs is done on the ground in unsanitary conditions, eliminating a key control point in SPS systems. While importing nations would prefer to see Armenia install EU- and US-compliant slaughterhouses, these are very costly. Intermediate, phased strategies, for example, use of "slabattoirs" slaughter slabs before abattoirs, may better fit national needs and medium-term export potential.

- **Action 35:** *Research and design an improved system to support the stamping out of livestock diseases, with a special emphasis on zoonoses,*

## Information and education

**4.57.** Armenia appears to be neglecting awareness raising and education, important elements in improving food safety and agricultural health. Among Armenia's major food safety concerns amenable to this approach are the zoonotic disease Echinococcosis, linked to the increased consumption of small ruminants; botulism; and the consumption of poisonous mushrooms. These three problems can be mitigated by sanitary practices in the slaughtering and disposal of animals, hygienic food preparation, proper home-canning of low-acid food, and overall public awareness.

- **Action 36:** *Use the media, programs in schools, and training programs for industry workers and farmers to increase public awareness of and education about public health, food hygiene, and food safety. Special attention should be paid to informing farmers about practices for avoiding zoonotic diseases and to educational programs to reduce botulism and mushroom poisoning.*

**4.58.** The impact of the domestic retail industry on compliance with international private retail requirements for food safety is still negligible. While the fundamental priority is for the domestic supply chain and retailers to live up to Armenia's current public health standards, the trend regionally is for broad consolidation by domestic or foreign-owned chains. Horizontal cooperation on food technology and food safety practice is needed.

- **Action 37:** *Design a support project to enhance the role of consumer, trade, and business associations in promoting food safety at the retail level.*

### Private sector

**4.59.** Water quality is a major constraint on food safety and the competitiveness of the food industry. Individual plants processing fruits and vegetables, milk, and meat require in-plant water treatment capacity and improved wastewater handling. Only a few have in-plant chlorination facilities, and very few have wastewater treatment facilities. Financing is a key issue for facilities improvement. Serious consideration should be given to loan or loan guaranty programs for meat packers and dairy, nut, and fruit and vegetable processors.

- **Action 38:** *Improve water treatment for overall hygiene and safety in food processing plants.*

**4.60.** Most private companies cannot finance upgrades to buildings, processing equipment, or cleaning and disinfection systems to provide the base of good manufacturing practices that would permit introduction of HACCP and other quality and safety management systems. Neither can they finance development of the coordinated supply chains necessary for upgrading safety and quality standards. Blends of grants and lending may be the best way to address this problem.

- **Action 39:** *When benefits exceed costs, develop, in cooperation with banks and donors supporting private sector projects, financial tools (lending guarantees and grants) to upgrade coordinated supply chains, buildings, and processing equipment and to introduce HACCP and other management tools needed by modernizing agribusinesses.*
- **Action 40:** *Develop a comprehensive plan for convergence toward international principles of hygiene in food processing, accompanied by timetables and a financing plan.*

### Other programs with grants

**4.61. Water quality.** Public education is the main strategy employed by public health authorities to reduce household use of contaminated water, but water-borne disease is still significant. Enforcement of ground-water standards, for example, by closing off access to shallow wells, is hampered by the lack of alternatives for local populations. The long-term solution is to improve water supply from borehole sources and treated reservoir water for a broader portion of the country, but immediate investment in water system repair and operation and management programs seems warranted.

- **Action 41:** *Incorporate additional water treatment and handling investments in the Rural Infrastructure Support program. Grants may be needed in some zones to treat wells, improve local water purification and treatment, and provide alternative sources or advanced treatment of water.*

**4.62. Pesticide destruction** Support for Armenia from the World Bank POPs and a strategy for destroying out-of-date pesticides would boost fruit and vegetables exports and increase domestic acceptance.

- **Action 42:** *Provide grant financing to design a plan for the safe destruction of persistent organochloride and out-dated pesticides.*

### Special concern regarding avian flu

**4.63.** It is to be noted that the recommended actions in this report do not include measures pertaining to avian flu, although its significance has been discussed. Indeed, the importance of the poultry sector to Armenia's economy and agricultural population warrants special attention to the problem. Under the Global Program for Avian Influenza (GPAI), the World Bank (in coordination with the FAO, OIE, and WHO) provides assistance to countries to deal with avian flu and to prepare for the possibility of a human influenza pandemic. For Armenia, the Bank has recently approved an avian flu preparedness project to be financed by IDA loans (US\$6.25 million) and grants from USAID and Japan. The project has four components: animal health (development of a national strategy, strengthening of veterinary services, and outbreak containment), human health (public health planning and coordination and strengthening of surveillance and response systems), public awareness and coordination support, and critical imports (imports necessary in an outbreak, such as protective clothing and gear, vaccines, and medical and communication supplies).<sup>58</sup>

<sup>58</sup> Project Appraisal Document on a Proposed Credit in the Amount of SDR 4.4 Million (US\$ 6.25 Million Equivalent) to the Republic of Armenia for a Avian Influenza Preparedness (AIP) Project as Part of the Global Program for Avian Influenza (GPAI), World Bank Report No. 35392-AM. May 1, 2006.

## Action matrix

**4.64.** Table 12 presents all of the actions recommended in this section of the report, identifies the government offices responsible for these actions, indicates expected time frames, assigns levels of priorities, and provides estimated costs.

**4.65.** The derivation of costs is described in detail in Appendix 5 . Table 11 contains a summary of the estimated costs for the public sector.

**Table 11. Estimated costs for the public sector (US\$ ‘000)**

Recommended Actions	Technical Assistance	Trainings/ Workshops	Equipment/ Supplies	TOTAL
Coordination team	970	-	50	1,020
Market opportunities	61	2	-	63
Institutional realignment and legislative framework	690	299	350	1,339
Inspection, monitoring, and surveillance	384	30	15	429
Pesticide management	63	-	-	63
Diagnostic capacity	673	400	1,450	2,523
Border procedures	348	130	200	678
Risk assessment and economic analysis	332	260	460	1,052
Emergency response	66	10	-	76
Information and education	127	4	350	481
Total	3,714	1,135	2,875	7,724

**4.66.** The areas with the greatest costs are diagnostic capacity, institutional and legislative adjustments and risk assessment and economic analysis; although 68 percent of the total estimated costs for risk assessment (or US\$716,000) is for the improvement of inspection, monitoring and surveillance activities (Action 33). Equipment is the biggest requirement for diagnostic capacity. Trainings and workshops are needed for diagnostic capacity and institutional and legislative frameworks. Other than establishing the coordination team, the areas requiring the most technical assistance are diagnostic capacity, institutional and legislative issues, inspection, monitoring and surveillance, and border procedures.

## Funding of Food Safety and Agricultural Health Management

**4.67.** Implementation of these recommendations would rely on government resources and assistance from donor and international agencies. Since donors provide significant support to help in modernizing Armenia’s food safety and agricultural health systems, involving them in discussions about priorities is important in promoting optimal effects from donor-funding.

**4.68.** Government expectations are that donor assistance would re-equip laboratories, train laboratory personnel, and provide communications equipment. Private labs (though many private laboratories are partially state owned) have the same expectations. If donors elect to provide this type of support (and in some cases it is clearly needed), the support should be designed first to require adequate state and private investment in infrastructure rehabilitation before any donor funds are spent. (See paragraph 4.43.)

**4.69.** The effectiveness of the investments will depend on governance and regulatory enforcement. Donor investments in the SPS arena should be made incrementally and should be tied to performance indicators of changes in public service organizations, planning, funding, and program implementation.

Table 12. Action plan for SPS management

Issues	Recommended actions for the public sector	Time frame	Priority	Office involved	Estimated costs (US\$)	Related assistance
<b>Coordination team</b>	1. Establish coordination team with project manager and international SPS coordinator to be supported by specialists in food safety, plant and animal health, and full-time translator.	Medium-term	High	MoA MoH	1,020,000	
<b>Market opportunities</b>	2. Assess Armenia's competitiveness in fish, dairy, and livestock products to determine the potential benefits of investment in EU third-country status for these products.	Short-term	Medium	MoA MTED	63,000	
<b>Institutional realignment and legislative framework</b>	3. Develop and adopt institutional and legislative framework to eliminate overlapping responsibilities of various ministries and create basis for an efficient and effective system of food safety control.	Medium-term	High	MoA MoH MTED for all actions	95,000	
	4. Assess best institutional set-up for Armenia - a single agency for food safety or an improved alignment among the present services - and realign existing roles and responsibilities.	Medium to long-term	Medium		101,000	
	5. Adjust law and policy to make Saniped responsible for food safety in the marketplace, with consolidation of authority for market testing and inspection of all retail food products, as well as for sales points for food and beverages.	Medium-term	High		93,000	
	6. Establish a system of public-private consultation on managing SPS that includes industry, farmer associations, and consumer groups and help prepare meeting agendas.	Medium-term	Medium		113,000	
	7. Translate into Armenian at least the WTO summary notifications and include a WTO language qualification as a hiring or promotion criterion in SPS-related bodies.	Medium-term	Medium		(Included in Action 1)	
	8. Assess whether Armenia's SPS control systems and border procedures meet the WTO test of nondiscrimination, with a view towards developing an action plan for bringing these systems into conformity with international requirements, as necessary.	Medium-term	High		71,000	
	9. Prepare a work program on regulatory amendments (including resources needed and methods and principles to be applied) with priority placed on regulations for niche-products with EU export potential and provide support to the task force.	Medium-term	Medium		866,000	
	10. Review all authorized inspection functions, abolish duplicate functions and those not useful in a market economy, improve transparency of inspection and certification process, and suppress corrupt inspection practices.	Medium-term	High		199,000	
	11. Improve governance of inspectorates by formulating procedures to be followed by public inspection services, requiring publication of work plans, periodic reporting, and conduct and publication of performance audits.	Medium-term	High		73,000	
<b>Inspection, monitoring and surveillance</b>	12. Assess and improve programs for human and animal health monitoring. These monitoring programs should provide food safety and animal health managers with information about and directives to focus their efforts on new and evolving priorities.	Medium-term	High		76,000	



Table 12. Action plan for SPS management (cont.)

Issues	Recommended actions for the public sector	Time frame	Priority	Office involved	Estimated costs (US\$)	Related assistance
<b>Inspection, monitoring and surveillance (cont.)</b>	13. Assess the priorities for funding public veterinary tasks and adjust the program.	Short-term	High	MoA	33,000	
	14. Provide an official version of the present quarantine list in an IPPC language, including scientific names, and assess its relevance for current needs..	Short-term	Medium	MoH for all actions	48,000	
<b>Pesticide management</b>	15. Design and recommend a system for pesticide container collection.	Short-term	Medium	MoA MoH	63,000	
<b>Diagnostic capacity</b>	16. Evaluate Armenia's laboratory system and prepare a strategic plan for its development, with special emphasis on consolidation, to improve the likelihood of adequate operations and maintenance funding.	Medium-term for all actions	High	MoH MoA	249,000	EU is providing TA along with IPPC/EPPO EU, FAO, FAO-SANCO program in disease diagnosis and epidemiology
	17. Rebalance the funding of laboratory upgrades by reducing staff and allocating cost savings to the operation and maintenance of equipment.		Medium	MoA MoH	33,000	
	18. Consider consolidating food safety laboratory capacity in Saniped Laboratory, especially the primary responsibility for official pesticide and veterinary material residue testing.		High	MoH	463,000	
	19. Reinforce the central public health laboratory to enable Armenia to deal with the rapidly increasing demands for improved surveillance and monitoring of food safety and agricultural health and to improve the scientific basis for mandatory regulations and voluntary standards.		High	MoH	333,000	
	20. Upgrade facilities and equipment of central public health laboratory to meet requirements for international ISO 17025 certification.		Medium	MoH	636,000	
	21. Assess costs and benefits of upgrading plant quarantine testing and laboratory facilities.		Medium	MoA	63,000	
	22. Rebuild a strengthened pest, disease, and weed seed identification capacity within Central Plant Protection and Quarantine Laboratory.		Medium	MoA	310,000	
	23. Recast the National Veterinary Laboratory as reference lab focusing on confirmation of livestock diseases and parasites and on the essential task of ensuring effectiveness and safety of veterinary vaccines and medicines employed to control disease.		Medium	MoA	200,000	
	24. Until the Saniped lab can be upgraded, contract pesticide residue analysis beyond organo-chloride and organophosphate families to private lab with more advanced and precise instrumentation.		High	MoH	33,000	
	25. Include as a special category in the monitoring programs of imported food and agricultural products the sampling and testing of products for pesticide residues, veterinary materials, allergens, additives, and colorants.		Medium	MoH	140,000	
	26. Develop a program for sampling imported pesticides and their domestic reformulations and contract their testing to a qualified laboratory.		Medium	MoH	63,000	

Table 12. Action plan for SPS management (cont.)

