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VEGETABLE VALUE CHAIN ASSESSMENT

USAID AGRIBUSINESS PROJECT

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EXECUTIVE SUMMARY

FOREWORD

This value chain assessment has been prepared to look at the overall situation in the vegetable sector of Serbian agribusiness. To maximize the market potential of this highly important sector, it is necessary that all its elements be understood. Our analysis has shown us that our strategy must take a broad view of the sector's constraints. We have outlined a number of necessary steps in the action plans at the end of the paper.

STRATEGIC VISION AND FOCUS

Our strategic vision encompasses three main action areas:

- Foster economic growth for the Serbian vegetable industry by taking proactive, market-driven measures responding to growing sales opportunities in both domestic and export markets.
- Boost production of high-quality vegetables demanded by customers of value-added foods in Serbia, Russia, Croatia, Montenegro, and European Union (EU) markets.
- Respond to market trends and opportunities while providing continuity by capitalizing on Serbia's competitive advantage in sales of storable root crops and processed vegetables.

The strategic focus of USAID's Agribusiness Project will be on three priority areas.

- **Root crops and other storable vegetables, such as cabbage.** With their longer marketing life, these vegetables can be sold during the winter and are able to garner higher prices in the off-season. Existing and new storage facilities should provide better-quality produce for higher prices; however, these facilities need to be expanded and better managed.
- **High-value perishable crops, such as greenhouse crops or specialty niche crops.** Because these enjoy higher prices and better profit margins, they have the potential to expand incomes along the whole supply chain, from the farmer to consumer. Encouragement will be given to diversifying producers' organizations (POs) to meet market demand.
- **Processed vegetable markets.** These are expanding and show potential for more value-added growth.

SUBSECTOR MARKET ECONOMIES

Growing per capita incomes within Serbia and in nearby European export markets have stimulated producers and agribusinesses to supply new and additional value-added vegetables to meet a growing demand in local and foreign markets. Anyone who has lived in Serbia over the last five years has seen a rapid rise in the variety of new vegetables available in the markets—particularly in the new supermarkets chains, green markets (farmers' markets), and higher-end restaurants serving the wealthier consumers willing to pay for new vegetables and off-season fresh produce.

Enterprising larger farms and more modern producer groups have diversified into new varieties, specialized salad greens, and other demand-driven vegetables previously unknown in Serbia. This growth of a diversified local fresh vegetable supply has not just happened during the growing season, but extended into the colder fall and spring months as more cool chain storage facilities, greenhouses, polyethylene tunnels, and protected cropping areas have sprung up throughout the country, providing the opportunity for more sales over a longer marketing season.

However, although market demand continues to grow at about 5 percent annually, Serbia's potential to supply is limited by a short growing season for warm-weather produce and a limited area under greenhouses suitable for these vegetables. With Serbia having a Continental rather than a Mediterranean climate, its growing season is too short to produce many of the perishable warm-weather fresh vegetables produced further south in Greece, Turkey, Israel, and Egypt. Although Serbia's fresh produce is competitively priced in the summer, the low prices and low margins involved make this a relatively unattractive market unless forward contracting locks in higher minimum (but realistic) prices—which most buyers are loath to do. Only about 2–3 percent of Serbia's greenhouses have cost-effective heating systems capable of economically producing summer vegetables in the winter months. It is true that farming areas devoted to the greenhouse vegetable market have grown nearly fivefold in the last decade, which is usually considered impressive by most experts in the field. Nonetheless, most of the plastic greenhouses are still not competitive with warmer farming operations in Mediterranean climates that may ship the produce northward to the Serbian import market in colder months.

With the notable exception of a few large and multimillion dollar corporate investments in greenhouse production, off-season fresh perishable vegetable production in Serbia, although important, has a minimal impact on the overall market. For example, over 90 percent of the Serbian market for perishable vegetables from November through April is supplied by imports, valued at about \$40 million annually. (All dollar amounts are in U.S. dollars.) These imports have been growing sharply over the last couple of years as Serbian import tariffs have dropped and per capita incomes have risen. Thus, the market has shown that high heating costs, big up-front investment costs, and limited sunshine usually make investing in the Serbian greenhouse vegetable industry to be an unattractive local investment compared to other agricultural investments. Nevertheless, a program of market surveys coupled with targeted technical assistance (TA) may well prove to be beneficial, to confirm needs and assist agribusinesses in this important part of the subsector.

Trade sources report that the best potential for economic growth in the vegetable sector is for 1) processed vegetables and 2) hardier vegetables that may be stored over longer periods to take advantage of seasonally higher vegetable prices in the winter. Serbia has ample land and good growing conditions for supplying market demand for the hardier produce such as root crops and cold-season vegetables, namely potatoes, onions, carrots, cabbage, and garlic. Summer vegetables grown for processing, such as sweet corn, peas, and green beans also have natural advantages in Serbia. Unfortunately, most of these market opportunities for processed vegetables have yet to be taken advantage of, largely because of low crop yields and thus high production costs. There are several reasons for these problems, including use of old seed varieties, inadequate irrigation, poor fertilizer usage, improperly used pesticides, and poor post-harvest techniques.

Serbia's processed and storable vegetables may be marketed over a longer period than the very perishable tender vegetables and have grown to fill unmet market demand in neighboring countries, such as Croatia and Montenegro, as well the growing demand in Serbia's domestic market. The larger producer groups are investing in consolidation centers and linking in with larger international agribusinesses to gear up

production to export root crops to Russia and Ukraine. They are also consolidating their existing market penetration into the summer vacation markets along the Dalmatian coast, where tourists pay high prices for produce.

While Serbia's exports of some hardier vegetables have grown into significant markets, imports of all kinds of vegetables have also grown as Serbia has opened its market to foreign competition. During the 1990s the Serbian market was insulated via economic sanctions, high import tariffs, and non-tariff barriers (NTBs). However, in the last eight years the Serbian import market has opened up, as the Government of Serbia has reduced NTBs and lowered maximum import tariffs to 30 percent ad valorem (plus a seasonal import surcharge) in preparation for World Trade Organization (WTO) and EU accession. This process of opening the Serbian market to international competition has led to an upsurge in fresh vegetable imports, which continue to grow at about 5 percent annually by volume. If and when Serbia joins the EU, its 30 percent duty protection (and additional seasonal tariffs) will be rapidly phased out and its imports of warm-weather vegetables should grow even faster, making investors reluctant to put money into expensive greenhouse operations.

Thus as the country increasingly aligns its foreign trade regime with WTO and EU policies, Serbia will likely swing from being a net exporter to a net importer of fresh vegetables, a process which is already underway as imports are growing faster than exports in this category. Most trade sources surveyed (see contact list in appendix) believe that Serbia will become a net importer of vegetables in two to three years, as the country has experienced a rapid growth of imports from low-cost foreign agribusinesses that produce the seasonally high-priced fresh vegetables during the off-season, at a lower cost of production, and can sell them more profitably in the Balkan markets. The industry sources we surveyed report that they see little chance in much import replacement in the seasonally high-priced import market for tender winter vegetables in Serbia, since the country simply does not have a natural competitive advantage in producing these vegetables off-season.

In summary, the fresh, especially storable, and processed vegetable industry will likely continue to expand rapidly in Serbia, should favorable marketing conditions continue. Rapid economic gains may be achieved with interventions by the project to assist in achieving economies of improved scale, producing reliable supplies, and reducing post-harvest losses in the vegetable industry in Serbia.

PRIORITIES FOR STRATEGIC INTERVENTIONS

STORABLE FRESH VEGETABLES (CHIEFLY ROOT CROPS)

The project's activities will focus on storable vegetables (onions, potatoes, carrots, parsnips, garlic, and so forth), because these are the vegetables for which Serbia has the competitive advantage, by extending technical assistance in two main areas: 1) targeted production technology and 2) post-harvest handling and storing. By growing market-driven crops demanded by domestic and foreign customers, significant economic results may be achieved. For example, it would be relatively easy for a TA program to raise marketable yields by 30 percent and cut post-harvest losses by 20 percent. The added product would end up being sold on domestic and export markets, boosting sales revenues by \$20–\$50 million annually.

PROCESSED VEGETABLES

There is also considerable promise in vegetables for industrial processing, including industrial peppers/dried paprika, green peas, green beans, sweet corn, and vegetable mixes, which are sold as

frozen, canned, dried, or pasteurized in domestic retail chains and export markets (e.g., Balkan countries, Russia, and EU countries). The varieties and quantities of vegetables being grown in Serbia for industrial processing are usually not harmonized with the processing plants' needs, especially as markets have changed rapidly over the last couple of years. Our work with processors may target two areas in particular: market promotion, and implementation of EU and U.S. standards and regulations (such as traceability), which also will be required in Russia by 2009. Further improvements in product packaging design and labeling are also crucial for developing market demand.

GREENHOUSE VEGETABLES

After much fieldwork and many meetings, we have found that there have been large investments—which are continuing—in greenhouses, often using thermal waters to save on heating costs. Although greenhouses still account for only about 5 percent of Serbia's total off-season perishable vegetable supplies, their access to this growing high-priced market may well benefit from the project's trade contacts and better market linkages to domestic and export sales channels.

OTHER HIGH-VALUE FRESH VEGETABLES

Fresh perishable vegetables with high profit margins, such as parsley, celery, parsnips, cauliflower, broccoli, and melons, are produced both in open fields and in protected areas, due to the high demand on the local market and relatively low supply during the off-season. These vegetables represent important market opportunities that may be relatively easy for the project's activities to support.

These products are demanded by consumers shopping in Serbian supermarket chains and green markets, as well as by processors. They are also much in demand in foreign markets, such as the Russian vegetable market and neighboring Balkan markets. Considerable additional sales can be achieved on these markets.

Agribusinesses selling these vegetables are enlarging plantings and production capacities as a result of growing demand for fresh vegetables, with trade sources claiming that local and foreign consumers are willing to pay higher prices for quality fresh produce. In recent years, agribusinesses in the vegetable subsector have seen their sales grow, with larger volumes, higher prices, and better profit margins. With growing revenue available for agribusinesses to reinvest in increasing output, these agribusinesses have already expanded vegetable plantings toward newer vegetables that earn higher profits, switching away from less profitable "traditional" types of vegetables. The introduction of advanced technology for vegetable production, certification (traceability, etc.), and packaging are the main activities that may be undertaken to boost sales during the life of the project.