Issues	Recommended actions for the public sector	Time frame	Priority	Office involved	Estimated costs (US\$)	Related assistance
<b>Border procedures</b>	27. Improve veterinary and plant inspection and quarantine border crossing sampling and diagnostic capacity (pilots for a selected set).	Medium-term for all actions	High	MoA	196,000	Underway with Armenian and EU funding
	28. Establish plant and animal quarantine facilities within Armenia.		High	MoA	222,000	
	29. Move the physical location for final SPS clearances on imports to border posts.		Medium	MoA	144,000	
	30. Co-locate inspection services (veterinary, plant quarantine) at the same border post inspection facility.		Medium	MoA	-	
	31. Prepare for the progressive elimination of conformity assessment by MTED.		Medium	MTED	116,000	
<b>Risk assessment and economic analysis</b>	32. Establish a small unit with expertise in risk assessment to provide firm science-based advice to government units responsible for safety management. Some of the unit's expertise can be shared by food safety and plant and animal health services.	Medium-term	Medium	MoA MoH MTED	268,000	
	33. Evaluate inspection, monitoring, and surveillance programs with regard to setting priorities and to attaining cost effectiveness; propose methods for their design and methodology, and formulate program for the first year.	Medium	High	MoA	716,000	
	34. Conduct cost-benefit analysis of current livestock investment strategies of Government and donors.	Short-term	Medium	MoA	68,000	
<b>Emergency response</b>	35. Research and design an improved system to support the stamping out of livestock diseases, with special emphasis on zoonoses.	Medium-term	Medium	MoA	76,000	
<b>Information and education</b>	36. Use the media, programs in schools, and training programs for industry workers and farmers to increase public awareness of and education about public health, food hygiene, and food safety. Special attention should be paid to informing farmers about practices for avoiding zoonotic disease and to educational programs to reduce botulism and mushroom poisoning.	Medium-term	Medium	MoA MoH	416,000	
	37. Design a support project to enhance role of consumer, trade, and business associations in promoting food safety at the retail level.	Medium-term	Medium	MoH MTED	65,000	
Issues	Recommended actions for the private sector	Time frame	Priority	Office involved	Estimated costs (US\$)	Related assistance
<b>Private sector</b>	38. Improve water treatment for overall hygiene and safety of food processing plants.	Medium-term for all actions	Medium for all actions	MoA	2,006,000	
	39. When benefits exceed costs, develop, in cooperation with banks and donors supporting private sector projects, financial tools (lending guarantees, and grants) to upgrade coordinated supply chains, buildings, and processing equipment and to introduce HACCP and other management tools needed by modernizing agribusinesses.			MoH MTED Private sector Donors	558,000	
	40. Develop a comprehensive plan for the convergence toward international principles of hygiene in food processing, accompanied by timetables and a financing plan				233,000	

**Table 12. Action plan for SPS management (cont.)**

Issues	Recommended actions with grants from other programs	Time frame	Priority	Office involved	Estimated costs (US\$)	Related assistance
<b>Water safety</b>	41. Incorporate additional water treatment and handling investments in the Rural Infrastructure Support program. Grants may be needed in some zones to treat wells, improve local water purification and treatment, and provide alternative sources or advanced treatment of water .	Long-term	Medium	MoH MoA	2,058,000	
<b>Pesticide management</b>	42. Provide grant financing to design a plan for the safe destruction of persistent organochloride and outdated pesticides.	Long-term	Medium	MoH MoA	5,136,000	

**Note:** Time Frame: Short-term, 18 months; Medium-term, 18 months to 3 years; Long-term, 3 to 6 years.

### Summary

**4.70.** The prevailing system of monitoring, surveillance, inspection, and quarantine for food safety, plant and animal health, and agrochemicals, as developed under the GOST and Soviet veterinary and phytosanitary systems and modified during the transition period, should be redesigned. The present system of inspection, monitoring, surveillance, and quarantine for food safety, plant and animal health, and agrochemicals loses its relevance when viewed within the context of international standards and market economy principles. Moreover, the system is not sufficiently based on cost and risk.

**4.71.** Additional efforts and budget are needed to renew Armenia's legal and regulatory system and to upgrade technical and human skills. Since Armenia is a small country with limited financial resources, however, additional funding should be selectively applied and well-prioritized.

- Priority should be given to interventions that can achieve high benefits at low cost or that prevent or control hazards with high cost and high risk.
- Risk analysis and cost-benefit assessments could lead to decisions to do nothing and leave things as they are.
- The scope of solutions should include efforts to which the private sector could contribute.
- Sharpening, prioritization, and sequencing of efforts will require a few rounds of consultation and subsequent assessments.
- For the short and medium terms, additional investments will be necessary to upgrade the SPS management system. For the long term, new efforts could be funded from savings that may be achieved through increased efficiency, abolition of out-dated GOST activities, and phasing-out of tasks with low priority.

**4.72.** Staffing levels in the public laboratories remain high, but utilization rates of existing equipment are very low. Although this may do little direct budgetary damage due to low salary levels and low use of consumables, it is an indication that the control system is not functioning properly, mainly due to lack of clear roles and responsibilities for each agency in the system. Investments in equipment alone will not result in increased utilization rates of the public laboratories. Prior to making investments in the laboratories, the legislative framework should be established, sufficiently financed and implemented, and translated into work plans for the inspectors and laboratories.

**4.73.** Unfortunately for the Armenian food safety and agricultural health system, as for those of many CIS transitional economies, is that humans are the sentinels for its weakness. Its public budget is stretched too thin, and emergencies shift funds out of ongoing programs, helping to create the next emergency. Paltry budgets of the official inspectorates deepen the structural problems. Acquiring proper funding does not merely involve an increased budget, however. It requires a thorough reconsideration of priorities for public funding.

**4.74.** Institutional capacity in SPS is shaped by the national legal framework and public and private capacities to regulate and manage food safety and animal and plant health. The legal framework is brought to life by the actions of the government bodies charged with its enforcement and of the private bodies responsible for meeting standards and market requirements in their day-to-day activities. At the end of the day, it is the general public as consumers who are responsible for the final stages of the safe handling and preparation of the foods and beverages they buy, prepare, and consume. The role of the public sector is to enforce the regulations needed to ensure the basic safety of the food supply, to support private entities with public infrastructure and services, and to inform and educate the public about food safety risks and their management. In plant and animal health, the public sector monitors and identifies pest and disease outbreaks nationally, excludes foreign pests and disease on imported products, takes quarantine and curative actions, underwrites research into plant and animal health problems, and works with producers, processors, and suppliers to address these problems.

## APPENDIX 1

### FOOD PROCESSING AND FOOD DISTRIBUTION DYNAMICS IN ARMENIA

#### Food Processing

During the Soviet era, the food processing industry in Armenia was part of the centrally-planned system, using factory designs from the 1940s and 1950s. During the transition period, state-owned enterprises were privatized. There were very few foreign direct investments and joint ventures. Privatization resulted in a collapse of the vertically integrated system. Small farms replaced larger collectives as the source of raw materials. Processing plants and the downstream sector were privatized. Subsequently, the newly privatized companies were downsized to better fit the prevailing raw material supply and market conditions.

Currently, the food processing industry constitutes up to about thirty-seven percent of all manufacturing in Armenia. The number of firms operating in the food processing sector has grown from 359 in 2000 to 756 in 2004.<sup>59</sup> Employment in food processing, however, declined over the same period from 13,900 to 11,600 production staff. Although in recent years many processing industries have been able to revitalize, much remains to be done. Most companies have outdated processing and packaging lines. The equipment is not energy efficient, and packaging does not meet modern standards. Considerable investment will be needed to make these companies' products competitive in the market. Many enterprises lack modern management practices, investment capital, and the financial resources to adequately compensate skilled labor.

Modernization and professionalization are making progress, and demand for skilled managers to run privatized companies is growing. Moreover, a new generation of small- and medium-size businesses is being established, filling market niches left by collapsed large enterprises. These companies receive financing from international organizations as well as from local sources.

Foreign direct investment (FDI) has so far been limited. In the brandy and wine processing subsector, for example, the Yerevan Brandy Company (YBC), the largest brandy producer in Armenia, was purchased by Pernod Ricard (France), and in the organic fruit and vegetable production and processing subsector, an investor from Argentina invested in Terra de Armenia.

The domestic market for processed and packaged food products is very fragmented. The major suppliers include large domestic and a few foreign producers. Small- and medium-sized local businesses also manufacture a significant range of products.

*Wine and brandy.* Wine and brandy production constitutes the largest segment of the food processing industry. After its sale to Pernod Ricard, YBC introduced new contract relationships with farmers, invested in quality improvements, and was able to re-establish the "Armenian Cognac" brand in CIS market. The demand for Armenian brandies is large in Russia, Ukraine, Belarus, and other CIS countries. Recently, more players entered the market. The resulting competition improved prices for grape farmers and increased product and packaging quality.

*Fruit and vegetable processing.* Fruit and vegetable processors are concentrated in the Ararat Valley, Armenia's main growing region for most fruits and vegetables, including several large canneries and some small- and medium-size operations. Much of their equipment and facilities are outdated. The four larger companies currently own some aseptic equipment and have been able to build new laboratory and testing facilities. The medium and small companies mix rehabilitated Soviet era equipment with new packaging lines. The large processors produce predominantly bulk products, such as tomato paste and fruit concentrates and purees. In recent years, however, the production of value-added, packaged products has increased with the introduction of nontraditional products, such as capers, green beans, and grape leaves.

Overall, the sector is export oriented. Traditionally, domestic demand for processed fruit and vegetables is weak, in part due to traditional home canning as well as the low incomes of the population. In recent years the industry has paid

<sup>59</sup> Statistical Yearbook of Armenia, 2005. These figures exclude micro (<5 employees) and small (5-15 employee) firms, for which accurate statistics are not available.

more attention to the domestic fruit juice market. Currently several processors produce juices from imported concentrates (orange, apple, mango, and so on) for the domestic market. These companies also export juice from Armenian vegetables and fruit, including tomatoes, carrots, apricots, and cherries.

*Dairy.* The dairy industry has capitalized on the growing demand for protein and on the tastes and preferences of Armenian consumers for traditional dairy products (cheeses, yogurt, sour cream, curds, and so on). The dairy industry consists of several fairly recently built large-scale plants containing modern equipment and using advanced technologies and solid quality control schemes. They mostly produce dairy products requiring quick consumption and low-temperature storage space (for example, sour cream, yogurt, and curds). Small-scale cheese operations exist in almost every village, and some have become important cheese producers and exporters. Armenia produces traditional saltwater cheeses; production of hard cheeses is not as widespread.

### Marketing Channels

Vertical integration and supply-chain coordination is an important means of ensuring quality, safety, and supply in the food processing sector. It occurs either through ownership relations or through formal or informal contracts. Informal contracts are common in developing and transition economies because contract enforcement institutions are often either absent or ineffective. In such cases private or self-enforcing mechanisms may replace public institutions, such as courts (see Gow and Swinnen 2001; Gow, Streeter, and Swinnen).

In wine processing, the vertical relationship between farmers and processors is well advanced. The processors (led by YBC) have entered into a system of medium-term contracts with farmers. Processors provide farmers with advance payments in the form of inputs (chemicals, fertilizer, and so on) and technical assistance in the form of processor-owned extension services. Several processors (small wineries) are integrating even further by purchasing vineyards.

The dairy industry is also integrating with farmers. Dairy companies normally organize milk collection centers around their plants or near the main livestock regions. Very often processors offer some support measures to agricultural producers to guarantee higher quality milk and a stable milk supply. These support measures can take the form of provision of veterinary services,<sup>60</sup> cash allowances covering transportation costs, and provision of free milk quality control materials and even technical and economic consultations.

### Food traders

Armenia has few food distribution companies. They normally specialize in distribution of imported food products and have exclusive contracts with the suppliers (such as Mars Candies, Nestle, and so on). In the majority of cases, the local food processors own their sales unit (staff and transportation), which is responsible for product distribution. Very often, some larger companies pay retailers for shelf space, provide training, and organize product testing. Sales personnel are paid salary and some premium.

Smaller companies normally hire outside sales personnel who have their own transportation, paying them a price margin for selling and distributing the product. These companies normally target remote stores or marketplaces (shukas).

### Retail markets

Armenia's national markets are dominated by individually owned shops supplied by importers/distributors, municipal markets, and direct suppliers. Yerevan has the largest concentration of consumers and much of the country's wealth. Therefore, it is the center of between 80 and 85 percent of retail trade in the country; food sales dominate, accounting for about 64 percent of total retail turnover.<sup>61</sup> Examination of the retail sector structure suggests consolidation is taking place (Table A1-1).<sup>62</sup>

<sup>60</sup> For instance, Vordi Armen LLC, a small-scale cheese plant in Kotayk, pays for veterinary services to conduct check-ups in the farms of major suppliers (with 5+ cows).

<sup>61</sup> Statistical Yearbook of Armenia. 2004. Chapter "Consumer Market."

<sup>62</sup> Many reports on the overall Armenian economy estimate that half is in the informal sector, meaning that statistics on imports, exports, and domestic retail operations should be interpreted with a wide margin of error.



**Table A1-1. Structure of retail trade outlets (number of registered establishments)**

	<i>1999</i>	<i>2000</i>	<i>2001</i>	<i>2002</i>	<i>2003</i>	<i>Population Outlet*</i>
Shops	5,182	4,744	4,548	5,204	4,568	703
Consumer goods markets	61	55	61	62	59	54,446
Kiosks	9,439	7,864	7,525	7,187	6,267	513
Agricultural products markets	46	45	41	42	39	82,367
Public catering objects**	553	572	579	649	720	4,462
Total Retail Outlets	15,281	13,280	12,754	13,144	11,653	276

Source: Statistical Yearbook of Armenia, 2004.

\* Calculated using the officially reported population of 3,212,300 in 2003.

\*\* Restaurants, cafes, pubs, canteens.

The table shows a decrease in the total number of retail outlets since 1999, with kiosks declining to 66 percent of earlier levels, a far faster rate of decline than that of the Armenian population, which dropped to 85 percent of 1999 levels by 2003. The number of large agricultural product markets (public semi-wholesale and retail centers such as the GUM Hall #2 in Yerevan) has also declined to 85 percent of the 1999 level, and shops declined to 88 percent of their former number. However, shops have grown in unit size by about 25 percent from an average 60 square meters to 75 square meters, so per Armenian, more retail shelf space is available today than in the past.