Examples of sales opportunities include:

- A Bulgarian company that bought a previously state-owned vegetable processing plant in Titel is giving subsidies to cauliflower and broccoli producers in the region (and the project may help the company expand sales and farmers boost their sales to the company).
- A vegetable commodity group manager for the Rodic-Merkator supermarket chain said that at this point they are looking for producers of cauliflower and broccoli, not just for their chain in Serbia, but also to export to other countries where they operate, such as Croatia, Slovenia, and Bosnia. Here again, the project may help the Rodic-Merkator group procure more vegetables so to boost sales incomes for all concerned.

EXPORT MARKET GROWTH

For Serbia's competitively priced vegetables, the project has identified four main steps to promote sales growth: 1) boosting sales volume at domestic market including supermarket sector (which builds a safe base to boost production to reach exportable levels of output to fill container loads, which is now a constraint); 2) facilitating exports to neighboring countries Montenegro, Bosnia, and Croatia (especially during the summer holiday season); 3) promoting exports to EU markets, and 4) assisting with sales to the Ukraine and Russian markets. These EU and Russian markets depend heavily on strict quality control, traceability, and follow-up customer service to maintain the market. Serbian suppliers can be competitive in each of these markets and we believe that the project can generate considerable additional sales over the duration of the project.

DOMESTIC MARKET SALES GAINS

By promoting forward-contracting with hypermarkets and vegetable processors, we may boost sales attributable to our work to raise marketable yields and may boost prices as well, both because of better quality and because of size/quality sorting, as demanded by the market. We will support and build on the already ongoing trend of improvements in the logistical infrastructure (consolidation/distribution centers and cool chain technology) to preserve product quality and reduce distribution costs along the supply chains to these four markets. As an example, such improvements helped Serbia increase its exports of carrots and onions to the EU countries in 2006 by 15 percent.

1. INTRODUCTION TO THE SUBSECTOR

Of all the subsectors in agriculture, fresh and processed vegetables have the most potential to respond to market opportunities rapidly, because of their shorter growing season. This is particularly true in regard to the increasing market demand during the tourist season on the Dalmatian Coast. Nonetheless, agribusiness experts have indicated that the best potential for economic growth is in Serbia's hardier vegetable industry, where a long storage season makes the vegetables more commercially able to take advantage of market opportunities, such as the growing market in Russia with its 1 percent duty preference for Serbia.

The majority of agribusinesses surveyed by the project report that the best potential for investment in the vegetable sector lies in improving root crops—potatoes, onions, garlic, and carrots—plus the winter cabbage, where Serbia has distinct competitive advantage, as the soils are quite fertile and costs of production are still relatively low. Economic and physical yields of high-quality sellable root crops and cabbage are still about 50 percent below those produced across the border in Hungary because of poor market linkages and outdated technology. With better education and investment promotion into these hardy and processed vegetable industries, the extended incomes garnered from a long marketing season are already providing high returns to some larger producers in Vojvodina. These same hardy vegetables and vegetables for processing may grow throughout Serbia.

A serious constraint to expanding Serbia's fresh vegetable sales during the lucrative winter months are the large investments needed in hard plastic insulated greenhouses with energy-efficient heating systems. Although they may be impressive when visited by people who do not work daily in the market, the few large greenhouses in Serbia simply cannot supply more than 5 to 10 percent of normal market demand. In any case, most experts contend that it is still not economical to produce many fresh vegetables December through March, given Serbia's cold continental climate. These more expensive greenhouses, with their high energy costs for heating, do best when using their limited space to produce niche commodities that are very scarce and thus more costly, such as flowers, high-priced winter fruits (e.g., strawberries), and early spring seedlings for plantings.

Heating is not the sole problem facing greenhouses: in addition, only 8 to 9 hours of sunlight are available for crops in the winter, which diminishes their winter production. Compensating for this requires using strong light sources, at substantial expense, to make the photosynthesis process work efficiently. Introducing new short day-length varieties would be a profitable solution for Serbia.

Post-harvest losses are clearly one of the biggest economic factors hurting farm income—and potentially a quick win for the project, achievable through a variety of interventions. Post-harvest handling, storage, and packaging technologies are at a very low level in Serbia, according to most industry and university sources, and their analyses point to losses of up to 40 percent that could easily be avoided with minimal investments in better management systems. As is the case with the rapid growth of greenhouses during the last couple of years, there has been a tremendous growth in simple but effective cold storage facilities made by producers of storable vegetables, such as potatoes, onions, garlic, carrots, and cabbage. Substantial savings can be achieved just by a simple storage practice of digging a hole in the ground and

putting a roof over the crop, and most cold storage facilities are just backyard underground bunkers to store the vegetables in a cooler area. However, they are often not well ventilated, nor do they have the controlled temperature conditions needed for optimal storage for many vegetables (e.g., onions and potatoes). Some of the better on-farm storage areas have concrete floors and walls rather than dirt floors, with new pallets keep the vegetables off the ground for good air circulation to reduce fungus and losses due to moisture caused rotting problems. (The EU specifies plastic pallets, which are better, but much more expensive). These bunker storage areas may be improved and post-harvest losses reduced by introducing good training programs and making low-cost investments to prevent much of the rot and spoilage storage problems; it would not take much of an investment in additional training and better facilities to dramatically reduce these post-harvest losses. A storage hygiene training program would also be highly beneficial.

Vegetable Marketing in Serbia. It is organized into different retail channels, including green markets (farmers' markets), wholesale "kvantas" markets, retail shops, hypermarkets, catering, processing, and export. The local Serbian market is dominated by Delta hypermarkets. Other hypermarkets—Metro, Mercator, Vero, and Inter-ex—are playing an increasing role in retail sales of agricultural and food products.

Vegetable processing industry. Most small farmers store their summer vegetables via processing for their own use, and only 5 to 8 percent of vegetable production goes into commercial processing operations. The vegetable processing industry still has not recovered from the split-up of the former Yugoslavia, and privatization of state owned farms is progressing slowly at best. In fact, most sources consider Serbia to have the slowest rate of privatization of any Eastern European country, which has led to much market uncertainty, making investments risky and slowing down the potential growth in the sector.

Processed vegetables sales have, however, grown quickly as farmers have responded to the unused capacity caused by privatization of old state-owned Agrokombinati (state cooperatives). These canning and freezing plants have expanded production of both frozen and canned vegetables, and can continue to grow inasmuch as they have not yet optimized their vertical integration and coordination with farmers via efficient contracting methods. Many of the larger vegetable processing plants have simply bought or rented out vast areas of land to ensure a reliable supply of vegetables for processing, because dealing with the numerous small producers has proved to be very inefficient and unreliable.

Respecting Contracts. Often small producers will sell in the fresh market when prices go up, rather than respect their contractual arrangements with vegetable processors. Therefore, it is easier and less risky for processors to do it themselves rather than rely on small farmers, who see short-term seasonal gains as more important than having long-term market outlets. The same problem about respecting long-term market contracts adversely affects exporters, because small and medium-sized farmers will simply say that they don't have any produce to fulfill export contracts, when the local market pays more. Reliable suppliers of consistently good-quality produce who will respect their long-term contractual arrangements are indeed a rarity. This lack is a severe problem affecting all the vegetable marketing networks in Serbia, in particular operating as a constraint to business expansion. The problem has to be resolved on a legal level, because law is currently not effective and provides no security. Many processors and exporters state that they would gladly pay more for vegetables if a reliable supply could be assured to meet their market demand.

In spite of much dilapidated infrastructure, Serbia's vegetable processing industry has the potential to revive production rapidly should investors become interested in doing so. It includes about 30 significant

processing companies with capacity for producing frozen, canned, and dried vegetables. The most notable are Frikom Belgrade, Aretol Novi Sad, Aroma Futog, Centropoizvod Belgrade, Flora Becej, Srbijanka Valjevo, Interfood Cacak, PIK Becej, Aleva Novi Knezevac, and BAG Backo Gradiste. They mainly process potatoes (as French fries, potato chips, and mashed potatoes), sweet and hot peppers (mostly for dried paprika and ajvar, the Balkan vegetable “caviar”), green peas, and sweet corn. Other less important processed vegetables include tomatoes for ketchup, cucumber for pickles, and various types of canned beans.

A. REASONS FOR WORKING IN THE SUBSECTOR

Emerging hypermarkets and increased income are leading to higher share of consumption of fresh and processed vegetables, which will directly influence development of supply channels within the subsector. The current market constraints are being relaxed, but high political risk factors and a relatively small domestic market often prevents foreign investors from working in Serbia. Nevertheless, the growing market linkages with the nearby European hypermarket chains are causing local investors to move forward with investments in facilities, since Serbian investors are less likely than foreign investors to be concerned about political risks, or are more familiar with the local situation and realize the high margins may compensate for higher risks involved with working in a smaller market of 8 million consumers. Thus, investments are contributing to more competition that is causing a faster consolidation of the supply chain, and more effective and efficient food delivery systems to evolve in response to pricing signals.

The market is attractive for many Balkan investors, since Serbia—unlike Montenegro, Croatia, and Bosnia—is self-sufficient in most heavily consumed vegetable crops, such as potatoes, carrots, cabbage, onions, and garlic. Given that Northern and Central Serbia regions are often seen as the breadbasket of the former Yugoslavian countries, people in the vegetable processing business are ready to consider investing in Serbia when and if local conditions become favorable. In addition, being centrally located for transportation networks within the Balkans provides the industry with an advantage over many neighboring countries.

The vegetable sector—including dried, frozen and processed products—generated on average 65,600 tons of goods worth \$50,000,000 annually for the period 1997–2005 (source: Serbian Statistical Office). There are 30 fruit and vegetable processing companies with a combined annual capacity of approximately 700,000 tons, of which 60 percent process fruits and 40 percent vegetables. The average total assets per company come to about \$9 million, reflecting a significant lack of modern technologies, and each company employs an average of 153 workers (source: Serbia Investment and Export Promotion Agency).

The growing popularity of healthier foods is underpinning investment opportunities in frozen vegetable production, which represents one of the largest and most dynamic subsectors. Both the number and the quality of frozen food products are increasing.

B. BOUNDARIES OF THE SUBSECTOR

The boundaries of the vegetable subsector subject to this value chain analysis are as follows:

1. **Primary.** Farmers; producers of fresh vegetables (noncommercial structure—small plots, poor coop management).
2. **Secondary.** Consolidation of processing sector: application of quality standards, investments in modern technologies for processing and packaging, product branding.

3. **Tertiary.** Services provided in support to subsector: input supply, extension and advisory services, logistics and transportation, trade, marketing and retail.