### Shops

Shops accounted for just over 49 percent of retail turnover in 2003. Some Eastern European countries limit shop sizes, requiring special permission to exceed 300 or 350 square meters. Armenia's average shop size is expected to grow until it reaches the Eastern European norm of about 250 square meters. Store size is important because larger stores show improved distribution efficiency, and standardization of private codes of practice accelerates as retailers consolidate. Most supermarket and hypermarket chains establish themselves with a minimum store size of 2,500 square meters, allowing a quantum jump in purchasing and distribution efficiencies. The shops seem to win and kiosks to lose the battle for market share, as shown in Table A1-2 and Figure A1-1. Consumer goods markets do not handle food products but are included here to show the relative distribution of sales between food and non-food products.

The bustling 137 percent growth of sales through shops from 1999 to 2003 has created opportunities for distributors, although most processors handle their own product distribution, especially the dairy products, meat, and poultry processors. These distributors and processors must maintain a cold chain, often underwriting the costs of refrigerated display cases for storing and displaying their products. During weekly delivery trips, their staff will check the operation of the equipment and pull out-of-date or spoiled stock. Some processing companies will soon install temperature recorders to monitor the storage conditions of their products in stores. Grocery stores and small supermarkets are growing; three supermarket chains each own 2 to 4 stores.

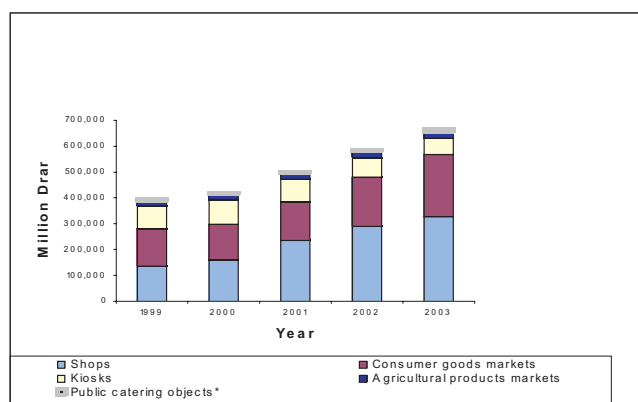
**Table A1-2. Total volume of retail trade turnover by type of retail outlet (million drams)**

	<i>1999</i>	<i>2000</i>	<i>2001</i>	<i>2002</i>	<i>2003</i>
Shops	137,869	163,612	238,303	292,049	327,307
Consumer goods markets	144,839	135,691	147,489	189,743	243,194
Kiosks	88,447	95,769	87,250	76,306	63,353
Agricultural products markets	19,716	23,633	25,849	25,149	24,640
Public catering objects*	2,991	3,553	5,398	5,685	6,742
Total volume of retail trade	393,862	422,258	504,289	588,932	665,236

Source: Statistical Yearbook of Armenia, 2004.

\*Restaurants, cafes, pubs, canteens.



**Figure A1-1. Total volume of retail trade turnover by type of retail outlet**

Source: Statistical Yearbook of Armenia, 2004.

\* Restaurants, cafes, pubs, canteens.

The consolidation of retail sales in shops should improve the efficiency and effectiveness of food inspection by public authorities. Application of private codes of practice is also easier in shops than in kiosks or the many stalls at the public agricultural markets. The relatively small-scale, independent ownership and operation of the shops, however, causes problems in implementing public and private codes of practice. Examples encountered were the handling of stock without expiration or beyond-expiry dates. Clients in Armenia often ask sales personnel if a product is newly delivered. Unscrupulous distributors have been known to pull dairy products held in a store for a week or two or held at too high a storage temperature and move them to a new shop or kiosk as a “fresh” delivery, so salespersons can state it is newly arrived. Public pressure from health regulators and from consumer groups in Armenia to print expiration dates on perishable processed products has helped reduce this practice in the case of dairy products. Other products, for example, sausages and smoked meats, are marked variously, some with simple lot numbers, some with production dates, and some with expiration dates.

No international supermarket chains operate as yet in Yerevan. The natural route for supermarket chains to enter Armenia is through Turkey, but that border is closed. If consolidation continues at the current pace, a club store such as Metro or Spar, may enter the Armenian market, creating a mixed semi-wholesale/retail space and modernizing the market segment currently held by GUM in Yerevan. Alternatively, a domestic distribution company might be established to supply shops, especially if national chains start to develop. It is at this point that private codes of practice may succeed in shifting the entire retail trade to a higher plane of operating standards.

### Kiosks

Kiosks, which handle about 9.5 percent of Armenia’s retail turnover, have declined to 66 percent of their 1999 number and handle only 72 percent of their earlier sales volume. Among the outlets classified as kiosks are the many microbakeries making traditional *kachapuri* (a bread with baked-in cheese), bread, and pastries; the *horovats* (barbecued meat) operators from roadside to café-side; the even more numerous kiosks that sell dairy products, sausage and some meats, soft and alcoholic beverages, snack foods, and canned goods, along with many other high-turnover consumer products; and the individual fruit and vegetable stalls and stands in Yerevan and in many municipal public spaces around the country.

Armenia has a transitional form of shop that may partially explain the kiosks’ decline in the cities. These shops group three to eight kiosk operators in a shared interior space, enabling some specialization in product range and product displays and some sharing of overhead costs. They handle many of the same products as the consolidated shops do, supplied by the same distribution channels. Each operator maintains his or her own cash register and accounts.

Kiosks are high turn-over operations, shifting supply as consumers change their demand patterns. While declining in volume, they still are important because they have densest coverage of the Armenian population, which makes many small, frequent kiosk purchases. However, kiosk owners are mobile and difficult to regulate. They are even more dif-

difficult to organize in a market in which they have a declining share, making it unlikely they will contribute to the development and enforcement of private codes of food industry practice. In some cases, they may undermine both public and private codes of practice by providing an outlet for below-standard and out-of-date products sold at deep discount. However, low-income buyers are as sensitive to poor value for price as anyone else, and will avoid revisiting a kiosk that has sold them inferior products.

### **Agricultural product markets**

This segment accounts for just under 4 percent of Armenia's total retail turnover. The number of outlets shrank to 85 percent of 1999 levels in the past five years, primarily because out-of-date structures in secondary towns closed. Total sales in the remaining markets increased by about 25 percent compared to 1999.

In central Yerevan, the renovated GUM market hall Number 2 holds a vast area of produce stalls; cereals, pulse, nut, and spice sellers; purveyors of smoked and fresh meat and poultry; hawkers of homemade coleslaw; and canned goods and bottled alcohol outlets. A limited amount of cold storage is available, but a large number of fruit and vegetable sellers do not use it, judging by the deteriorating condition of their fresh produce. Stalls are made of plasticized wire mesh to permit relatively easy cleaning. The meat merchants generally have cold storage and refrigerated display cases, although safe holding temperatures must be difficult to maintain during the summer. The GUM market also houses a live fish market on the level below its main hall. Large aerated tanks hold live fish and crayfish delivered from farm ponds, lakes, and rivers in small tanker trucks. The same level houses a series of small retail shops, ranging in size from 20 to 50 square meters. Disconcertingly, a mezzanine level above the main floor holds a shoe and clothing bazaar.

The total surface area of this GUM market approaches that of the basic unit of a chain store supermarket (2,500 square meters), but it combines elements of a wholesale storage site, a mixed semi-wholesale farmers' market, and a retail market. The hall has easily 300 or more individual tenants, and while it is much cleaner and better organized than markets in many countries in the region, food handling procedures remain highly variable. Product quality, too, varies tremendously, even on items imported from major multinationals, such as Dole bananas and Agrexco grapes. Older, more damaged fruit is sold at lower prices than fresher, better handled fruit. Luxury items such as caviar also have a sliding quality/price structure, with four-year old caviar deeply discounted and three-month old caviar selling at a premium. While some separation exists between meats and fruits and vegetables, the potential is high for cross-contamination while products are moved between the selling floor and cold storage. In summary, if GUM is at the upper end of Armenia's agricultural products market scale, then this segment, with its atomistic behavior, does not appear to be well suited to adopt private codes of practice.

### **Public catering establishments**

This segment represents only 1 percent of retail turnover in Armenia. In transitional and developing economies, however, public catering or food service establishments (hotels, restaurants, cafes, pubs, and canteens) have a greater influence on private food standards than numbers would indicate. This is because they primarily the urban dwellers, decision makers from the public and private sectors, and tourists. These establishments increased about 30 percent in number from 1999 to 2003, but sales volume increased by 125 percent. Public eateries also grew in size per outlet, as measured by average number of seats, from 48 to 54.

Armenia's hotels, restaurants, and cafes are inspected at least twice yearly by public health authorities. They all use a mix of imported and domestic goods, with a preference for the latter. National consumers prefer domestic goods, and quality and reliability of national suppliers have improved over the past five years. The segment follows a broad range of private standards depending on the target client base. International chains have only a small presence in Armenia. The higher-end hotel and restaurant trade prefers processors already meeting export standards. The Yerevan Marriott Hotel and the Yerevan Hotel, managed by Golden Tulip, are exceptions; both hotels work with domestic suppliers who supply fresh and processed foods approximating international product and packaging standards. Some hotel chains operating in the Trans-Caucasus would like to simplify their sourcing requirements and collaborate with distributors able to provide reliable supplies of products meeting their standards.

## APPENDIX 2

### ISSUES IN FOOD SAFETY

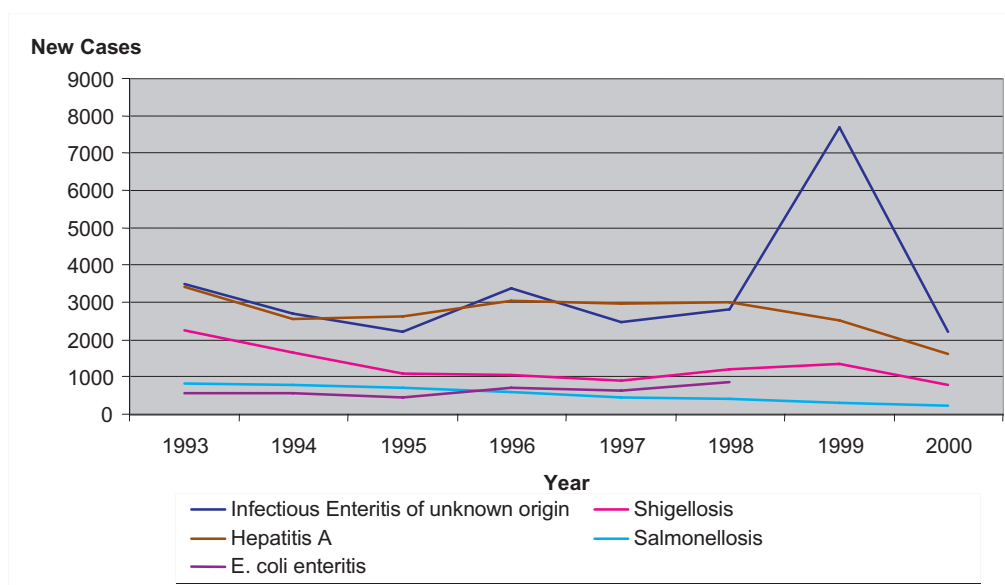
For purposes of this report, the relative importance of food- and water-borne diseases and their trends are more important than absolute numbers, but even relative analysis undoubtedly remains subject to error.

#### Types, incidence and trends in food- and water-borne disease

Figure A2-1 shows the top five food- and water-borne diseases in Armenia. These diseases are dominated by cases of unidentified infectious enteritis, shigella and hepatitis A, which are likely to be highly correlated with contaminated water supplies but are also transmitted by contaminated uncooked or undercooked foods. Unidentified infectious enteritis may be bacterial, viral, or protozoal in origin. The Health and Epidemiological Inspection directorate indicates that some of these cases may be salmonella infections or *Staphylococcus aureus* infections. Shigella is a bacterial disease associated with fecal contamination and wastewater contamination. Hepatitis A is a viral disease transmitted by contaminated water, oral-fecal contact, and household contact with infected family members or friends.

Despite improvements in water treatment and water distribution in some Armenian cities over the past decade, statistics show that major recurring problems with water contamination continue to occur throughout the country. The 1999 jumps in infectious enteritis, shigella, and the slow but progressive climb in *E.coli* enteritis are worrying. Despite these figures, all of the processors interviewed during this study claimed that their municipally supplied water was of the highest quality or that any detected problems were quickly solved. A few processing plants had in-plant water treatment capacity (chlorination), but none adjusted their wastewater releases.