Subsector products included in this analysis are:

(1) Storable vegetables (e.g., root crops) and their products	(2) Vegetables for industrial processing	(3) Fresh perishable vegetables with high profit margins
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Storable vegetables and vegetable products—potato, cabbage, carrots, onion and beans—allow more efficient marketing as fresh, with proper storage spaces and ventilation. Currently, there is a positive trend within private sector, which has been investing in new types of storage capacities to gain a competitive edge on the market. However, most existing storage capacities are not suitable, and farmers must be trained to become more efficient in safekeeping vegetables and preventing losses.

Vegetables for industrial processing include industrial peppers, peas, green beans, sweet corn, potatoes, carrots, and onion. As noticed, some of the storable vegetables have a significant share in the industrial processing as well. All the above-mentioned products are sold frozen, dried, or pasteurized on domestic and export markets.

Fresh perishable vegetables with high profit margins, such as parsley and other fresh herbs, celery, parsnips, cauliflower, broccoli and melons (including watermelons), are produced in open fields and/or within protected areas. Due to high demand on the local market and the relatively low supply of these goods over the past several years, they represent important produce to consider for support.

Sweet peppers and tomatoes—produced both in open fields and in protected areas—might in theory also belong to this category, but they have limitations that make their suitability for support more doubtful. Both are produced in high volumes and are important primarily for local markets. However, they are also quite perishable, and tomatoes are also imported in high volumes from Macedonia. At this stage, other value chains are considered more feasible to support, although they should be kept in mind for future consideration.

2. MARKETS

A. THE DOMESTIC MARKET

LOCALLY GROWN PRODUCE

In Serbia, domestic grocery chains dominate retail. While several international hypermarkets (Mercator, Vero, Metro) do operate in the country, they serve a low percentage of the population and cannot influence domestic consumers or, more importantly, domestic producers. The market domination of domestic retail chains (Rodic and Delta) makes it difficult to enhance competitiveness of Serbia's agriculture. Healthy competition between foreign and domestic retail chains can bring changes that can motivate Serbian producers how to be more efficient. Higher and more stable product prices, balance between supply and demand, incorporating production standards, and reducing the number of intermediaries in the producer-consumer chain will increase prices (of raspberries, for example) paid to direct producers, thereby producing market incentives to shape products according to the demands of the modern global market. It is advisable to follow the example of Poland, Serbia's biggest competitor on the market of fresh fruit and vegetable products which has encouraged international grocery chains to establish themselves in that country.

The major characteristic of Serbia's domestic supply channels is inconsistent supply, which leads to significant imports from Macedonia, Turkey, and Poland. Hypermarkets are not interested in investing time, resources, and efforts in consolidating a supply chain. They would rather get into production on their own or rely on imports, trying to influence farmers/organizations to follow the market dynamics. Green markets are still important for consumers because of their strong social component—the regular contact and the trust and created between producers, who traditionally sell their products at the green markets, and buyers. However, instead of farmers green markets are now dominated by traders, who buy from the farms as well as import vegetables. Green markets schedule their main days once a week, with a smaller selection of wares available on other days.

Organic vegetables are becoming more and more important as a source of healthy food. Production of this type of crop is low at present, although 3,000 hectares of organic vegetables are grown. The potential for growth is great, and expansion—oriented toward the export market—should be actively encouraged.

TABLE 1. SERBIA'S TRADE BALANCE BY PRODUCTS AND VALUES 2005–2007

Code	Product label	2005	2006	2007	2007	2007
		Balance in value	Balance in value	Balance in value	Exported Value	Imported Value
US \$ 1,000s						
'0701	Potatoes	\$1,014	-\$1,476	-\$1,851	\$2,201	\$4,052
'0702	Tomatoes	-\$10,200	-\$9,804	-\$12,711	\$1,112	\$13,823
'0703	Onions, garlic, and leeks, fresh or chilled	-\$2,245	-\$2,828	-\$3,028	\$1,137	\$4,165

Code	Product label	2005	2006	2007	2007	2007
		Balance in value	Balance in value	Balance in value	Exported Value	Imported Value
		US \$ 1,000s				
'0704	Cabbages and cauliflowers, fresh or chilled	-\$897	-\$1,574	-\$823	\$559	\$1,382
'0705	Lettuce and chicory, fresh or chilled	-\$247	-\$342	-\$583	\$16	\$599
'0706	Carrots, turnips, and salad beetroot, fresh or chilled	-\$381	-\$516	\$74	\$446	\$372
'0707	Cucumbers and gherkins, fresh or chilled	-\$3,651	-\$3,316	-\$4,594	\$430	\$5,024
'0708	Leguminous vegetables, shelled or unshelled, fresh or chilled	-\$1,959	-\$944	-\$926	\$2	\$928
'0709	Vegetables NES, fresh or chilled	\$10,556	\$11,791	\$9,761	\$12,818	\$3,057
'0710	Frozen vegetables	\$13,343	\$14,313	\$21,909	\$24,161	\$2,252
'0711	Vegetables, provisionally preserved (unfit for immediate consumption)	\$1,605	\$1,700	\$3,223	\$4,098	\$875
'0712	Dried vegetables	\$7,555	\$7,290	\$7,753	\$14,574	\$6,821
'0713	Dried vegetables, shelled	-\$3,230	-\$5,238	-\$9,336	\$467	\$9,803
'0714	Manioc, arrowroot Salem (yams), etc.	-\$1	\$0	\$0	\$0	\$0

NES = not elsewhere specified

TABLE 2. VEGETABLE IMPORTS IN 2005

Product	Quantity in kg	U.S. \$
Potatoes, seed, fresh, frozen	5,664,675	2,965,614
Tomato, fresh, frozen	18,337,245	10,501,013
Onion, seed	1,643,700	1,187,013
Onion, fresh, other	5,594,658	1,025,528
Cabbage	6,404,006	1,361,973
Cucumbers, fresh	8,657,507	3,051,757
Peas, seed, dried	1,351,400	1,544,569
Beans, dried, other	6,602,832	3,023,146

IMPORTED VEGETABLE MARKET

Besides significant local vegetable production, a high percentage of vegetables are imported out of season and throughout the year. Reasons are usually lower price, better quality, or sometimes good marketing. Kvantas markets are also creating disorder in this area, and local consumers traditionally prefer better-packed imported products over domestic ones. The reason for the substantial vegetable imports is simply the lack of domestic production of protected out-of-season vegetable crops.

**TABLE 3. PRODUCTION, CONSUMPTION AND EXPORTS OF VEGETABLES
(2003–2006 AVERAGES IN 000 TONS)**

Crop	Production	Consumption in Households	Export
Potatoes	830	270	9
Cabbage	300	150	1
Tomatoes	185	125	0,8
Beans	50	45	0
Peppers	140	100	4
Peas	35	15	0,2
String beans		15	0,06
Onions	120	65	

Source: Jefferson Institute: *Competitiveness of the Serbian Economy* <http://tinyurl.com/66g55c>

B. THE EXPORT MARKET

Serbia has very few fresh vegetable exporters—only about 10 small to medium-sized enterprises. Exporting fresh vegetables (and fresh fruits) usually represents a part-time or supplementary activity for companies chiefly engaged in exporting frozen and processed products, as well as fresh mushrooms. Among these companies are Atle, Flora, Frigonais, Libertas Ltd, Malina Product Ltd., and ML Fruit of Valjevo. An example of a company whose sole activity consists of exporting fresh fruits and vegetables is Agroidual (however, its exports go to Russia).

Processed vegetables are exported through major processing companies and cold storage facilities (Flora-Becej, Frikom-Beograd, Foodland-Beograd, Centroproizvod-Beograd, Porecje-Vucje, and Srbijanka-Valjevo). Serbian cold storage facilities mainly belong to these large processors.

FIGURE 1—VEGETABLE EXPORT VALUES 2001–2004

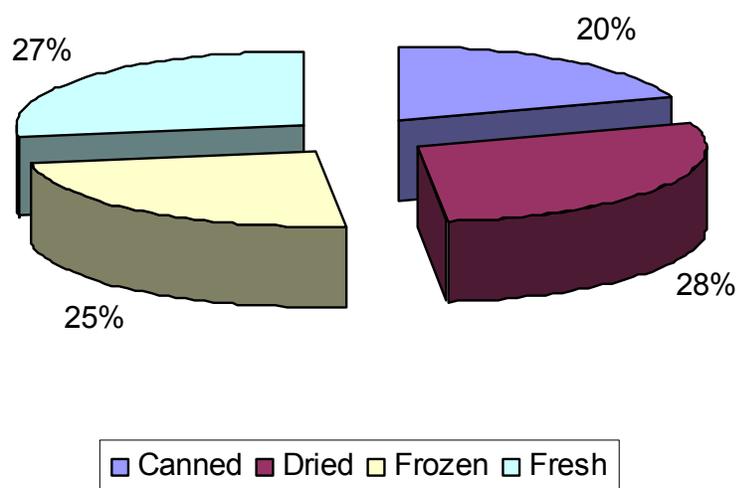


TABLE 4. SERBIA VEGETABLE EXPORTS: TOTAL VOLUME, VALUE, AND PRICES 2005–2007

Code	Product label	2005	2006	2007
		Exported value	Exported value	Exported value
		US \$ 1,000s	US \$ 1,000s	US \$ 1,000s
'0701	Potatoes	\$2,800	\$2,080	\$2,201
'0702	Tomatoes	\$398	\$654	\$1,112
'0703	Onions, garlic and leeks, fresh or chilled	\$360	\$621	\$1,137
'0704	Cabbages and cauliflowers, fresh or chilled	\$318	\$185	\$559
'0705	Lettuce and chicory, fresh or chilled	\$0	\$5	\$16
'0706	Carrots, turnips and salad beetroot, fresh or chilled	\$73	\$310	\$446
'0707	Cucumbers and gherkins, fresh or chilled	\$128	\$374	\$430
'0708	Leguminous vegetables, shelled or unshelled, fresh or chilled	\$59	\$15	\$2
'0709	Vegetables NES, fresh or chilled	\$12,672	\$14,267	\$12,818
'0710	Frozen vegetables	\$14,397	\$16,624	\$24,161
'0711	Vegetables, provisionally preserved (unfit for immediate consumption)	\$2,075	\$2,338	\$4,098
'0712	Dried vegetables	\$10,449	\$13,427	\$14,574
'0713	Dried vegetables, shelled	\$132	\$160	\$467
'0714	Manioc, arrowroot Salem (yams), etc.	\$0	\$0	\$0

Code	Product label	2005	2006	2007
		Exported quantity, tons	Exported quantity, tons	Exported quantity
'0701	Potatoes	51,235	38,529	13,576
'0702	Tomatoes	1,273	2,591	4,041
'0703	Onions, garlic and leeks, fresh or chilled	1,459	3,110	2,901
'0704	Cabbages and cauliflowers, fresh or chilled	2,276	1,030	4,101
'0705	Lettuce and chicory, fresh or chilled	0	1	8
'0706	Carrots, turnips, and salad beetroot, fresh or chilled	658	3,880	2,896
'0707	Cucumbers and gherkins, fresh or chilled	397	820	1,050
'0708	Leguminous vegetables, shelled or unshelled, fresh or chilled	144	20	4
'0709	Vegetables NES, fresh or chilled	8,961	11,526	9,123

Code	Product label	2005	2006	2007
		Exported quantity, tons	Exported quantity, tons	Exported quantity
'0710	Frozen vegetables	19,529	18,971	24,191
'0711	Vegetables, provisionally preserved (unfit for immediate consumption)	783	865	3,477
'0712	Dried vegetables	1,756	3,122	2,015
'0713	Dried vegetables, shelled	98	117	241
'0714	Manioc, arrowroot Salem (yams), etc.	0	0	0

Code	Product label	2005	2006	2007
		Price US\$/kg	Price US\$/kg	Price US\$/kg
'0701	Potatoes	\$0.05	\$0.05	\$0.16
'0702	Tomatoes	\$0.31	\$0.25	\$0.28
'0703	Onions, garlic and leeks, fresh or chilled	\$0.25	\$0.20	\$0.39
'0704	Cabbages and cauliflowers, fresh or chilled	\$0.14	\$0.18	\$0.14
'0705	Lettuce and chicory, fresh or chilled	N.A.	\$5.00	\$2.00
'0706	Carrots, turnips and salad beetroot, fresh or chilled	\$0.11	\$0.08	\$0.15
'0707	Cucumbers and gherkins, fresh or chilled	\$0.32	\$0.46	\$0.41
'0708	Leguminous vegetables, shelled or unshelled, fresh or chilled	\$0.41	\$0.75	\$0.50
'0709	Vegetables NES, fresh or chilled	\$1.41	\$1.24	\$1.41
'0710	Frozen vegetables	\$0.74	\$0.88	\$1.00
'0711	Vegetables, provisionally preserved (unfit for immediate consumption)	\$2.65	\$2.70	\$1.18
'0712	Dried vegetables	\$5.95	\$4.30	\$7.23
'0713	Dried vegetables, shelled	\$1.35	\$1.37	\$1.94
'0714	Manioc, arrowroot Salem (yams) etc	N.A.	N.A.	N.A.

Sources: ITC Calculations based on COMTRADE's statistics on export markets characterized by fresh vegetables and processed vegetables (frozen, canned, pasteurized)

Importantly, Serbia has the capacity to process 700,000 tons of fruits and vegetables, given its available capacities. However, export quantities for fresh products are estimated at 70,000 tons; for processed vegetables, at 50,000 tons. Fresh exports are led by potatoes, watermelons, and brassicas.

TABLE 5. LEADING FRESH VS. TOTAL FRESH VEGETABLES IN SERBIA'S EXPORT STRUCTURE 1997–2005

Product	Avg. in tons	% of total fresh exports	Average total fresh, tons	Value in \$000	% of total fresh exports	Average value fresh, \$000
Potatoes	17,999	52,5	34,304	985.22	7.80	
Melons and watermelons	6,996.90	20,50		673.11	5.40	
Other fresh	2,943.80	8,50		702.22	5.60	
Mushrooms	2,037.30	6,00		9,439.22	75.20	12,541.22
brassicas	1,595.10	4,50				
Total		92%	100%		94%	100%

FRESH VEGETABLE EXPORTS

In Table 6, we see trends for 16 groups of fresh vegetables that are part of Serbia's export structure, based on data for 2000–2005 from the Serbian statistical office. Characteristic of the fresh vegetables being exported are large volumes and relatively low prices per unit (examples include potatoes, carrots, onions, and cabbage). During the past five years, vegetable exports to Russia have significantly increased. The Russian market at this point is not as demanding in terms of standards, quality, or varieties as the EU market is, but that will change over the next two years when standards will become obligatory for the Russian market as well.

TABLE 6. FRESH VEGETABLE EXPORT VOLUMES 2000–2005

Product (tons)	2000	2001	2002	2003	2004	2005
ONIONS	254	310	743	151	1,336	1,096
GARLIC	159	265	486	353	191	159
LEEKs	0	25	5	0	0	0
CAULIFLOWERS AND BROCCOLI	25	49	46	121	70	15
KALE	0	0	0	0	0	0
BRASSICAE	293	399	5,329	4,486	903	2,260
SALAD GREENS	92	141	40	0	5	0
CARROTS	371	604	540	211	1,563	658
CUCUMBERS AND PICKLES	239	219	380	160	320	396
LEGUMES	24	478	399	298	259	144
POTATOES	342	2,687	55,111	32,124	9,012	50,607
TOMATOES	797	317	557	465	739	1,273
ONION SEED	150	57	384	56	70	0
MUSHROOMS	779	3,881	2,482	712	1,515	1,814
MELONS AND WATERMELONS	1,643	11,026	10,652	9,047	17,933	6130
OTHER FRESH VEGETABLES	4,122	2,052	3,756	4,401	4,430	7,147
TOTAL	9,290	22,510	80,910	52,585	38,346	71,699

FROZEN VEGETABLE EXPORTS

TABLE 7. FROZEN VEGETABLE EXPORT VOLUMES AND VALUES 2000–2005

	2000	2001	2002	2003	2004	2005
Total exports (in tons)	14,493	22,980	20,634	13,161	18,515	19,768
Total export (in \$1,000)	6,177	12,918	13,130	10,758	15,083	14,589

TABLE 8. FROZEN VEGETABLE EXPORTS 1997–2005

Product	Average volume, tons	% of total frozen vegetable export tonnage	Average value, \$000	% of total frozen vegetable export value
Peas	5,193	33	2,484	23.5
Sweet corn	4,081	26	1,915	18
Green beans	1,883	12	839	8
Frozen processed vegetables	458	3	246	2.3
Potatoes	262	1.5	49	0.5
Other	3,897	24.5	5,066	48
Total	15,774	100	10,599	100

During 1997–2005, frozen vegetables represented 24 percent (15,774 tons) of average vegetable export volumes. However, they represented 21.4 percent (at \$10.6 million) of average vegetable export value for this period.

TABLE 9. CUMULATIVE PROCESSED AND EXPORTED VOLUMES OF FROZEN VEGETABLES 1997–2005

Type of product	Processed—average total, tons	Exported—average total, tons	% of frozen vegetables exported
Frozen vegetables	22,765	14,812	65

Looking at average processed (frozen) vegetable quantities for 1997–2003, average volumes produced were 22,765 tons, whereas export average was 14,812 tons: that is, 65 percent of frozen products were exported and the remainder consumed domestically. The data for this period show **six frozen vegetable groups in the Serbian export structure**.

Two further observations:

- All of these six groups of vegetables were continuously being exported during this period, which implies good potential for increasing exports in existing markets.

- Three product groups—peas, green beans and beans, and sweet corn—represented 71 percent of export volumes and 50 percent of export value. This opens large opportunities for Serbia, since these products are grown on large plots, are highly mechanized, and involve processing plants.

FRESH DRIED VEGETABLE EXPORTS

TABLE 10. TOTAL VOLUMES OF DRIED VEGETABLES PROCESSED AND EXPORTED 1997–2003

Product	Average volume processed. tons	Average quantities exported. tons	% exported
Dried vegetables	3,170	2,804	88

The average volume of dried vegetables processed during 1997–2003 was 3,170 tons, whereas exports were 2,804 tons, or 88 percent of the average total produced.

TABLE 11. EXPORTS OF DRIED VEGETABLES BY LINE ITEM 1997–2003

Product	Average volumes, tons	% of total dried vegetable exports	Average value, \$000	% of total dried vegetable exports
Dried pepper, milled	1,223.4	41.6	2,962.1	20.4
Other vegetables and mixes	831.5	28.3	1,536.2	10.6
Mushrooms	682.2	23.2	9,625.4	66.3
Onions	119.3	4.0	280.5	2
Peas	63.1	2.1	82.4	0.5
Beans	17.3	0.6	19.7	0.1
Legumes	0.4	0.01	0.3	0.002
% of total export volumes	2,937	100	14,506.9	100

The data for 1997–2003 show that seven dried vegetable groups made up the export structure, of which dried peppers, other vegetables, and mixes and mushrooms accounted for 93 percent. During this period mushrooms took the highest share of export value, with \$9.6 million or 66 percent, whereas the lowest share was for legumes—0.002 percent.

Three product groups represented 93 percent of volumes and 97 percent of values: mushrooms, dried and milled pepper, and other vegetables and vegetable mixes. Again, mushrooms predominated, but a promising export vegetable for Serbia is dried pepper: it has a lot of production on private farms, engaging local labor and processing plants.

TABLE 12. TOTAL VOLUMES OF PASTEURIZED VEGETABLES PROCESSED AND EXPORTED 1997–2003

Product	Average volumes processed, tons	Average quantities exported, tons	% exported
Pasteurized vegetables	23,573	11,247	48

The average annual quantity of dried vegetables processed during 1997–2003 was 23,573 tons, while the quantity exported was 11,247 tons, or 48 percent of total average produced.

TABLE 13. EXPORTS OF PASTEURIZED VEGETABLES BY LINE ITEMS 1997–2005

Product	Average volumes produced, tons	% of total exported	Average value, \$000	% of total export value
Other pasteurized vegetables	6,729.7	52.3	3,619.6	30.3
Vegetables in vinegar	2,910.1	22.6	3,309.8	27.7
Canned vegetables	1,168.1	9.08	1,805.4	15.1
Sweet corn	935.7	7.2	1,521.3	12.7
Potatoes	613	4.7	833.7	6.9
Mushrooms	229.5	1.7	608.7	5.1
% of total export volumes	12,586.1	98	11,698.5	98

The data for 1997–2005 show that nine pasteurized vegetable groups were in the export structure, with six representing 98 percent of exports (the three others are tomatoes, ketchup, and pickles). It is noticeable that 84 percent of exports were accounted for by the first three groups—other pasteurized vegetables, vegetables in vinegar, and canned vegetables. Four further observations are:

- There is a noticeable fluctuation in positive export trends within groups
- Five product groups were being exported continuously over this period, which implies a potential for growth in known markets.
- Ninety percent of the export volume and 86 percent of export monetary value were represented by five product groups: other pasteurized vegetables, vegetables in vinegar, canned, potatoes, and mushrooms.
- Fluctuations in exports can be avoided with the development of long-term strategy, market research, and the opening of new markets.