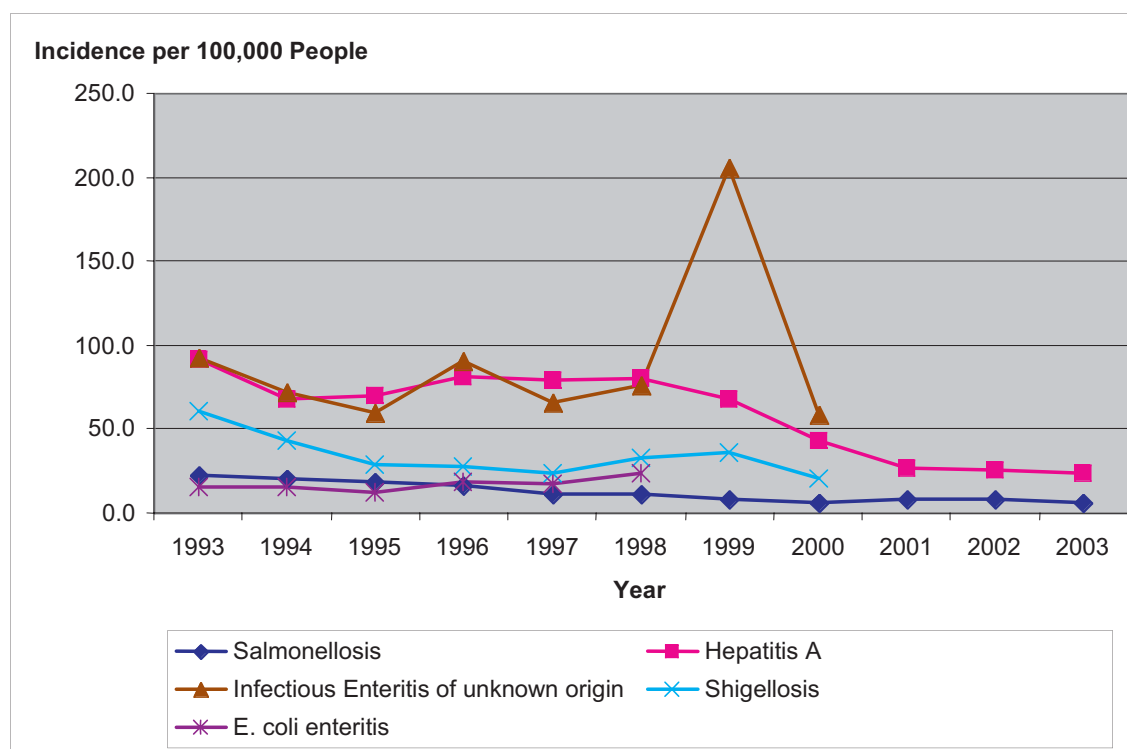
**Figure A2-1. Top five food- and water-borne diseases in Armenia**



#### Sources:

1. WHO Surveillance Program for Control of Food-borne Infections and Intoxications in Europe, Seventh Report, Country Reports: Armenia 1993-1998, Bundesinstitut für Risikobewertung, Germany.
2. WHO Surveillance Program for Control of Food-borne Infections and Intoxications in Europe, Eighth Report, Country Reports: Armenia 1999-2000, Bundesinstitut für Risikobewertung, Germany.
3. Statistical Yearbook of Armenia, 2004, Public Health for 2001-2003.

Figure A2-2 provides trends in food-borne disease incidence expressed as cases per 100,000 people. It includes 11-years of data on hepatitis A and salmonella. Hepatitis A is a general indicator for basic hygiene practice and food- and water-borne disease spread. Salmonella is a good marker for the level of hygiene and management applied to poultry production and raw or undercooked egg consumption. Eight years of data are provided for the three other most frequently diagnosed food-borne diseases. The chart shows that, overall, food and water hygiene conditions have improved substantially in Armenia since the early 1990s, but that diseases, probably resulting from sewage contamination of household and irrigation water supplies, continue to be significant and recurring problem.

**Figure A2-2. Top five food- and water-borne diseases, incidence per 100,000 people***Sources:*

1. WHO Surveillance Program for Control of Food-borne Infections and Intoxications in Europe, Seventh Report, Country Reports: Armenia 1993-1998, Bundesinstitut für Risikobewertung, Germany.
2. WHO Surveillance Program for Control of Food-borne Infections and Intoxications in Europe, Eighth Report, Country Reports: Armenia 1999-2000, Bundesinstitut für Risikobewertung, Germany.
3. Statistical Yearbook of Armenia, 2004, Public Health for 2001-2003.

**Zoonotic diseases**

Figure A2-3 shows trends in the diagnosed cases of zoonotic diseases most closely associated with transmission from animals to humans. Salmonellosis cases are often closely linked to the poultry industry. Brucellosis usually derives from consumption of infected milk. Echinococcosis is caused by a dangerous, sometimes life-threatening tapeworm prevalent in areas throughout the world with substantial sheep populations. It tends to be transferred to humans by domestic dogs that have eaten sheep offal or rodents carrying the tapeworm in an intermediate lifecycle stage.

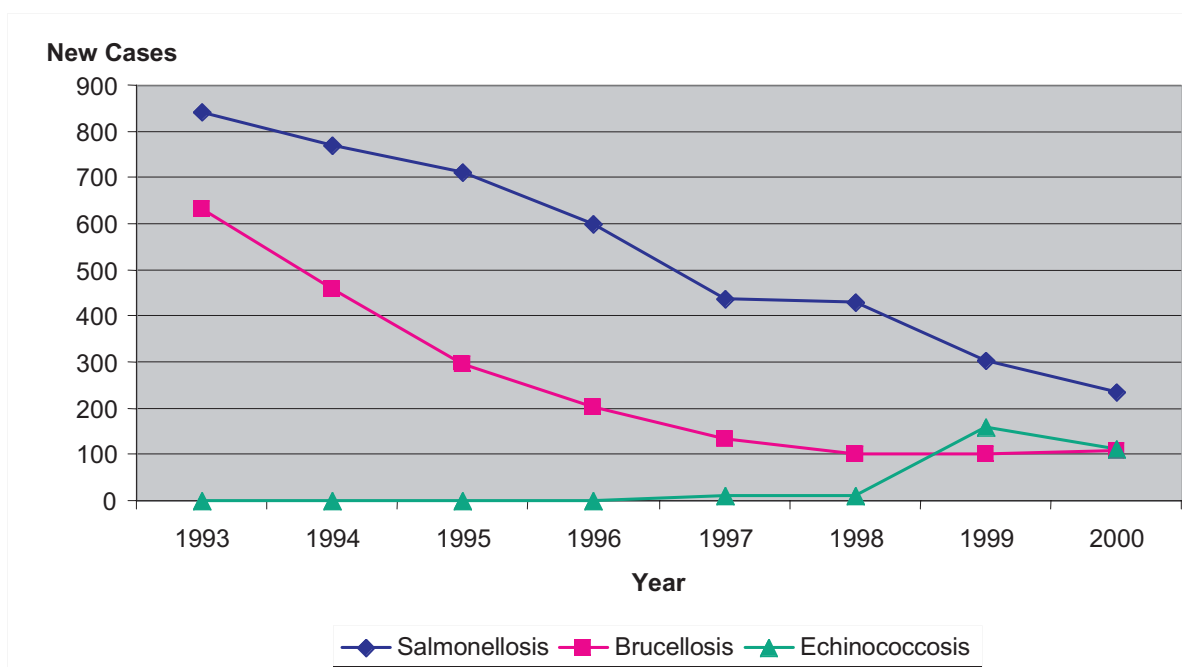
Salmonella and brucellosis diagnoses have declined over time. The reduction in these two diseases probably reflects a combination of factors. Poultry and dairy cattle hygiene has improved, and an increasing proportion of milk is pasteurized. Producers and new investors have intensified commercial poultry operations. Veterinary support to these operations has increased as the producers hire or contract for private veterinary services. In addition, the Public Health Service has identified a series of foods and beverages made with raw eggs and typically consumed in summer and has banned their preparation by restaurants and food service organizations during high risk periods. Dairy processors have improved their supply chains and hired their own veterinary technicians and veterinarians. Most processors require their veterinary staff to work regularly with producers on inspection and milking hygiene. Mandatory public vaccination programs have been reestablished, although some problems with vaccine quality have been reported.

In contrast to the poultry and dairy sectors, there has seen little modernization. Small ruminant numbers have been on the increase, and echinococcosis appears to be on the rise.<sup>63</sup> This may be an unintended side effect of the increasing impor-

<sup>63</sup>Data from 1993 to 1996 were not available, so this observation may be flawed, although medical researchers working on Echinococcus granulosus, a major species present in Armenia, indicate a general upsurge in echinococcosis through many CIS states. The less common Echinococcus multilocularis is also found in Armenia.

tance of sheep (and goats) as living savings banks for smallholders and medium-scale herders. As people slaughter more sheep at the roadside, the amount of offal they feed dogs will likely increase, and people will then more often pick up the tapeworm's infective stage (cestodes). Deworming dogs and educating sheepherders about fencing off slaughter areas and disposing or rendering sheep offal are standard recommendations for reducing echinococcosis. Educational effort and disposal by burning dead sheep or offal are necessary, but without modernization of marketing channels and better returns to producers for their sheep meat, it will be difficult to obtain funding from the domestic industry for these efforts. In other words, when they see a business reason for improving veterinary and sanitary practices, producers in the sheep trade are more likely to do so.

**Figure A2-3. Selected zoonotic diseases**

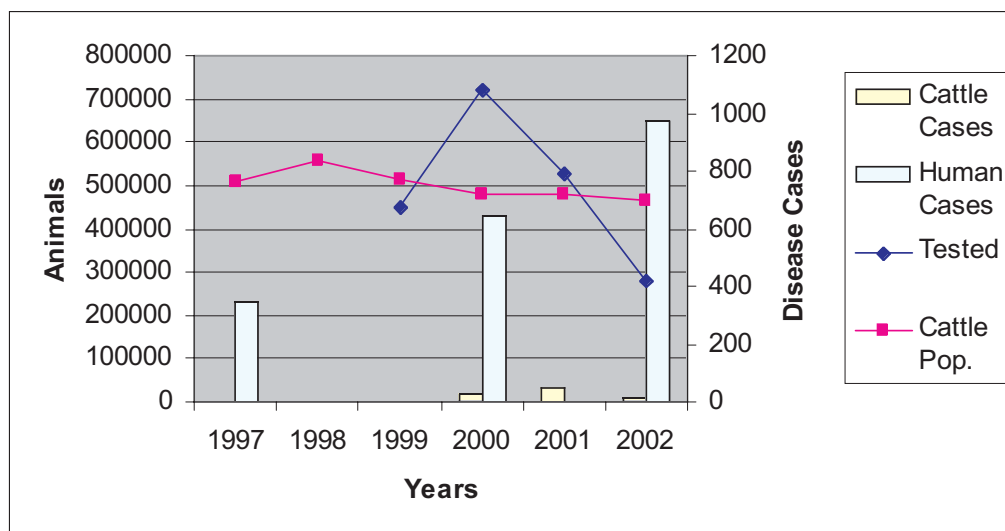


*Sources:*

1. WHO Surveillance Program for Control of Food-borne Infections and Intoxications in Europe, Seventh Report, Country Reports: Armenia 1993-1998, Bundesinstitut für Risikobewertung, Germany.
2. WHO Surveillance Program for Control of Food-borne Infections and Intoxications in Europe, Eighth Report, Country Reports: Armenia 1999-2000, Bundesinstitut für Risikobewertung, Germany.
3. Statistical Yearbook of Armenia, 2004, Public Health for 2001-2003.

Tuberculosis in the human population of Armenia is increasing at an alarming rate. Many causes contribute to this, from antibiotic resistance to poor and overcrowded conditions in Armenian prisons, but Figure A2-4 suggests that zoonotic transmission of bovine tuberculosis may also be contributing to the spread of this disease. It appears that about 20 cases of human tuberculosis result from each bovine tuberculosis outbreak in Armenia. (The lack of human cases in 2001 is probably due to a reporting artifact.) Zoonotic transmission most often occurs in rural areas, where consumption of unpasteurized milk and meat from infected animals is more likely, although veterinary inspectors and laboratory personnel interviewed for this study reported finding infected meat and offal when sampling products sold to city markets.

Figure A2-4. Bovine tuberculosis

*Sources:*

1. WHO Surveillance Program for Control of Food-borne Infections and Intoxications in Europe, Seventh Report, Country Reports: Armenia 1993-1998, Bundesinstitut für Risikobewertung, Germany.
2. WHO Surveillance Program for Control of Food-borne Infections and Intoxications in Europe, Eighth Report, Country Reports: Armenia 1999-2000, Bundesinstitut für Risikobewertung, Germany.
3. Statistical Yearbook of Armenia, 2004, Public Health for 2001-2003.

**Two major food safety issues: botulism and poisonous mushrooms**

Armenia's Public Health and Epidemiological Inspection staff identify as major food safety issues botulism caused by improper home-canning of low-acid foods ( $\text{pH} > 4.6$ ) and consumption of poisonous mushrooms gathered and eaten by individuals.

Figure A2-5 shows the reported incidence of both. *Clostridium botulinum* bacterial spores will grow in hermetically-sealed glass jars of low-acid foods, such as meats, leafy vegetables, beans, potatoes, onions, and eggplant, if they are not processed at temperatures in excess of boiling for long enough periods of time. To avoid this, a pressure cooker must be used and the time of sterilization adjusted for each type of food preparation. At high elevations, including many rural locations in Armenia, errors are easily made in calculating the adjustments and settings needed to reach the proper sterilization temperatures. Pickling in vinegar or fermentation to bring the  $\text{pH}$  below 4.6 is a safer way of preparing canned and bottled foods. Education is the most broadly used approach to the reduction of botulism from home canning, but although Marze-level staff broadcast TV messages on low-acid, canned-food safety, the number of cases seems to be increasing, as households seek low-cost, home-style vegetable preparations. The WHO Surveillance Program for Control of Food-borne Infections and Intoxications in Europe, centered at the Federal Institute for Risk Analysis in Germany, has issued a general alert on the increased incidence of botulism in both Armenia and neighboring Georgia.<sup>64</sup> Both countries have some of the highest reported incidence rates of botulism in the world.

Mushroom poisoning is common wherever wild mushrooms are gathered for food. The usual trend is for large crops of wild mushrooms to lead to spikes in the incidence of poisoning. While only three years of statistics were available for this study, Armenia seems to follow this general pattern. Education and public awareness campaigns during mushroom-gathering seasons are the usual approaches to reducing consumption of poisonous mushrooms.

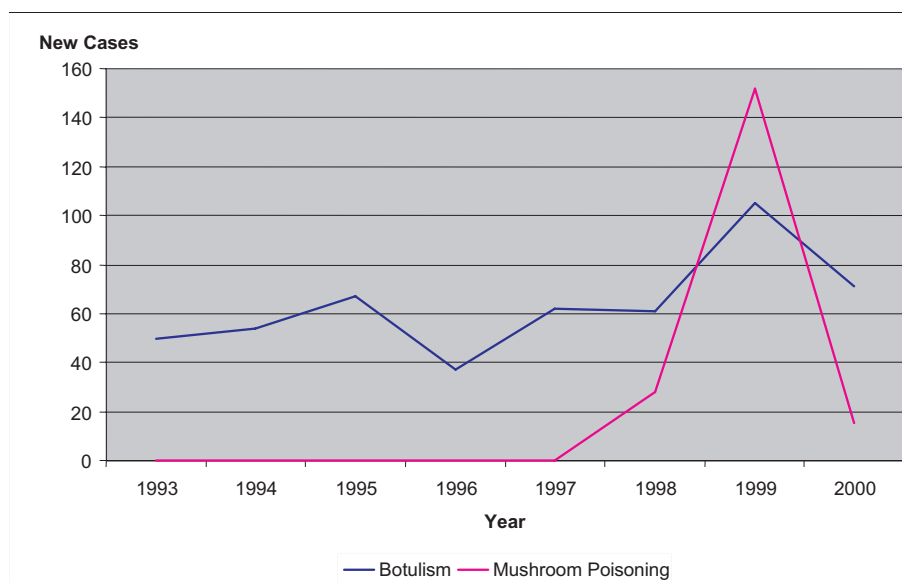
**Environmental health hazards**

Two main areas of environmental health hazards in Armenia are not covered in statistics on food-borne disease. One is harmful metal contamination of soil and water. Armenia mines lead, copper, and cadmium. Interviews with public health officials and laboratory staff suggested that heavy metals contamination of food or water was not a problem.

<sup>64</sup> WHO Surveillance Program for Control of Foodborne Infections and Intoxications in Europe, Eighth Report, 1999-2000, Bundesinstitut für Risikobewertung, Germany.



Figure A2-5. Botulism and mushroom poisoning



*Sources:*

1. WHO Surveillance Program for Control of Food-borne Infections and Intoxications in Europe, Seventh Report, Country Reports: Armenia 1993-1998, Bundesinstitut für Risikobewertung, Germany.
2. WHO Surveillance Program for Control of Food-borne Infections and Intoxications in Europe, Eighth Report, Country Reports: Armenia 1999-2000, Bundesinstitut für Risikobewertung, Germany.
3. Statistical Yearbook of Armenia, 2004, Public Health for 2001-2003.

The second environmental health hazard is persistent organochloride pesticides or POPs and potential leakage from Armenia's main outdated pesticide storage site in the Ararat Valley. Use of organochloride pesticides (DDT, Dieldrin, Aldrin, and so on) in Armenia was banned in the early 1970s, but monitoring samples from Lake Sevan and the Ararat Valley have revealed residues of these pesticides two to three times greater than international standards, suggesting that their use continued into the early 2000s.<sup>65</sup>

Outdated pesticide storage is a problem in many countries because the internationally-accepted pesticide destruction methods are expensive and repackaging and transport of concentrated pesticides is inherently dangerous. In Armenia, the concern is that outdated pesticides are still stored in their original containers, usually metal drums, and that the oldest ones have corroded and are leaking. One NGO has begun a monitoring program downstream of the pesticide storage site to note any persistent contamination of surface or ground water. Most milk and cheese factories state that they limit their purchase of fluid milk to sources in high alpine pastures to avoid the pesticide and nitrate problems found in the Ararat Valley. They do not seem to be aware of the persistence of organochloride pesticide residues and high nitrate levels in Lake Sevan and its surrounding watersheds, a zone in which many of their suppliers are located.

### Food allergies

The personnel of one consumer group have noted an increased incidence of allergies among Armenian consumers in the post-Soviet period. Interviews conducted with representatives of producers, processors, and regulatory authorities indicate this is a widely held belief. It is most often expressed by a declaration that domestic foods are grown without the use of chemicals (or very small amounts of pesticides and fertilizer or antibiotics) and are, therefore, more natural or organic than imported foods. Discussions with Armenian processors and examination of labels on Armenian-produced products, however, show that many of the same food additives are used in Armenia as are used elsewhere. Clinical data are not readily available on food allergies in Armenia to determine whether imported foods cause increased rates of allergic reaction.

<sup>65</sup> United Nations Economic Commission for Europe, 2000, Environmental Performance Review #10, Armenia.

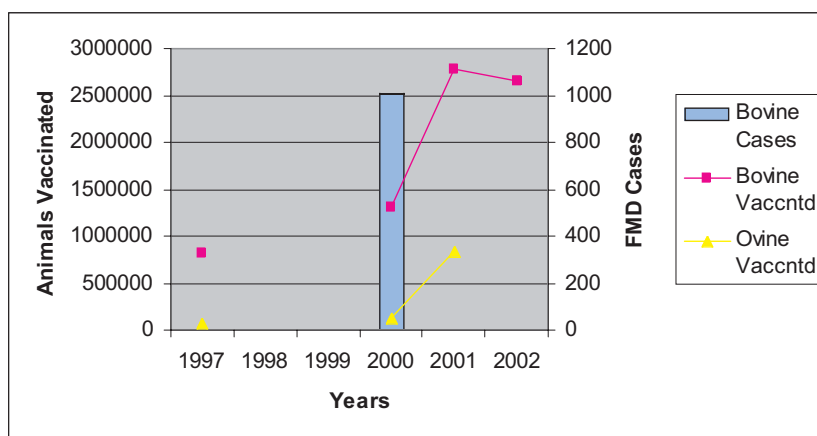
## APPENDIX 3

## LIVESTOCK HEALTH

Armenia has been part of the World Organization for Animal Health (OIE) since 1997. The statistical reports to the OIE for Armenia are incomplete for 1998 and 1999, but a few diseases are used to illustrate observations about the livestock health situation.<sup>66</sup>

Figure A3-1 shows data on foot and mouth disease (FMD), one of the more important animal quarantine diseases for animal health and international trade because it can completely block ruminant meat and feed exports from a country. FMD is not the most important national livestock constraint in Armenia, however, because meat from FMD-infected animals can be eaten with little to no risk of human infection and because Armenia does not export meat.

**Figure A3-1. Foot and mouth disease**



Armenia has several endemic serotypes of FMD and its Veterinary Inspection Service has a policy of checking animals for FMD at least twice a year. Between 1997 and 2002, the national cattle herd was about 500,000 head, with sheep at about the same level, although small ruminant stock statistics are said to be less accurate. Vaccination frequency for cattle appears to have increased from about one-and-a-half times (1997) to about five times year-end herd size (2001-2002), probably reflecting essentially universal three times yearly vaccination for all animals, including yearlings and those intended for slaughter, after the FMD outbreak of 2000. The level of vaccination of sheep lags behind that of cattle. Some observers believe this is not a problem because sheep are fairly resistant to most strains of FMD, and, therefore, expensive vaccination efforts should be concentrated on diseases with greater impact on livestock or human health. Cattle have higher unit values, and it takes longer to rebuild herds of cattle than of small ruminants. When FMD outbreaks are identified in Armenia, road transport of cattle and sheep from one area to another is blocked. Overland movement is more difficult to control, however.

Figure A3-2 and Figure A3-3 present longer-term data from the OIE on anthrax cases in cattle, sheep, and goats. Several strains are present in the region. In the Soviet period massive vaccination was done, as shown in the 1993 figures. Anthrax spores can persist in a vegetative state in soil for decades, and the disease can be quiescent for years before an outbreak occurs. When testing and vaccination decline, as they did in 1998 and 1999 (although not to zero; the statistics are simply unavailable for those two years), the potential for outbreaks and zoonotic transmission to humans increases, especially when diseased animals are slaughtered and meat consumed, as occurred in 1999 and 2000. The break-up of state farms also led to the retirement of incinerators for diseased animals. While the Armenian veterinary inspection and quarantine policy changed from slaughter to destruction by incineration in 2001, it is very likely that herders slaughtered and sold meat of diseased animals to avoid economic loss over the entire outbreak period. One can speculate that this practice sparked the larger number of human anthrax cases, although another mode of transmission could easily have been involved, for example, through the handling of hides and skins or the unhygienic disposal of offal from slaughtered animals.

<sup>66</sup> OIE data are available online at <<http://www.oie.int>>. Anthrax data and global reports are available at <<http://www.vetmed.lsu.edu/whocc>>.

Figure A3-2. Bovine anthrax cases

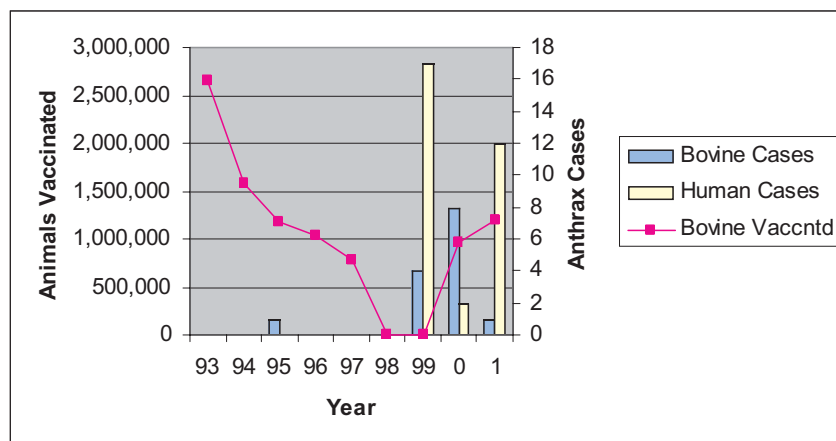


Figure A3-3. Sheep and goat anthrax

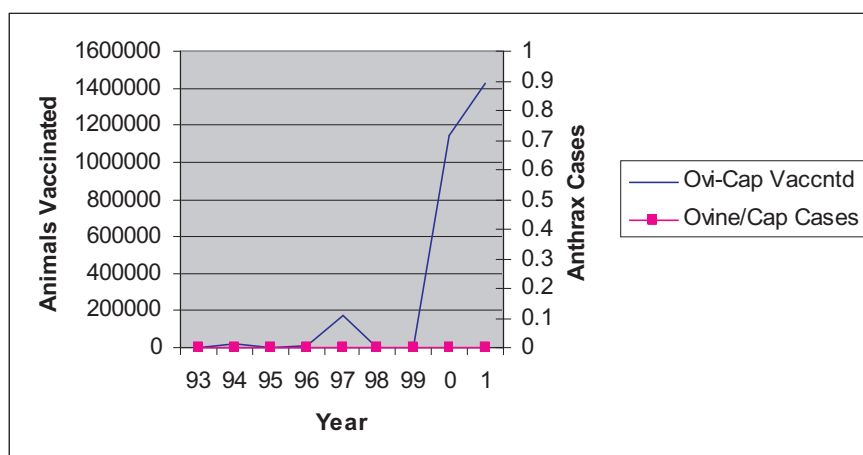


Figure A3-3 indicates no reported outbreaks of sheep or goat anthrax occurred between 1993 and 2001. This is very unlikely to reflect the real disease situation, given the outbreak in the cattle population, but incomplete or doubtful reporting is a problem common to the collection and dissemination of animal health statistics in most transitional and developing economies. Armenia's universal vaccination campaigns in 2000 and 2001, following the decline in 1998-99 and the partial vaccination campaign following the bovine anthrax outbreak in 1996, further suggest that sheep and goat anthrax cases were present or that quarantine procedures for containing outbreaks were judged to be insufficient. The major recommended actions for anthrax would be (i) public education, (ii) development of capacity for rapid diagnosis at site of animals that suddenly die, (iii) broader epidemiological analysis of hotspots, and (iv) vaccination.

Figure A3-4 provides data reported to the OIE on bovine brucellosis, the disease cited by the head of the Veterinary Inspection Service as his service's highest priority. It would appear that an important reservoir of brucellosis in cattle is not being reduced by the veterinary and quarantine practices now followed in Armenia. While the gross numbers suggest that the entire cattle herd is being tested at least once or twice each year, it is more likely that the more accessible animals are being tested twice a year and the less accessible once or not at all.