PRICES IN SERBIA AND THE REGION

The state used to control the purchase price of agricultural products. That practice is now ended, and wholesale prices are freely determined at the market as a result of negotiations between the intermediary or wholesaler and the producers. Because of weather variations, quantities change from year to year, thereby affecting the bulk purchasing price of the products. Table 14 presents prices of fruits and vegetables based on data provided by enterprises (agricultural, industrial, retail, etc.) and cooperatives purchasing products directly from producers, either for sale or for processing. Bulk purchasing prices in Serbia are valid only during the season; they were quoted as net values for producers and compared with prices on representative European terminals in 2005.

TABLE 14. BULK AND WHOLESALE PRICES, IN EUROS, AT KEY EU TERMINAL MARKETS 2000–2005

Prices in effect at representative European terminals in 2005					

	2000	2001	2002	2003	2004	Location	Unit of measurement	Min. price	Max. price
Potatoes	0.21	0.16	0.11	0.23	0.11	Paris	kg	0.20 (Aug.)	0.68 (May)
Beans	0.54	1.14	1.17	1.13	0.95	New Covent Garden	c. 1 kg	2.54 (July)	3.94 (March)
Peas	0.24	0.50	0.41	0.18	0.18	New Covent Garden	c. 1 kg	3.91 (July)	6.36 (June)
Onion	0.00	0.00	0.12	0.21	0.12	New Covent Garden	c. 1 kg	0.71 (Jan)	1.83 (May)
Garlic	0.14	0.12	0.12	1.03	0.73	Paris	kg	2.05 (July)	4.50 (May)
Cabbage	0.63	0.89	0.89	0.11	0.08	Paris	kg	0.22 (Jan–Feb)	0.60 (July–Aug)
Carrots	0.12	0.14	0.18	0.08		Paris	kg	0.25 (Jan)	0.5 (May)
Tomatoes	0.10	0.08	0.14	0.13	0.14	Paris	kg	0.3 (July)	2.57 (May)
Peppers	0.09	0.13	0.11	0.2	0.19	Paris	kg	0.90 (June–July)	3.60 (Apr)
Cucumber	0.25	0.21	0.19	0.2	0.2	Paris	kg	0.24 (Aug)	1.41 (Feb)
Watermelons and melons	0.17	0.20	0.19	0.1	0.007	Rotterdam	kg	0.15 (Aug)	1.29 (May)

DIFFERENTIATION AND SEGMENTATION OF THE MARKETS

Serbia's main export markets are the countries of the EU and former Yugoslavia. The combined tables below show the trading structure by vegetable type and country of destination.

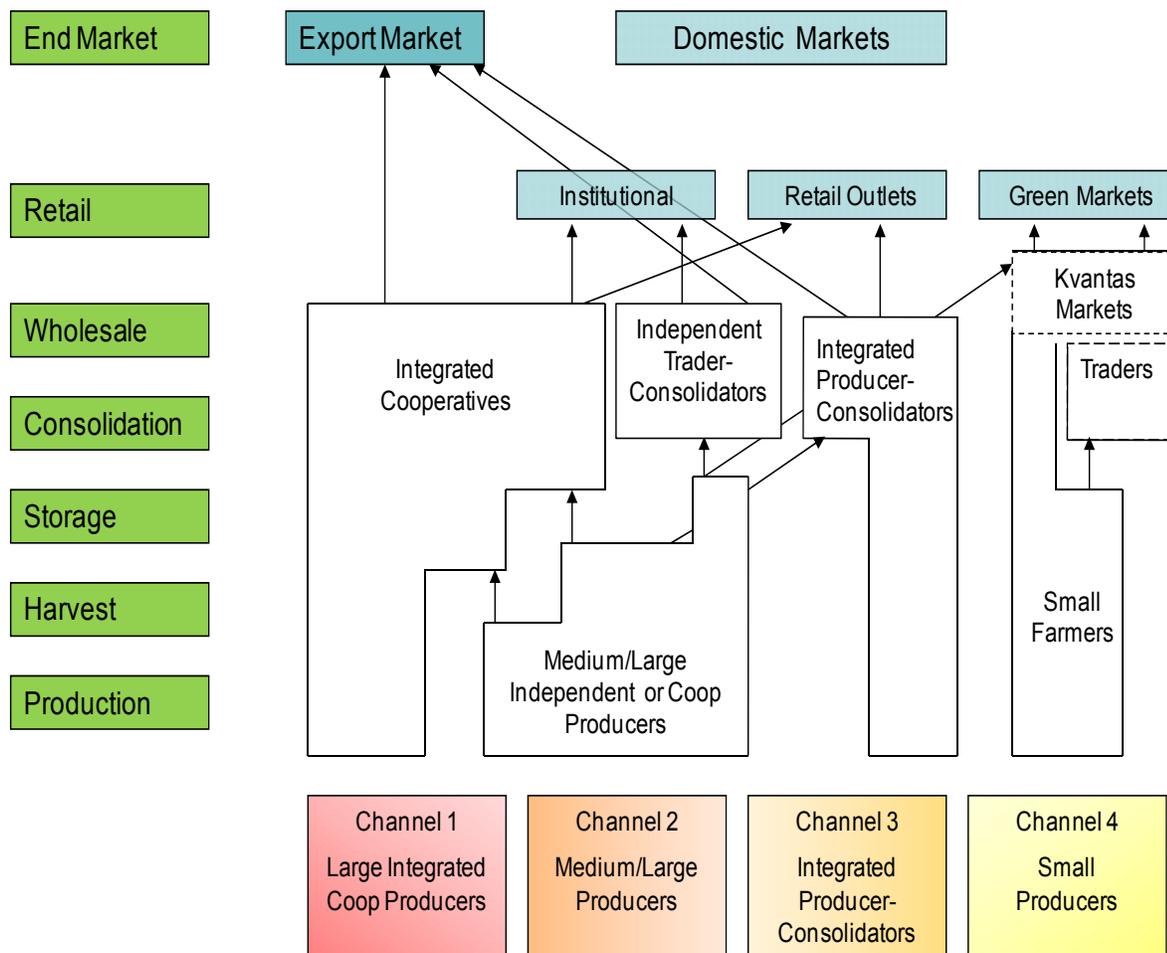
TABLE 15. FRESH VEGETABLE EXPORTS 2001–2004, IN \$000

Countries of former Yugoslavia	2001	2002	2003	2004
Bosnia and Herzegovina	745	1,064	992	958
Bulgaria	82	1,422	36	20
Macedonia	114	454	185	184
Croatia	19	68	307	61
Romania	5	617	1,038	495
Albania	42	142	0	10
Subtotal	1,007	3,767	2,558	1,728
EU countries	2001	2002	2003	2004
Slovenia	259	468	1,046	1,081
France	361	822	540	446
Germany	1,201	1,623	1,993	2,980
Greece	8	107	16	0
Italy	8,748	5,195	2,931	7,010
Austria	508	569	556	601
Slovakia	2	240	110	211
Hungary	6	277	198	540
Czech R	52	166	215	505
Poland	175	180	170	284
Denmark	0	0	0	34
Netherlands	16	68	60	19
Subtotal	11,336	9,715	7,835	13,711

Other	2001	2002	2003	2004
Swiss	181	341	277	201
Cyprus	7	172	0	0
Turkey	0	0	0	0
USA	0	0	0	0
Belorussia	0	0	0	0
Russia	0	0	0	7
Subtotal	188	513	277	208
Grand Total	12,531	13,995	10,670	15,647

3. THE SUBSECTOR MAP

FIGURE 2. VEGETABLE VALUE CHAIN MAP
Vegetable Sales Channels to Domestic and Export Markets



SUBSECTOR CHANNELS AND MAP

INPUT SUPPLIES

Production inputs play a crucial role in vegetable production, for which Serbia depends heavily on the import of hybrid seeds, fertilizers, etc. Seedling production presents one of the weaknesses in the domestic vegetable subsector; seedlings are often imported, especially from Hungary. Dutch vegetable technology is spread widely through networks of local distributors. Delta Agrar, the Virginia Group, Enza Zaden, and Agro Arm are some of the most important input suppliers on the Serbian market. To overcome shortages, large and medium-sized processors often purchase the necessary inputs (such as seeds and crop protection products) themselves and supply them to their produce sources.

PRODUCTION/HARVESTING

Production of vegetables takes up some 500,000 ha in Serbia, or 10 percent of total arable land. Family farms represent the greatest percentage of all farms (over 60 percent). Individual farms and coops account for 85 percent of total vegetable production, while retail and processing companies produce 15 percent. Annual vegetable production is about 2 million tons, with substantial potential surpluses for processing and exports. Serbia's vegetable processing industry includes about 25 companies, which produce frozen, canned, and dried vegetables; using the industry's existing capacities, it has significant potential to develop. The major processed vegetable crops are potatoes, tomatoes, and peppers. The EU is the main trade partner for Serbian vegetable products—it imports more than 40 percent of total production.

Vegetable production is based on conventional production principles. Producers are not applying modern growing technologies, as implied by following table showing that Serbia and Croatia realize far lower yields per hectare than in Poland, Hungary, and the Netherlands for five important crops.

TABLE 16. COMPARISON OF YIELDS IN SERBIA AND OTHER COUNTRIES 2001–2005

COUNTRIES	SUBJECT	COMMODITY	2001	2002	2003	2004	2005
Serbia	Yield (kg/ha)	Beans, green	4,166.67	4,112.31	4,153.85	4,153.85	4,153.85
Croatia	Yield (kg/ha)	Beans, green	2,474.1	2,976.84	1,935.35	6,875	6,919.85
Netherlands	Yield (kg/ha)	Beans, green	11,891.89	17,027.03	12,162.16	10,004.11	10,041.6
Serbia	Yield (kg/ha)	Cabbages, other brassicas	12,712.06	14,850.36	11,539.8	15,958.33	12,872.78
Poland	Yield (kg/ha)	Cabbages, other brassicas	36,934.34	43,954.44	36,502.63	39,707.3	35,568.87
Croatia	Yield (kg/ha)	Cabbages, other brassicas	12,499.7	12,664.12	9,464.89	12,703.42	22,373.57
Netherlands	Yield (kg/ha)	Cabbages, other brassicas	32,344.36	29,259.26	32,375	25,875	26,125
Serbia	Yield (kg/ha)	Carrots and turnips	8,189.43	7,797.69	5,867.91	9,170.85	8,336.21
Poland	Yield (kg/ha)	Carrots and turnips	27,886.84	24,924.3	27,566.17	30,540.71	27,967.19
Croatia	Yield (kg/ha)	Carrots and turnips	8,126.87	9,018.05	5,788.07	8,312.07	18,501.47
Netherlands	Yield (kg/ha)	Carrots and turnips	46,666.67	5,2750	54,000	55,087.72	61,027.57
Serbia	Yield (kg/ha)	Chilies and peppers, green	6824.69	7,973.25	7,607.17	7,780.21	8,397.36

COUNTRIES	SUBJECT	COMMODITY	2001	2002	2003	2004	2005
Croatia	Yield (kg/ha)	Chilies and peppers, green	7231.52	8,640.41	5,655.07	8,273.85	14,093.33
Netherlands	Yield (kg/ha)	Chilies and peppers, green	245,833.3	25,1012.2	259,686.7	263,900.4	279,126.2
Serbia	Yield (kg/ha)	Garlic	2,892.28	2,929.46	2,354.92	2,720.54	3,113.75
Hungary	Yield (kg/ha)	Garlic	7,855.16	6,118.54	5,370.14	9,403.83	7,475.68
Netherlands	Yield (kg/ha)	Garlic	48,000	48,000	48,000	46,935.35	46,262.44

Serbia has about 5,000–6,000 ha of crops under greenhouses, both plastic and tunnels. There are also about 64 hectares under glasshouses, but 70 percent of this is not in use, mostly because of high price of heating (gas/oil). Serbia has a great potential to organize production of vegetables in closed environments next to hot springs, which by supplying heat would cut production costs and make vegetable prices more competitive.

TRADING, STORING, AND PACKAGING

Acting as collection centers, traders are in most cases a necessary link within the value chain. As processors' buying agents in remote areas (or areas that are distant from processing plant), they collect products from small-scale local collectors and thus fill the gap between the latter and processors. Very often, traders also buy vegetables from farmers and sell directly to the green markets. Frequently they provide additional services, such as grading, repacking, and transportation, while in some cases they handle the drying of vegetables as well. The margin they charge is usually negotiated with processors, and it varies from 10 to 30 percent on average. Traders in vegetables must meet common requirements for traders—being officially registered for such activities, possessing appropriate storerooms for various products, being equipped with scales for weighing—but there are no other requirements they must meet.

PROCESSING

Besides consuming vegetables domestically, Serbia also exports fresh products to international markets without any value-adding processing. Two million tons of fresh vegetables present a serious base for processing and the export market, but this output is not used adequately for several reasons. The most important ones are a lack of modern technologies and the need to introduce relevant standards for export marketing, such as those of the International Organization for Standardization (ISO), Hazard Analysis and Critical Control Point (HACCP), and British Retail Consortium (BRC). Processing companies are mostly small to medium-sized family businesses employing from 2 to 100 employees. Small processors commonly do the primary processing, including grading, trashing, drying, cutting, and packing. As most of these operations are done manually and are extremely labor-intensive, during the processing season primary processors employ from a few to more than 100 employees on part-time or seasonal basis. This way the subsector creates a large source of employment for unskilled workers, even elderly women in less favored areas in Serbia. There are 30 large companies dealing with vegetable processing, including Frikom Belgrade, Aretol Novi Sad, Aroma Futog, Centroproizvod Belgrade, Flora Becej, Srbijanka Valjevo, Interfood Cacak, PIK Becej, Aleva Novi Knezevac, and BAG Backo Gradiste.

The major processed vegetable crops in Serbia are potatoes (French fries, potato chips, and potato puree), green peas, peppers (pasteurized, dried paprika, and ajvar), and sweet corn. Other important products include tomatoes, cucumbers (pickles), and beans.

WHOLESALE/EXPORT MARKETS

This group includes exporters as well as wholesale companies. Most of the export goes through the following 10 companies: Frikom Belgrade, Aretol Novi Sad, Aroma Futog, Centroproizvod Belgrade, Flora Becej, Srbijanka Valjevo, Interfood Cacak, PIK Becej, Aleva Novi Knezevac, and BAG Backo Gradiste.

RETAIL MARKETS

Domestic retailers for the subsector's products include supermarket chains, retail shops, and green markets. Supermarket chains have taken over part of the role played by green markets and wholesale markets, but problems with ensuring the variety and freshness of their products are constraining their further development.

LEVERAGE POINTS

- Producer organizations
- Agricultural business development services (ABDS) providers
- Governmental institutions
- Local governments
- Processing companies
- Consolidation/distribution centers
- Retail chains
- Post-harvest handlers—storage and logistics
- Nursery plant importers and domestic nurseries

This study identified **channels** according to the size and importance of their participants: processors, coops, large farmers, and small farmers. Each channel is discussed in the following section.

CHANNEL 1: PROCESSORS

Approximately 15 percent of all vegetables produced in Serbia go to the processing sector (about 30 companies), which both buys vegetables from farmers and cooperatives and produces them for its own needs. Since 2005, the latter practice has become more common as a result of a lack of quality raw materials. The relationship between processors and domestic producers has experienced great difficulties in the past, as both sides were not respecting contractual obligations. Even with the vegetables that they grow themselves, processors are forced to import raw materials.

This channel is highly organized and managed well. The capacity of the processing plants is about 700,000 tons per year. Unfortunately, they are not using their full capacity, due to the poor supply of raw

materials. The annual vegetable production is approximately 2 million tons. Even given the consumption of these products in the fresh state, it could be concluded that there are important surpluses for processing and export. Unfortunately, the level of technology in the existing equipment in about 70 percent of these enterprises is far below the international standards required by the EU and other importing countries. Quality of products is variable, the range of products is modest, and products do not have an appropriate level of commercialization, such as proper packaging, labeling, and marketing.

Serbia has experienced a closing of foreign markets over the past decade due to a number of issues, such as sanctions and Romania and Bulgaria's EU accession. This problem, along with the decrease in domestic demand caused by a drop in Serbia's living standards, has caused the drastic reduction in the Serbia's production volumes and changes in its production structure. In the period before the sanctions were imposed, the degree of capacity utilization was high.

In vegetable production, there is a good degree of compatibility between areas with potential for raw material production and the location of the processing plants (although mountainous regions are neglected to some extent). This is very important, given how crucial it is to reduce transportation time to obtain quality vegetable products. However, these processing plants cannot cover all vegetable production regions so that they can carry out their main role—allowing the sale of products at a more favorable time than during the harvest season. Better utilization of Serbian vegetables depends on modernizing the means of transport so that vegetables can be picked up immediately after harvest, as well as establishing systems of quality control according to the international regulations and standards.

CHANNEL 2: COOPERATIVES

Coops are an important channel for producing and marketing vegetables. However, due to the transition from socially owned to modern market-oriented coops, many lost their role as production and marketing organizations, and a large number went out of business. There is a new wave of modern coops, but their growth is limited by the existing cooperative law, which doesn't permit investment initiatives by coops. For example, new coops don't play a significant role in vegetable marketing, since most contractual arrangements with hypermarket chains and processors are on an individual basis, as a result of coops being unable to enforce market-related operations.

Serbia has about 1,000 registered coops, of which 60 percent are engaged in fruit and vegetable production. Their main markets are Serbia, neighboring countries, and Russia. It is essential to support the cooperative movement and provide assistance for its rapid development.

CHANNEL 3: LARGE FARMERS (SUPERMARKET CHANNEL)

There are few large farms among Serbia's family farms, which are often chopped up into smaller pieces of land: only 4.5 percent of Serbian farms are more than 10 hectares in size, and such farms comprise only about 17 percent of Serbia's total agricultural area. Large farms have direct contracts with hypermarkets and rarely sell on green markets. At present these producers show great interest in technology and the technical improvement of their production (market-oriented varieties, with yields improved to a level acceptable to the buyers). This should be actively encouraged. An additional issue is the need to invest in storage and packaging capacities. These producers should be used as models for the smaller producers—that is, large and small producers should be encouraged to work together as soon as the Ministry of Agriculture adopts the new cooperative law which will allow coops to invest.

CHANNEL 4: SMALL FARMERS

Small farms, with 1–10 hectares of arable land, make up 95 percent of the 770,000 farm holdings in Serbia. They represent the biggest obstacle to developing the vegetable supply chain, since nearly 50 percent are smaller than 5 hectares. Small producers sell most of their production directly to the traditional green markets, where they offer a wide assortment of varieties, fresh products, and good prices, although they also sell limited quantities to traders and retail shops. Their potential has increased in recent years, but in terms of development, their organizational, economic, and technical aspects are poor and reflect a lack of technical and technological progress. The reason for this is the long-term absence of favorable credit conditions for the purchase of equipment, for mechanization, for the construction of building facilities, and in recent years even for current production, which can't be financed by the farms because of their decreased economic power. The number of small vegetable producers will probably increase, however, due to the exit of many people from the cities to the country.

It will be difficult for these small crop producers to support their operations, despite the potential that exists for them to improve their output and profits. While they can become involved in exporting through standardized production as members of cooperatives (such as Fruitland), farmers need to be better organized.

4. SUPPORTING ORGANIZATIONS AND REGULATORY FRAMEWORK

SUPPORTING ORGANIZATIONS

Although Serbia has 34 agricultural extension stations, they do not have enough people in the field providing assistance, and extension often suffers from a lack of appropriate financing. In the past, agricultural extension focused on supporting farmers in technical aspects of crop and livestock production. Even now, extension services primarily concentrate on providing non-economic advice. Moreover, the system is out of date in the information it provides, and its usefulness to emerging farming enterprises is limited.

Formal extension in Serbia is the responsibility of the **Institute of Science Application in Agriculture** through its **Regional Agricultural Stations**. Its activities are limited to applied research in the form of field trials and testing (soil, seeds, plants, and livestock). It is heavily oriented to the needs of Agrokombinats, big farms, enterprises, etc. Its capacity to provide advice on investment strategies or other farm business planning is limited, and it doesn't reach out to the majority of farmers. Agricultural stations also conduct statutory control function services on behalf of the Ministry, which is a conflict of interest and not conducive to the effective functioning of an extension service.

There is some advice provided by private individuals, and a small private extension network has been developed by donors. Its long-term prospects are still unclear at this point, because it has not been able to generate enough funds by charging for its services, as it only reaches a limited number of farmers. It could have an important role in a competitive market as a source of advice to farmers, but that market has not yet been developed. Most farmers have either too little money or too little appreciation of the value of an extension service to be willing to pay for it at present. Lack of agricultural education and training is also a contributing factor.