Figure A3-4. Bovine brucellosis

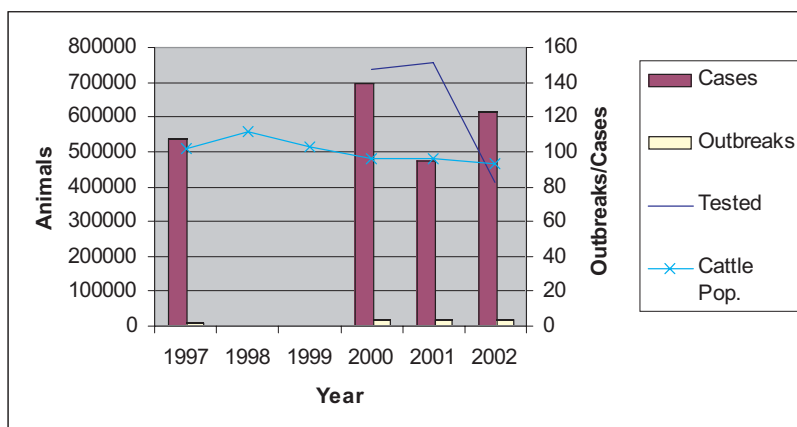
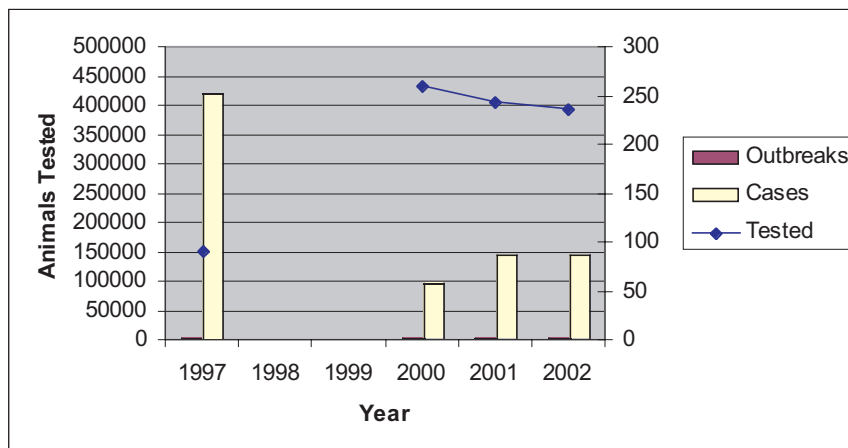


Figure A3-5 shows that the situation is similar for sheep and goats. Either the national herd is being tested once, and control measures are ineffective, or some part of the herd is receiving more frequent testing and control. Slaughter and destruction of infected animals are the standard means used to cull diseased animals and eventually eliminate the disease from herds. The Veterinary Inspection service indicated that small farmers will often resist testing from fear of losing animals with little compensation. In some cases, farmers have beaten inspectors and driven them from their villages. Dairy processors indicate that producers will feed contaminated milk to their other animals, pigs for example, sometimes boiling it but at other times not. The economic pressure on poor small producers to use or sell all of their animal output is intense.

Figure A3-5. Ovine /caprine brucellosis

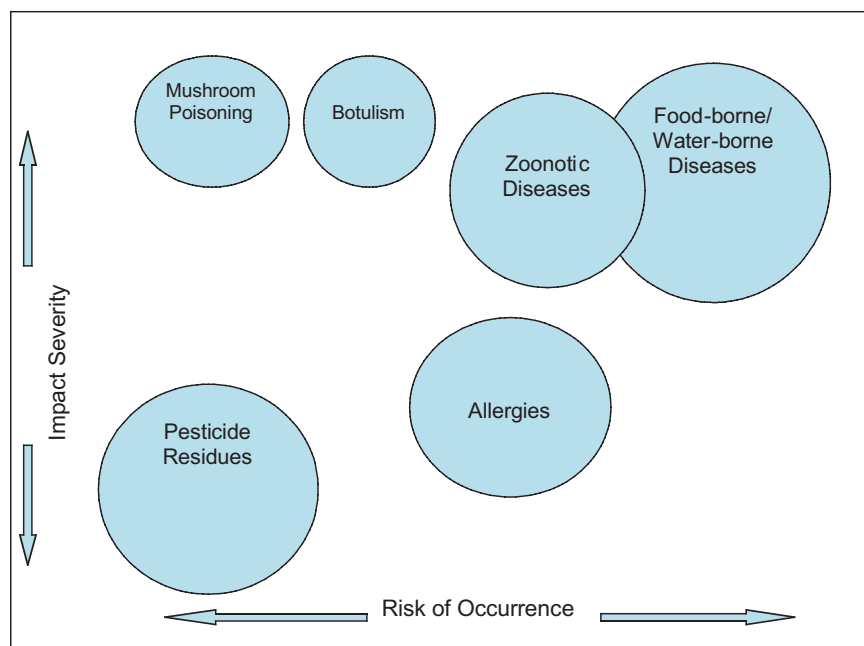


## APPENDIX 4

### SEVERITY AND RISK OF OCCURRENCE OF CERTAIN HEALTH HAZARDS

**Public Health Perspective** From a food safety and agricultural health perspective, assessments of the degree of likelihood a problem will occur and the potential severity of its effect on human, animal, or crop health are the keys to setting strategic priorities. Division of public and private responsibilities and the costs and benefits of policy alternatives also guide decisions. Figure A4-1 presents a simplified risk and severity chart for groupings of food safety concerns in Armenia. It shows that the most frequently occurring high-severity problems are food- and water-borne diseases, closely followed by zoonotic diseases. Botulism is often fatal in Armenia, but it affects a smaller proportion of the population than do the other diseases of concern. Wild mushroom poisoning occurs less frequently still, but it too can be fatal. Food-induced allergies are reported relatively frequently, but they seldom cause death. Finally, pesticide residues in food are reported relatively infrequently and rarely will be a cause of death. The database on pesticide residues in Armenia is very weak, but the general consensus is that Armenian agriculture is a low input agriculture and that pesticide residues should consequently be very low in both livestock and crops.

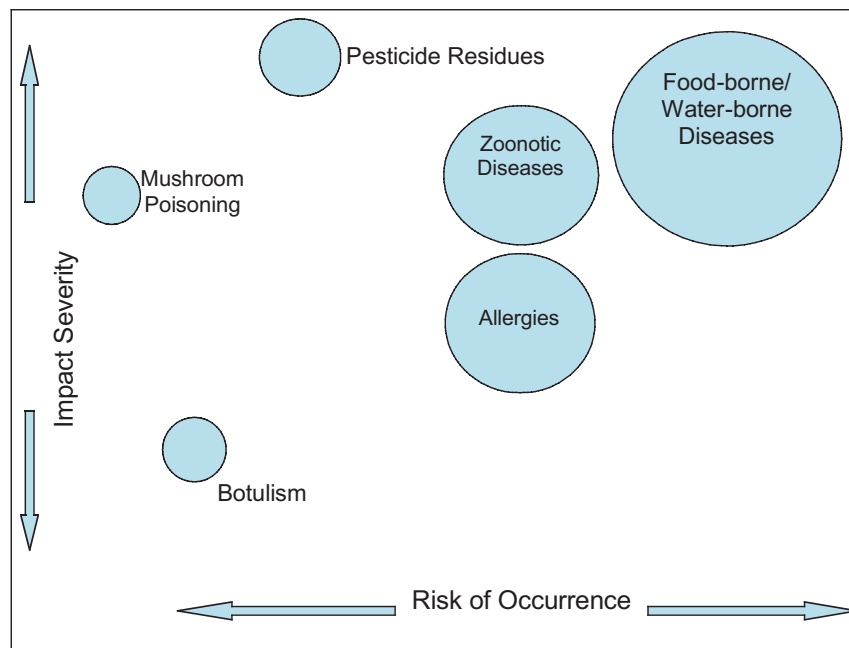
**Figure A4-1. Severity/ risk of occurrence of food safety issues in Armenia**



Source: D. Humpal, field report, 2005.

**Export Perspective** The impact and likelihood of occurrence of food safety issues in exports differs from those for products sold domestically because of the relatively small amounts of Armenian exports and because food safety problems will impact foreign markets. In contrast to Figure A4-1 on domestic food safety, which is based primarily on incidence data, Figure A4-2 derives from a qualitative risk projection, as no reliable data exists on the actual incidence of any of these problems in export markets. Data is unavailable because export flows from Armenia are so limited that the probability of a shipment being physically inspected in either the European Union or North America is extremely small and because the somewhat larger flows to neighboring Georgia and other CIS states undergo weak and frequently corrupt import inspection processes. A key element from the export perspective is that many specific products cannot be exported at all because public services or private exporters cannot meet the safety and other requirements imposed by foreign markets.

Figure A4-2. Severity/ risk of occurrence of food safety issues from an export perspective



Source: D. Humpal, field report, 2005.

Priorities for exports (Box A4-1) are, first, control of food- and water-borne hazards and, second, pesticide-residue testing. These two areas should be the principal focus for investments made by public institutions to regulate exports and by private producers and manufacturers to increase export variety and volume. Others issues entail low or moderate risk and impact.

#### Box A4-1. Key focus areas for export-related food safety

- **Food- and water-borne diseases remain the most important category of concern for both exports and domestic health.** Greatest stress is needed on dairy products, crayfish and trout exports, along with diversified Armenian exports that include a broader range of products (canned vegetable mixes and juices), and improving the mediocre state of most processing company infrastructure.
- **Pesticide residues are a high SPS-impact problem in exports** because of the zero-tolerance regulations for use of banned pesticides in the EU and the US, combined with the intensified official pesticide monitoring programs. The intensity of enforcement by an importing country determines the potential detection and impact of this problem, regardless of the human health risk for Armenia.
- **In exports, zoonotic disease problems are of reduced concern** because Armenia's current livestock exports are tiny, or occur informally, or involve livestock products (for example, eggs) for which disease control is improving. For cheese export, control of tuberculosis and brucellosis remain a priority. Avian flu threat presents a new and serious challenge for the whole poultry sector;
- **Risk/impact of allergies in exports** is moderated by the low volumes involved and the labeling requirements in importing countries for canned foods, brandy, and wine;
- **Exports of mushrooms and home-canned vegetables or meats** as an informal, cross-border export to Georgia, Turkey, Azerbaijan, or Turkey could occur, but the amounts would be miniscule and incidents would not be reported.

Source: D. Humpal, field report, 2005.



## APPENDIX 5

### COST ESTIMATES FOR ACTION PLAN IMPLEMENTATION

To estimate costs for the actions recommended in this report, three subgroups were first established: actions pertaining to the public sector, actions relating to the private sector, and actions already receiving grants from other programs.

The implementation of the action plan will require a combination of technical assistance, training and workshops, and equipment and supplies (

Table A5-1). Technical assistance would consist of an international and a local consultant. For purposes of estimation, monthly rates of US\$25,000 and US\$3,000 were assumed for the international and local consultants, respectively, with an international fare of US\$2,000 used in the computations. For most actions, greater participation is required of local consultants, with the international consultants arriving at the beginning of the activity to set up frameworks and parameters and returning for the final stages and completion of the activity. (For some actions, an intermediate third trip is allotted for supervision and updates.) The local counterparts handle the gathering and organization of information. Training may consist of study tours abroad; training programs in foreign institutions, either to help policymakers understand new concepts before adopting them in Armenia or to educate practitioners; or workshops to disseminate new policies among stakeholders or to explain new procedures to government staff. Foreign training is more productive if undertaken in operational settings, for example, learning new diagnostic techniques in a laboratory rather than in a classroom. Moreover, training can be done as part of twinning projects. Workshops with about 50 participants were estimated to cost US\$1,000 (about US\$20 per participant); when an international resource person conducts the workshop, estimated costs are US\$5,000. Certain actions, predominantly the diagnostic and other operational activities, will require computers (both hardware and software), laboratory and other equipment, and tools. The cost estimates do not include compensation for participating government staff, which is the Government's responsibility. Estimates were based on the projected number of consultants (three consultants are posited for some actions for food safety and plant and animal health), duration of work, and required training and equipment.

For the public sector, the total estimated cost was US\$7.7 million, about US\$2.9 million for equipment and supplies, US\$3.7 million for technical assistance, and US\$1.1 million for training and workshops. Recommended actions for the private sector were estimated to cost about US\$2.8 million, US\$2.6 million to be funded by grants. The recommendations on investments in water infrastructure and for destruction of pesticides are already being financed by other programs.

**Table A5 1. Breakdown of Cost Estimates**

Recommendations for the Public Sector	Technical Assistance	Training/ Workshops	Equipment/ Supplies	TOTAL (US\$)
<b>Coordination team</b>				
1. Establish coordination team with project manager and international SPS coordinator to be supported by specialists in food safety, plant and animal health, and a full-time translator.	International SPS coordinator, 36 months + 10 travel allowances: 36 x \$25,000 = \$900,000 10 x \$2,000 = \$20,000 Translator 50,000		Computers, equipment: \$50,000	<b>1,020,000</b>
<b>Market opportunities</b>				
2. Assess Armenia's competitiveness in fish, dairy, and livestock products to determine the potential benefits of investment in EU third-country status for these products.	1 international consultant, 2 months: 2 x \$25,000 + \$2,000 = \$52,000  1 local consultant, 3 months: 3 x \$3,000 = \$9,000	Workshop: \$2,000		<b>63,000</b>

Table A5-1. Breakdown of Costs Estimates (cont.)