Service is also provided by the staff of the **research institutes, universities, and NGOs**, if financed by the Ministry of Agriculture. A few input providers are also providing some advice. Staff of agricultural middle schools (vocational schools) may also be providing limited advice and information. In general, the knowledge of the staff and the quality of the service provided are unsatisfactory.

This project can address these problems with farm extension by introducing best practices from EU and/or the United States to identified stakeholders, with a special focus on commercial service providers as a point of sustainability. State extension service offices and NGOs are most probably unsuitable for intervention, as their organizational structure and ownership status have not yet been resolved.

At this point, private extension services are very rare, and they work only with large farmers/cooperatives. The ultimate goal might be the creation of a network of combined private-NGO extension service providers for the vegetable sector.

REGULATORY FRAMEWORK

Serbia's shrinking current account deficit in agro-food foreign trade, which in 2005 even turned into a modest surplus, along with its €350 million overall trade surplus, reflects its recent progress in the area of trade policy. The negotiations for trade agreements have provided the guiding framework for Serbian trade policy in recent years. The start of negotiations with the EU on the Stabilization and Association Agreement (SAA) and the talks with WTO on a future WTO membership for Serbia have started to influence Serbian trade policy, even though they are not yet concluded.

During the first two-day talks with WTO in October 2005, Serbia submitted a memorandum on its foreign trade regime and information on domestic support and export subsidies in agriculture, as well as a legislative plan of action. The WTO Agreement on Agriculture (AoA) is of core importance. It requires Serbia to adjust its agricultural policies in the areas of domestic support, market access, and export subsidies. The commitments in the agreement require WTO member states to increase market access and to reduce expenditures on both domestic supports and export subsidies. The AoA also includes references to non-trade concerns, listed as food security and environmental issues. Since then, import tariffs have been reduced and the institutional framework for trade policy has been strengthened. In November 2005, the Serbian parliament passed a foreign trade law consistent with WTO and EU regulations.

Bilateral trade agreements have also influenced Serbia's approach to foreign trade, in particular free trade agreements (FTAs) with neighboring states in Southeast Europe. EU accession and trade liberalization within the framework of the FTAs must go hand in hand to avoid potential trade distortions. To meet EU standards and make good use of the unrestricted access to the EU-25 market, MAFWM has established working groups to revise draft laws relating to food safety, Veterinary Services and the WTO's sanitary and phytosanitary (SPS) measures.

Fresh vegetable producers and processors at this point have a number of regulations and standards to meet before Serbia enters the EU.

AGRICULTURAL AND FOOD TRADE POLICIES

To meet the future challenges, the MAFWM is planning to establish a number of additional agencies, including a Land Agency (to improve land markets), a Payment Agency (likely to be a directorate reporting to MAFWM), and a Center for Cooperative Development. Capacity and institution building is a key issue of the nation's agricultural strategy, which also includes the introduction of a monitoring system. The strategy is clearly focused on further steps toward EU and WTO membership. Therefore, all agricultural policy measures foreseen are in line with the general approach of the agricultural program Serbia adopted. The government is looking for the optimal level of protection in an effort to secure increased competitiveness for agriculture, coupled with sustainable development for Serbia's rural economy. Moreover, Serbia has to adjust border control, create a system of laboratories, and clarify and define the role of institutions to avoid overlapping of responsibilities. Serbia's present level of tariff protection no longer deviates significantly from that prescribed by the EU. However, its border control is insufficiently coordinated.

Serbia's export incentives include benefits for the processing industry and measures to strengthen the supply and production chain, which will increase regional competitiveness.

VAT TAX POLICY IMPLEMENTATION: INFORMAL MARKET EFFECT

In July 2004, a law establishing a value-added tax (VAT) was adopted by the Serbian Government, and it became effective in January 2005. At the same time, a measure was introduced to compensate farmers for the VAT paid on agricultural production inputs. In practice it is a separate tax levied on registered VAT payers, who have to pay a surcharge of 5 percent on the gross price when purchasing agricultural produce from non-registered farmers. Green market sales, however, have yet to be incorporated into the VAT system, an omission that allows over half of the vegetables and other agricultural goods sold on the informal market to avoid paying taxes; as a result, the sales will not be recognized by the Government of Serbia and will be excluded from the future EU measures to support registered farms and agricultural production.

FOOD SAFETY POLICIES

The draft Food Safety Strategy for Serbia, which will form the basis for preparing the priority Food Safety Law, has been developed and submitted to the Ministry of Agriculture. The issue of a Food Safety Strategy and a Food Safety Law has been pending already for a number of years. Measures for the quality control of food and agricultural products in foreign trade have not yet been elaborated.

EXPORT SUPPORT

The agro-food trade balance has mostly been negative since the mid-1990s. Due to the export support programmed by the MAFWM, 2005 was the first year with a positive trade balance in this area since 2000. This positive trend continued in 2006, 2007, and the first half of 2008.

The Ministry of International Economic Relations, the Ministry of Economy, the Chamber of Commerce, and the Serbia Investment and Export Promotion Agency (SIEPA) are the key trade support institutions in Serbia. It appears that the activities of these institutions are not fully coordinated, but with assistance from the USAID Agribusiness Project, the impact could be further increased.

CENTRAL EUROPEAN FREE TRADE AGREEMENT (CEFTA)

The Serbian government and its predecessors took an active part in the CEFTA process. It signed FTAs with the Former Yugoslav Republic of Macedonia in 1996 and Russia in 2000; more recently, it has signed six more, with Bosnia and Herzegovina, Croatia, Albania, Bulgaria, Romania, and Moldova. In the FTA of 1996, the Former Yugoslav Republic of Macedonia protected its agricultural products with customs duties, but the document has been further refined since then, and since June 2006 trade has been fully liberalized between the two countries. In 2007 Serbia signed the CEFTA agreement itself, which brings together the major Balkan countries in commodity exchanges. After having started preparations for WTO accession as part of the Federal Republic of Yugoslavia in 2001, the government of the Republic of Serbia applied in 2004 for accession to the WTO as a separate customs territory (that is, without Montenegro). Integration into the WTO and EU will open new big markets and offers a lot of potential. In order to actually make use of the access to new markets, however, immense improvements in productivity and quality (standards) are needed.

IMPORT TARIFFS: HIGH DOMESTIC MARKET SUPPORT VIA BORDER PROTECTION

Since 2001 the maximum tariff has been reduced from 40 percent to 30 percent, and the tariff structure has been simplified to six bands (1 percent, 5 percent, 10 percent, 15 percent, 20 percent, and 30 percent).

Most agricultural commodities continue to benefit from the maximum rates of protection of 20 percent and 30 percent.

5. SUBSECTOR DYNAMICS

TRENDS AND DRIVERS

Driving forces in this subsector are the emerging hypermarket chains and vegetable processing factories. Both of these control and dictate the flow of vegetable products. Farmers' organizations are still too weak to influence market development significantly.

Producer groups. Vegetable producers' organizations that already have experience with international assistance projects are primary foci for establishing a representative union of producer groups and driving institutional capacity building and market development through it. Examples include the Begecki Povrtari Coop (Begec), the Cooperative Gospodjinci (Gospodjinci), and the Agrokooperativa Coop (Horgos).

Industry groups. These include hypermarket chains (Rodic-Merkator, Metro, Vero, Interex, and others) and processing companies (such as Flora- Becej, Frikom-Beograd, Foodland-Beograd, Centroproizvod-Beograd, Porecje-Vucje, and Srbijanka-Valjevo).

Government. The agricultural schools mainly seem to target the education and training of agricultural technicians needed for the agroprocessing sector, semi-managerial positions in coops, and public service. However, private farmers cultivate most of the land, and this needs to be addressed. More emphasis should be put on farm business management and practical farming skills. Programs (day courses) should also be made available to private farmers.

Technological changes. These include introduction of packaging facilities, cold stores, storage facilities, distribution centers, and HACCP and GlobalGAP standards.

BOTTLENECKS

Bottlenecks constrain expansion and profitability of the sector in many ways, from lack of up-to-date cultivars to poor storage, quality control, technical and managerial skills, marketing, and packaging, as well as a paucity of business service providers. These problem areas are discussed in more detail below.

ADEQUATE PRODUCT VARIETY AND LONGER GROWING AND SELLING SEASONS

Inadequate range of varieties. The assortment of cultivars in Serbia does not reflect global market dynamics pertaining to the creation of new cultivars of vegetables that would enhance product quality, resistance against diseases and parasites, and extension of the season. Prevailing varieties are old and not suitable for fresh consumption on demanding markets. Varieties of such vegetables as potatoes, sweet corn, and more should be adjusted to the market's needs.

Lack of high-profit vegetables. Vegetables offering high profit margins, such as broccoli, artichokes, various types of lettuce (lolo rosso, iceberg), field salad, rucola (arugula), cocktail tomatoes, and more, are grown in Serbia in small quantities. But for almost all of these vegetables, most of what is consumed in Serbia must be imported. Serbia's weather conditions are absolutely suitable for growing these vegetables. Producing them domestically would not only lower prices and help avoid the need to import these items, it also offers the potential for exporting them, since their world consumption is on the rise,

especially when raised organically. Organic production is highly feasible for a number of these products, taking into account, for example, that cocktail tomatoes are sensitive to pesticides and ripen better without the latter, thanks to natural resistance against disease.

Inadequate growing techniques. Generally speaking, improving Serbia's competitiveness in fruit and vegetable exports requires changes in the production system, including the implementation of new techniques and machinery, irrespective of the types applied. Two other necessary elements here are: 1) extension of the vegetable season not only by using new cultivars, but also by means of various techniques of implementation (hotbeds, growing on substrate, etc.); 2) setting up anti-hail nets above orchards and plantations to ensure less vulnerability to weather conditions (net prices range from €8,000 to €15,000 per hectare, but one seasonal output destroyed justifies the investment).

Shortage of ambient-temperature warehouses with controlled atmosphere. Extension of the production season is primarily constrained by a shortage of adequate storage opportunities. Because of lack of proper storage, some locally grown and traditionally produced vegetables must still be imported out of season as fresh goods. With proper storage, products such as carrots, parsley, celery, onions, and many others can be kept and sold with insignificant quality changes throughout the year. Out of the 220 refrigerated warehouses in Serbia, only two can maintain contemporary storage conditions using so-called ultra-low oxygen (ULO), controlled-atmosphere technology. Neither of these two ULO-equipped facilities is used to store fresh fruits and vegetables that could be used for export.

Little expertise on controlled-atmosphere storage technology and management in order to reduce losses, improve product quality, and extend the storage period. This is a new technology for Serbia, and there are no experts or ABDS providers to deliver permanent advisory services on best production practices. The percentage of losses for high-quality vegetables during storage is relatively high compared to that for developed countries.