Recommendations for the Public Sector	Technical Assistance	Training/ Workshops	Equipment/ Supplies	TOTAL (US\$)
<b>Institutional realignment and legislative framework</b>				
3. Develop and adopt an institutional and legislative framework to eliminate overlapping responsibilities of the various ministries and to create a basis for efficient and effective systems of food safety control.	1 international consultant, 3 months, 2 travel allowances: 3 x \$25,000 = \$75,000 2 x \$2,000 = \$4,000 1 local consultant, 4 months: 4 x \$3,000 = \$12,000	Workshops: \$4,000		<b>95,000</b>
4. Assess the best institutional set-up for Armenia—a single agency for food safety or a much improved alignment among the present services—and realign existing roles and responsibilities.	1 international consultant, 3 months, 2 travel allowances: 3 x \$25,000 = \$75,000 2 x \$2,000 = \$4,000 1 local consultant, 4 months: 4 x \$3,000 = \$12,000	Workshop: \$10,000		<b>101,000</b>
5. Adjust law and policy to make Saniped responsible for food safety in the marketplace, with consolidation of authority for market testing and inspection of all retail food products as well as sales points for food and beverages.	1 international consultant, 2 months, 2 travel allowances: 2 x \$25,000 = \$50,000 2 x \$2,000 = \$4,000 1 local consultant, 3 months: 3 x \$3,000 = \$9,000	Workshop with international resource person: \$30,000		<b>93,000</b>
6. Establish a system of public-private consultation for managing SPS that includes industry, farmer associations, and consumer groups and help prepare meeting agendas.	1 international consultant, 2 months, 2 travel allowances: 2 x \$25,000 = \$50,000 2 x \$2,000 = \$4,000 1 local consultant, 3 months: 3 x \$3,000 = \$9,000	Study tours + workshop with international resource person: \$50,000		<b>113,000</b>
7. Translate into Armenian at least the WTO summary notifications and include a WTO-language qualification as a hiring or promotion criterion in SPS-related bodies.				(Included under Action 1)
8. Assess whether Armenia's SPS control systems and border procedures meet the WTO test of nondiscrimination, with a view towards developing an action plan for bringing these systems into conformity with international requirements, as necessary.	1 international consultant, 2 months, 2 travel allowances: 2 x \$25,000 = \$50,000 2 x \$2,000 = \$4,000 1 local consultant, 4 months: 4 x \$3,000 = \$12,000	Workshop with international resource person: \$5,000		<b>71,000</b>
9. Prepare a work program on regulatory amendments (including resources needed and methods and principles to be applied), with priority placed on regulations for niche-products with EU export potential, and provide support to the task force.	1 international consultant, 8 months, 4 travel allowances: 8 x \$25,000 = \$200,000 4 x \$2,000 = \$8,000 1 local consultant, 36 months: 36 x \$3,000 = \$108,000	Training abroad + workshop with international resource person: \$200,000	Task force support: \$350,000	<b>866,000</b>
<b>Inspection, monitoring and surveillance</b>				
10. Review all authorized inspection functions, abolish duplicate functions and those not useful in a market economy, improve transparency of inspection and certification processes, and suppress corrupt inspection practices.	3 international consultant (food safety, plant and animal health), 2 months, 2 travel allowances: 3 x 2 x \$25,000 = \$150,000 3 x 2 x \$2,000 = \$12,000 3 local consultant, 3 months: 3 x 3 x \$3,000 = \$27,000	Workshop with international resource person: \$10,000		<b>199,000</b>

Recommendations for the Public Sector	Technical Assistance	Training/ Workshops	Equipment/ Supplies	TOTAL (US\$)
<b>Inspection, monitoring and surveillance</b>				
11. Improve governance of inspectorates by formulating procedures to be followed by public inspection services, requiring publication of work plans, periodic reporting, and conduct and publication of performance audits.	1 international consultant, 2 months, 2 travel allowances: 2 x \$25,000 = \$50,000 2 x \$2,000 = \$4,000  1 local consultant, 3 months: 3 x \$3,000 = \$9,000	Workshop with international resource person: \$10,000		<b>73,000</b>
12. Assess and improve programs for human and animal health monitoring. These monitoring programs should provide food safety and animal health managers with information about and directives to focus their efforts on new and evolving priorities.	2 international consultants, 1 month each, 1 travel allowance each: 2 x \$25,000 = \$50,000 2 x \$2,000 = \$4,000  2 local consultants, 2 months each: 2 x 2 x \$3,000 = \$12,000	Workshop with international resource person: \$10,000		<b>76,000</b>
13. Assess the priorities for funding public veterinary tasks and adjust the program.	1 international consultant, 1 month: \$25,000 + \$2,000 = \$27,000  1 local consultant, 2 months: 2 x \$3,000 = \$6,000			<b>33,000</b>
14. Provide an official version of present quarantine list in an IPPC language, including scientific names, and assess its relevance for current needs.	1 international consultant, 1 month: \$25,000 + \$2,000 = \$27,000  1 local consultant, 2 months: 2 x \$3,000 = \$6,000		Interpretation and translation services: \$15,000	<b>48,000</b>
<b>Pesticide management</b>				
15. Design and recommend a system for pesticide container collection.	1 international consultant, 2 months, 2 travel allowances: 2 x \$25,000 = \$50,000 2 x \$2,000 = \$4,000  1 local consultant, 3 months: 3 x \$3,000 = \$9,000			<b>63,000</b>
<b>Diagnostic capacity</b>				
16. Evaluate Armenia's laboratory system and prepare a strategic plan for its development, with special emphasis on consolidation, to improve the likelihood of adequate operations and maintenance funding.	3 international consultants, 2 months each, 2 travel allowances each: 3 x 2 x \$25,000 = \$150,000 3 x 2 x \$2,000 = \$12,000  3 local consultants, 3 months each: 3 x 3 x \$3,000 = \$27,000	Study tours + workshops with international resource person: \$60,000		<b>249,000</b>
17. Rebalance the funding of laboratory upgrades by reducing staff and allocating cost savings to the operation and maintenance of equipment.	1 international consultant, 1 month: \$25,000 + \$2,000 = \$27,000  1 local consultant, 2 months: 2 x \$3,000 = \$6,000			<b>33,000</b>
18. Consider consolidating food safety laboratory capacity in Sanipid Laboratory, especially the primary responsibility for official pesticide and veterinary material residue testing.	1 international consultant, 2 months, 2 travel allowances: 2 x \$25,000 = \$50,000 2 x \$2,000 = \$4,000  1 local consultant, 3 months: 3 x \$3,000 = \$9,000	Methods training: \$100,000	Equipment: \$300,000	<b>463,000</b>

Table A5-1. Breakdown of Costs Estimates (cont.)

Recommendations for the Public Sector	Technical Assistance	Training/ Workshops	Equipment/ Supplies	TOTAL (US\$)
<b>Diagnostic capacity</b>				
19. Reinforce the central public health laboratory to enable Armenia to deal with the rapidly increasing demands for improved surveillance and monitoring of food safety and agricultural health and to improve the scientific basis for mandatory regulations and voluntary standards.	1 international consultant, 2 months, 2 travel allowances: 2 x \$25,000 = \$50,000 2 x \$2,000 = \$4,000  1 local consultant, 3 months: 3 x \$3,000 = \$9,000	International training + workshop with international resource person: \$70,000	Equipment: \$200,000	<b>333,000</b>
20. Upgrade facilities and equipment of the central public health laboratory to meet requirements for international ISO 17025 certification.	1 international consultant, 4 months, 3 travel allowances: 4 x \$25,000 = \$100,000 3 x \$2,000 = \$6,000  1 local consultant, 10 months: 10 x \$3,000 = \$30,000	International training + workshop with international resource person: \$100,000	Equipment: \$400,000	<b>636,000</b>
21. Assess costs and benefits of upgrading plant quarantine testing and laboratory facilities.	1 international consultant, 2 months, 2 travel allowances: 2 x \$25,000 = \$50,000 2 x \$2,000 = \$4,000  1 local consultant, 3 months: 3 x \$3,000 = \$9,000			<b>63,000</b>
22. Rebuild a strengthened pest, disease, and weed seed identification capacity within Central Plant Protection and Quarantine Laboratory.	EU providing TA	International training + workshop with international resource person: \$60,000	Equipment: \$250,000	<b>310,000</b>
23. Recast the National Veterinary Laboratory as a reference lab focusing on confirmation of livestock diseases and parasites and on the essential task of ensuring the effectiveness and safety of veterinary vaccines and medicines employed to control disease.	Work by EU/FAO		Equipment: \$200,000	<b>200,000</b>
24. Until the Saniped lab can be upgraded, contract pesticide residue analysis beyond the organochloride and organophosphate families to a private laboratory with more advanced and precise instrumentation.	1 international consultant, 1 month: \$25,000 + \$2,000 = \$27,000  1 local consultant, 2 months: 2 x \$3,000 = \$6,000			<b>33,000</b>
25. Include as a special category in the monitoring programs of imported food and agricultural products the sampling and testing of products for pesticide residues, veterinary materials, allergens, additives, and colorants.	1 international consultant, 1 month: \$25,000 + \$2,000 = \$27,000  1 local consultant, 1 month: \$3,000	Workshops with international resource person: \$10,000	Equipment: \$100,000	<b>140,000</b>
26. Develop a program for sampling imported pesticides and their domestic reformulations and contract their testing to a qualified laboratory.	1 international consultant, 2 months, 2 travel allowances: 2 x \$25,000 = \$50,000 2 x \$2,000 = \$4,000  1 local consultant, 3 months: 3 x \$3,000 = \$9,000			<b>63,000</b>

Table A5-1. Breakdown of Costs Estimates (cont.)

Recommendations for the Public Sector	Technical Assistance	Training/ Workshops	Equipment/ Supplies	TOTAL (US\$)
<b>Border procedures</b>				
27. Improve veterinary and plant inspection and quarantine border crossing sampling and diagnostic capacity (pilots for a selected set).	2 international consultants, 1 month each: 2 x \$25,000 = \$50,000 2 x \$2,000 = \$4,000  2 local consultant, 2 months each: 2 x 2 x \$3,000 = \$12,000	Foreign training + workshop with international resource person: \$30,000	Equipment and supplies: \$100,000	<b>196,000</b>
28. Establish plant and animal quarantine facilities within Armenia.	2 international consultants, 2 month each: 2 x 2 x \$25,000 = \$100,000 2 x \$2,000 = \$4,000 2 local consultant, 3 months each: 2 x 3 x \$3,000 = \$18,000		Equipment and supplies: \$100,000	<b>222,000</b>
29. Move the physical location for final SPS clearances on imports to border posts.	1 international consultant, 3 months, 2 travel allowances: 3 x \$25,000 = \$75,000 2 x \$2,000 = \$4,000  1 local consultant, 5 months: 5 x \$3,000 = \$15,000	Foreign training + workshop with international resource person: \$50,000		<b>144,000</b>
30. Co-locate inspection services (veterinary, plant quarantine) at same border post inspection facility.	Underway w/ EU and Armenian funding			<b>0</b>
31. Prepare for the progressive elimination of conformity assessment by MTED.	1 international consultant, 2 months, 2 travel allowances: 2 x \$25,000 = \$50,000 2 x \$2,000 = \$4,000  1 local consultant, 4 months: 4 x \$3,000 = \$12,000	Foreign training + workshop with international resource person: \$50,000		<b>116,000</b>
<b>Risk assessment and economic analysis</b>				
32. Establish a small unit with expertise in risk assessment to provide firm science-based advice to government units responsible for safety management. Some of the unit's expertise can be shared by food safety, plant and animal health services.	1 international consultant, 2 months: 2 x \$25,000 + \$2,000 = \$52,000  1 local consultant, 2 months: 2 x \$3,000 = \$6,000	International training for 5 persons @ \$30,000: \$150,000	Initial operating cost: \$60,000	<b>268,000</b>
33. Evaluate inspection, monitoring and surveillance programs with regard to setting priorities and to attaining cost effectiveness; propose methods for their design and methodology; and formulate a program for the first year.	3 international consultants, 2 months each, 2 travel allowances each: 3 x 2 x \$25,000 = \$150,000 3 x 2 x \$2,000 = \$12,000  3 local consultants, 6 months each: 3 x 6 x \$3,000 = \$54,000	Study tours abroad + workshops with international resource person: \$100,000	Computers, adjustment of survey and testing equipment: \$400,000	<b>716,000</b>
34. Conduct cost-benefit analysis of the current livestock investment strategies of Government and donors.	1 international consultant, 2 months: 2 x \$25,000 + \$2,000 = \$52,000  1 local consultant, 2 months: 2 x \$3,000 = \$6,000	Workshops with international resource person: \$10,000		<b>68,000</b>

Table A5-1. Breakdown of Costs Estimates (cont.)

Recommendations for the Public Sector	Technical Assistance	Training/ Workshops	Equipment/ Supplies	TOTAL (US\$)
<b>Emergency response</b>				
35. Research and design an improved system to support the stamping out of livestock diseases, with special emphasis on zoonoses.	1 international consultant, 2 months, 2 travel allowances: 2 x \$25,000 = \$50,000 2 x \$2,000 = \$4,000 1 local consultant, 4 months: 4 x \$3,000 = \$12,000	Workshops with international resource persons: \$10,000		<b>76,000</b>
<b>Information and education</b>				
36. Use the media, programs in schools, and training programs for industry workers and farmers to increase public awareness of and education about public health, food hygiene, and food safety. Special attention should be paid to informing farmers about practices for avoiding zoonotic diseases and to educational programs to reduce botulism and mushroom poisoning.	1 international consultant, 2 months, 2 travel allowances: 2 x \$25,000 = \$50,000 2 x \$2,000 = \$4,000 1 local consultant, 4 months: 4 x \$3,000 = \$12,000		Media campaign: \$350,000	<b>416,000</b>
37. Design a support project to enhance the role of consumer, trade, and business associations in promoting food safety at the retail level.	1 international consultant, 2 months: 2 x \$25,000 + \$2,000 = \$52,000 1 local consultant, 3 months: 3 x \$3,000 = \$9,000	Workshops: \$4,000		<b>65,000</b>
<b>Estimated costs for the public sector</b>	<b>3,714,000</b>	<b>1,135,000</b>	<b>2,875,000</b>	<b>7,724,000</b>
Recommendations for the Private Sector	Technical Assistance	Training/ Workshops	Grants	TOTAL (US\$)
38. Improve water treatment for overall hygiene and safety in food processing plants.	1 local consultant, 2 months: 2 x \$3,000 = \$6,000		2,000,000	<b>2,006,000</b>
39. When benefits exceed costs, develop, in cooperation with banks and donors supporting private sector projects, financial tools (lending guarantees and grants) to upgrade coordinated supply chains, buildings, and processing equipment and to introduce HACCP and other management tools needed by modernizing agribusinesses.	1 international consultant, 2 months: 2 x \$25,000 + \$2,000 = \$52,000 1 local consultant, 2 months: 2 x \$3,000 = \$6,000		500,000	<b>558,000</b>
40. Develop a comprehensive plan for convergence toward international principles of hygiene in food processing, accompanied by timetables and a financing plan	1 international consultant, 3 months, 2 travel allowances: 3 x \$25,000 = \$75,000 2 x \$2,000 = \$4,000 1 local consultant, 8 months: 8 x \$3,000 = \$24,000	Study tours abroad + workshops with international resource person: \$30,000	\$100,000	<b>233,000</b>
<b>Estimated costs for the private sector</b>	<b>\$167,000</b>	<b>\$30,000</b>	<b>2,600,000</b>	<b>2,797,000</b>
Recommendations with Grants from Other Programs	Technical Assistance	Training/ Workshops	Grants	TOTAL (US\$)
41. Incorporate additional water treatment and handling investments in the Rural Infrastructure Support program. Grants may be needed in some zones to treat wells, improve local water purification and treatment, and provide alternative sources or advanced treatment of water.	1 international consultant, 2 months: 2 x \$25,000 + \$2,000 = \$52,000 1 local consultant, 2 months: 2 x \$3,000 = \$6,000		2,000,000	<b>2,058,000</b>
42. Provide grant financing to design a plan for the safe destruction of persistent organochloride and outdated pesticides.	1 international consultant, 3 months: 3 x \$25,000 + 2,000 = \$77,000 1 local consultant, 3 months: 3 x \$3,000 = \$9,000	Study tours abroad + workshops with international resource person: \$50,000	5,000,000	<b>5,136,000</b>
<b>TOTAL</b>	<b>\$144,000</b>	<b>\$50,000</b>	<b>\$7,000,000</b>	<b>7,194,000</b>



## APPENDIX 6

## GLOSSARY

<b>accreditation, laboratory also accreditation bodies</b>	Formal recognition that a laboratory is competent to perform specified tests or measurements. An accreditation body is an organization that performs the accreditation service (UNIDO).
<b>Acquis Communautaire (EU)</b>	The entire body of EU laws, policies, and practices that have evolved up to the present. This includes all treaties, regulations, and directives passed by the European Union and affiliate institutions. The expression made its first official appearance in the 1992 Maastricht Treaty, under which it became an explicit objective of the Union "to maintain the <i>acquis communautaire</i> and build on it."
<b>agricultural health</b>	Animal and plant health; <b>see animal health and plant health.</b>
<b>agrochemical</b>	Synthetic chemicals used in agriculture, including fungicides, pesticides, insecticides, chemical fertilizers, herbicides, feed additives, fumigants, plant hormones, steroids, and antibiotics.
<b>animal health</b>	Issues pertaining to diseases of fish, bees, and livestock and the prevention thereof.
<b>border post</b>	Port, airport, railway station or road checkpoint open to international trade of commodities at which veterinary or plant inspections may be performed (OIE).
<b>calibration, traceable</b>	Calibration consists of comparing the output of a process or instrument to be calibrated against the output of a standard instrument of known accuracy when the same input (measured quantity) is applied to both instruments. Traceable calibration is a mandatory requirement in meeting standards such as ISO 9000 and requires documentation showing that process instruments are calibrated by standard instruments linked by a chain of increasing accuracy back to national reference standards.
<b>conformity assessment</b>	The entire process, including testing, calibration, inspection and certification, to determine whether products, processes, systems, and people meet specified requirements (UNIDO).
<b>disinfestation</b>	Application of procedures to eliminate arthropods that may cause disease or are potential sources of infectious agents of animal disease or zoonoses (OIE).  Arthropods include insects, centipedes, millipedes, spiders, scorpions, mites, and ticks.
<b>epidemiology</b>	Study of the causes, distribution, and control of disease in populations.
<b>equivalence</b>	The circumstance in which the sanitary and phytosanitary measures of one country, though not identical to those of another country, have the same effect or achieve the same level of sanitary or phytosanitary protection (WTO).

<b>GAP, Good Agricultural Practice</b>	GAP refers to the application of recommendations and available knowledge to address environmental, economic, and social sustainability for on-farm production and post-production processes resulting in safe and healthy food and non-food agricultural products (FAO).
<b>GOST</b>	[gosudarstvennyy standart ] The system of technical standards maintained by the Euro-Asian Council for Standardization, Metrology, and Certification (EASC), a regional standards organization operating under the auspices of the Commonwealth of Independent States (CIS). The GOST standards were originally used in the former Soviet Union.
<b>HACCP, Hazard Analysis and Critical Control Point</b>	A widely accepted food safety management system for ensuring food safety. The approach monitors critical points in food chain to prevent food safety problems by identifying specific hazards and measures for their mitigation (FAO Food Quality and Safety Systems Manual, 1998).
<b>harmonization (of standards)</b>	The establishment, recognition, and application by different countries of sanitary and phytosanitary measures based on common or uniform standards.
<b>ISO, International Organization for Standardization</b>	<p>ISO is a nongovernmental organization consisting of a network of national standards institutes from a number of countries. The ISO seeks to achieve a consensus among these countries on specifications and criteria to be applied consistently in the classification of materials, in the manufacture and supply of products, in testing and analysis, in terminology, and in the provision of services.</p> <p>ISO 9000 provides a framework for quality management throughout the processes of producing and delivering products and services.</p> <p>In June 1997, Codex recommended that laboratories responsible for control of export and import foods comply with ISO/IEC Standard 17025 "General Requirements for the Competence of Calibration and Testing Laboratories" (ISO).</p>
<b>ISPM, International Standards for Phytosanitary Measures</b>	Standards, guidelines, and recommendations adopted by contracting parties to the IPPC (and selected other FAO members) as the basis for phytosanitary measures. <i>Note, however, that the same acronym is more commonly used for Invasive Species and Pest Management.</i>
<b>maximum residue level (MRL)</b>	<p>This is the maximum concentration of a pesticide, veterinary drug, or other chemical substance residue (expressed as mg/kg), recommended by the Codex Alimentarius Commission to be legally permitted in or on food commodities and animal feed. Foods derived from commodities that comply with the applicable MRLs are intended to be toxicologically acceptable and safe for human consumption. (FAO)</p> <p>Food regulators can use MRLs other than those recommended by Codex Alimentarius or can choose their own MRLs for substances and food products for which no Codex Alimentarius advice has been formulated.</p>
<b>Monitoring</b>	<p>Continuous investigation of an infected population or subpopulation and its environment to detect changes in the prevalence or incidence of a disease, often to chart progress of a disease-control program to assess its effectiveness (OIE, FAO EMPRES).</p> <p>See <b>surveillance</b>.</p>

<b>morbidity rate</b>	Incidence or prevalence of disease (FAO EMPRES).
<b>mortality rate</b>	Proportion of death in a population (FAO EMPRES).
<b>mutual recognition arrangements</b>	Mechanisms by which a user or acceptance authority in one country can have sufficient confidence in the validity of test reports and calibration certificates from laboratories in foreign countries without needing to make individual evaluations of the competence of those laboratories (UNIDO).
<b>nondiscrimination in trade</b>	<p>A country treats its trading partners equally (giving them equally "most-favored-nation" or MFN status). Some exceptions are free trade areas in which special arrangements apply to goods traded among countries within the "free trade area."</p> <p>Also, imported and locally produced goods are treated equally, at least after the foreign goods have entered the market. This treatment of foreign and domestic goods, services, trademarks, copyrights, and patents is known as "national treatment," that is, providing foreign producers the same treatment as is given to national producers (WTO).</p>
<b>notifiable disease</b>	Diseases listed by law that must be brought to the attention of veterinary authorities as soon as it is detected or suspected (OIE).
<b>OIE listed diseases</b>	Transmissible diseases as established by the OIE International Committee (Chapter 2.1.1 of the Terrestrial Animal Health Code 2005). In May 2004, OIE member countries approved the creation of a single list of diseases notifiable to the OIE. A new list was approved in May 2005 by the International Committee and became effective in 2006. Note that before 2006, diseases notifiable to the OIE were classified in two lists, List A and List B (OIE).
<b>outbreak</b>	Occurrence of disease in an identifiable group of animals (for example, animals in a pen or animals within a village) at a level greater than that normally expected (FAO EMPRES).
<b>pest</b>	Any biotic agent capable of causing injury to plants or animals or to plant and animal products.
<b>pest list</b>	<p>Also referred to as "regulated pests list." Either or both a list of quarantine pests associated with plant products not present in the importing country, and/or of pests of quarantine importance associated with the product found only in parts of the importing country and subject to official control. These lists are required of countries under the International Plant Protection Convention (IPPC) as part of their safeguarding activities, including pre-clearance inspection at ports of entry, exotic pest surveys, and eradication activities.</p> <p>See <b>quarantine pest; regulated non-quarantine pest; and regulated pest.</b></p>
<b>pesticide residue</b>	Any specified substance in food, agricultural commodities, the environment, or animal feed resulting from the use of a pesticide. The term includes any derivatives of a pesticide considered to be of toxicological significance (FAO).
<b>phytosanitary</b>	Pertaining to plant quarantine (FAO).

<b>phytosanitary certificate</b> also <b>phytosanitary certification</b>	A phytosanitary certificate is an official document attesting to the phytosanitary status of any consignment affected by phytosanitary regulations (FAO).
<b>phytosanitary legislation</b>	Basic laws granting legal authority to the relevant ministry or agencies to draft phytosanitary regulations (FAO).
<b>phytosanitary measure</b>	Any legislation, regulation, or official procedure intended to prevent the introduction and/or spread of quarantine pests (FAO).
<b>plant health</b>	Issues pertaining to pests and diseases affecting plants and the control or prevention thereof.
<b>plant quarantine</b>	All activities designed to prevent the introduction and/or spread of quarantine pests or to ensure their official control (FAO).
<b>quarantine</b>	For plants, official confinement of plants or plant products subject to phytosanitary regulations for observation and research or for further inspection, testing, and/or treatment (FAO).  For animals, isolating a group of animals to preclude contact with other animals and prevent spread of disease. During quarantine, animals may undergo observation for a specified length of time and, if appropriate, testing and treatment (OIE).
<b>quarantine pest</b>	A pest of potential economic importance to the area endangered thereby, either not yet present or present but not widely distributed and being officially controlled (FAO).
<b>regulated non-quarantine pest</b>	A non-quarantine pest is one present in plants intended for planting and that affects that intended use by imposing an economically unacceptable impact and is therefore regulated within the territory of the importing contracting party (IPPC, 1997).
<b>regulated pest</b>	A quarantine pest or a regulated non-quarantine pest (IPPC, 1997).
<b>risk</b>	Likelihood in an importing country of the occurrence and likely magnitude of an event adverse to human, plant, or animal health resulting from a hazard (OIE).
<b>risk analysis</b>	Process composed of hazard identification, risk assessment, risk management, and risk communication (FAO).

**Risk assessment** is the evaluation of the likelihood and the biological and economic consequences of entry, establishment, or spread of a pathogenic agent within the territory of an importing country. **Risk management** is the process of weighing policy alternatives in light of the results of the risk assessment and, if required, selecting and implementing appropriate control options, including regulatory measures. **Risk communication** is the interactive exchange of information on risk among risk assessors, risk managers, and other interested parties.

In plant health, a Pest Risk Analysis (PRA) combines pest risk assessment and pest risk management. Pest risk assessment is the determination of whether a pest is a quarantine pest and evaluation of potential effects of its introduction. Pest risk management is the decision-making process to reduce the risk of introduction of a quarantine pest. (FAO).

<b>sanitary and phytosanitary (SPS) measures</b>	Any measure applied to protect human, animal, and plant health or life from risk arising from the entry, establishment, or spread of a hazard (OIE).
<b>science-based</b>	Based on scientific justification or as a consequence of consistent risk decisions based on an appropriate risk assessment (WTO).
<b>stamping out</b>	Method of disease eradication involving killing all animals in a herd or defined region infected with and/or exposed to pathogens (OIE).
<b>surveillance</b> also <b>active surveillance,</b> <b>passive surveillance</b>	<p>Observation and investigation of a susceptible (uninfected) population or subpopulation aimed at the early detection of cases of a particular disease so control actions can be quickly instituted (OIE, FAO EMPRES).</p> <p>Surveillance is often subdivided into two categories, passive and active. Passive surveillance is the secondary use of routinely collected data generated for another purpose, such as diagnostic service. Active surveillance is the routine collection of data the primary purpose of which is surveillance (FAO EMPRES).</p> <p>See <b>monitoring</b>.</p>
<b>traceability</b>	Ability to follow the movement of a food through specified stage(s) of its production, processing, and distribution chain (Codex Alimentarius Commission).
<b>transboundary animal disease</b>	Diseases of significant economic, trade, and/or food security importance for a considerable number of countries that can easily spread to other countries and reach epidemic proportions and the control and/or management of which, including exclusion, requires cooperation among several countries (FAO EMPRES).
<b>transit, transit corridor</b>	Country or area through which commodities destined for an importing country are transported or in which a stopover at a border post occurs (OIE).
<b>transparency</b>	The principle of making available, at the international level, information on sanitary and phytosanitary measures and their rationale (OIE, FAO).
<b>zoonosis</b>	Disease or infection naturally transmissible from animals to humans (OIE).

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<b>IPPC</b>	International Plant Protection Convention
<b>OIE</b>	Terrestrial Animal Health Code (2005). General definitions. <a href="http://www.oie.int/eng/normes/mcode/en_chapitre_1.1.1.htm">http://www.oie.int/eng/normes/mcode/en_chapitre_1.1.1.htm</a> .
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