QUALITY CONTROL

Need to introduce HACCP and GlobalGAP Certificates. It is vital for the vegetable subsector to adjust farm management practices to conform to good agricultural practice (GAP). Farmers—and some processors and traders as well—remain unaware of the real need for this: in fact, 85 percent of Serbian food producers and processors are either not familiar at all, or insufficiently familiar with the standards applicable to food safety, although the Government of Serbia enacted a regulation precisely to govern food safety in that industry. Serbia's regulation is in line with European Commission's Decision 1148/2000, which, in conjunction with the previous decision promulgated in 1996, requires fresh fruits and vegetables designated for consumption to comply with marketing standardization and to obtain a "certificate of conformity" before entering the market.

There is a need for dissemination of information and training about farm management, product processing and handling, and international standards and certification throughout the Serbian farm market chain.

Low level and range of product grading and testing. To allow Serbian producers greater access to lucrative export markets, more regional laboratories with skilled staff should be permanently available to producers for the testing of soil, water, products, etc., needed to meet ISO 17025 standards. The Ministry of Agriculture recently started a project on building one central laboratory in Batajnica and five regional ones in Sombor, Nis, Cacak, Smederevo, and Sremska Mitrovica. These laboratories will be equipped to be able to fulfill all the EU requirements regarding analyses of seed, seedling, and product quality.

Lack of distribution/consolidation centers. Such centers should have modern technology for grading, sorting, and packing fresh vegetable (including calibrators, floating systems, packaging, and more). The aim will be for these distribution centers to take over the role of “kvantas” wholesale markets, whose activities have been taking place completely in a grey economy with no control by any official institution. An additional value of these centers will be that individual vegetable producers and cooperatives will be able to sell or deliver their products there to be washed, packed, and prepared for the final buyers.

PRODUCTIVITY

Fragmented production and marketing. The fragmentation of farms, and the small average surface area of farm plots, is a big obstacle to raising competitiveness with regard to both the quantity and the quality of production, as well as farmers’ ability to use their buying/selling power to reduce production costs and increase incomes. Producers are poorly linked, both vertically and horizontally (associations are underdeveloped or do not exist). The only good example of horizontal and vertical integration and coordination of farmers is in the apple production sector.

Limited technical knowledge. Although Serbian farmers have a long tradition of vegetable production, technical knowledge is at a low level, especially as regards the use of modern technologies. Farmers need capacity building in production, market-oriented production planning, post-harvest management and quality control, and sales and marketing. Another level of technical assistance is needed for farmers’ organizations. The extension services offered by university professors, extension stations, and private providers are unsystematic and very often fail to reflect current production and market trends.

Poor managerial skills of farmers and producers’ organizations. Both farmers and producers’ groups have limited knowledge of farm cost management and of sources of finance (bank programs and credits; the Ministry of Agriculture’s loans and subsidies).

High costs of on-farm investments—and of the credit needed to make them. Examples of widely needed investments include irrigation systems, mulch foil, rotating tills, narrow platforms, hail and frost protection, calibrators, packaging machines, and cold storage units. The loan arrangements offered by financial institutions feature high interest rates and unfavorable conditions.

PACKAGING

Inadequate packaging and labeling. Improving packaging and labeling is a very important step in the whole chain for the competitiveness of final products. While the EU market demands quality certified packaging, there are very few certified local producers of food packaging that are applying safety standards. In addition, retail vs. bulk as a predominant packaging practice needs to be introduced to a greater extent.

ABDS PROVIDERS

Few ABDS providers. The 34 state-supported extension stations, as well as universities, NGOs, and private companies, are not providing support systematically. This issue must be addressed through the project support.

SALES AND MARKETING

Absence of crucial connections among producers. While a number of cooperatives and associations have been registered in the past few years, they are not operational and do not apply basic principles of cooperative bylaws. There is a mandatory umbrella organization on the national level—the Cooperative Union—but since it does not serve the interests of member organizations, overall no progress has resulted from farmers' attempts to benefit from joint activities. The current outdated cooperative law, the long procedure (for political reasons) required to adopt a new law, and unsatisfactory support to producers' organizations are all challenges to be addressed in attempting to create a representative body that would serve farmers' interests.

Poor vertical linkages of farmers with other value chain actors (processors, supermarkets, exporters, and input suppliers). New demands made by the market have been a huge challenge to all value chain participants. Over the past 20 years, attempts have been made to follow trends and fulfill market and production demands on all levels. Unfortunately, previous linkages have ceased to exist and need to be renewed.

Poor marketing and branding strategies. After many years of sanctions, our producers and processors have lost their markets, and they have not been able to modernize their production. Now they need to compensate for 15–20 lost years and invest in new technologies and equipment to meet new standards and expectations. The subsector has had to deal with many other priorities as well, so marketing and promotion have usually been left aside.

6. VISION FOR GROWTH

The following table lists the main growth opportunities that can be derived from the previous analysis. For each of the key constraints identified, we propose a set of actions to be implemented under the project.

Proposed actions are as follows:

- Develop demonstration plots and conduct trainings on advanced technologies in vegetable production and post-harvest handling.
- Develop training programs for new (cold) storing technologies
- Develop programs for creation of a network of agribusiness service providers.
- Conduct workshops on packaging and labeling standards to meet higher standards and achieve value-added prices.
- Facilitate provision of loans and new investments to the producers' organizations in cooperation with the financial institutions.
- Facilitate linkages between the producers' organization and buyers.
- Organize study tours and sales trainings.

TABLE 17. GROWTH OPPORTUNITIES, CONSTRAINTS, INTERVENTIONS, AND EXPECTED RESULTS

A. Major Growth Opportunities	B. Key Constraints	C. Specific Actions / Interventions	Expected results
<p>1. Emerging hypermarket chains</p> <p>2. Increasing demand locally and in EU for fresh vegetables and healthy food</p> <p>3. Privatization of agricultural enterprises</p> <p>4. Import substitution</p> <p>5. Preferential trade agreements with Russia</p> <p>6. Serbia as a member of CEFTA trade zone</p>	<p>Inadequacy of product variety and extension of growing and selling season</p>	<p>Develop demonstration fields for the analysis of new vegetable varieties and seeds in Serbian climate and introduction of advanced production techniques; early varieties to extend the harvest period, suitable for fresh consumption on demanding markets. Training of trainers, including ABDS providers, representatives of producers' organizations (POs), and processors' extension workers.</p>	<p>Long-term (3–5 year) impacts</p>
		<p>Improve vegetable production by introducing new and modern varieties based on market criteria in Western Europe, combined with the criteria of local supermarkets. STTA and training of trainers, including ABDS providers, PO representatives, and processors' extension workers.</p>	<p>Medium-term (1–2 year) impacts</p>
		<p>Work with Ministry of Agriculture and ABDS providers to encourage growers to use certified seed material through dissemination of information on cost/benefit impact and on preferable varieties (by market, price, and available suppliers) via specialized newsletters, bulletins, and brochures.</p>	<p>Long-term (3–5 year) impacts</p>
		<p>Conduct greenhouse management training. Analysis and presentation of what is needed for setting up commercial greenhouse production, including financial structures. Training of trainers, including ABDS providers, PO representatives.</p>	
		<p>Demonstrate modern greenhouse production. Introduce advanced crop management techniques through STTA and training of ABDS providers, POs' representatives, and post-harvest handlers. Support the set-up of demonstration greenhouses.</p>	
		<p>(STTA) Conduct training in new technologies in vegetable storage. Give instruction in optimal storage conditions to reduce losses and improve product quality. STTA will be provided to ABDS providers, PO representatives, and processors' and consolidators' extension workers.</p>	<p>Short-term (1 year) impacts</p>
		<p>(STTA) Conduct cold chain improvement training to remove the gaps in the cold chain at all points, including immediate post-production cooling, transport, and storage. Participants: ABDS providers, PO representatives, and processors' extension workers.</p>	<p>Medium-term (1–2 year) impacts</p>
		<p>Support domestic production of storable and dried vegetables as the most competitive vegetable products. Assist processors in developing better supplies of vegetables for drying and establishing vertical linkages with farmers through the value chain. Conduct workshops on growing techniques, harvesting, and post-harvest handling (PHH) of vegetables intended for consumption fresh and for drying. Participants: processors' extension workers, public extension stations, farmers' advisory services. Explore possibility of establishing drying facilities within advanced POs.</p>	<p>Medium-term (1–2 year) impacts</p>

A. Major Growth Opportunities	B. Key Constraints	C. Specific Actions / Interventions	Expected results
	Poor quality control	<p>Assist in implementation of quality standards. 1) Assist producers with the faster, more comprehensive implementation of GlobalGAP farm standards, accepted by the leading retail groups worldwide. 2) Assist producers with training, consulting services, and certification in HACCP standards for storage facilities, PHH facilities, and vegetable processing plants. 3) Develop a network of trained ABDS providers to train processing/export companies and enforce application of standard operating procedures (GlobalGAP, HACCP, ISO, etc.).</p>	Medium-term (1–2 year) impacts
		<p>Develop a network of ABDS providers to train processing/export companies and enforce application of standard operating procedures (GlobalGAP, HACCP, ISO, etc.).</p>	
		<p>Work closely with institutions to help existing regional and national laboratories improve provision of services to vegetable producers, such as soil and water analysis, leaf mass quality, product grading, and testing for pesticide residues. This will require the following project interventions: assist laboratories in getting accredited under the ISO/International Electrotechnical Commission 17025 standard; network laboratories with producers' organizations; and involve growers into integrated production system for vegetables to move forwards product traceability. If there is a need, the project will financially support provision of necessary lab equipment and establishment of new laboratories as PO extension services.</p>	Medium-term (1–2 year) impacts
		<p>(TA) Conduct training in improved PHH techniques (grading, sorting, and packing). Analysis and presentation of what is needed for grading, packing and storing fresh vegetables for faster adoption of international standards for fresh vegetable exports and sales to supermarkets. This intervention should also improve a market information system that ties price to grades and reaches farmers. Participants: relevant staff of ABDS providers (public extension stations, advisory services workers, agricultural development centers), PO representatives, farming enterprises. In specific cases, the project could fund part of the costs for procurement of PHH machines.</p>	Short-term (1 year) impacts
	Low productivity	<p>(TA) Build capacity of ABDS providers in advanced technologies in vegetable production. The relevant staff of ABDS providers (POs, public extension stations, advisory services, agricultural development centers, private input suppliers, and vegetable-processing companies) will be trained to advise and assist farmers in field and fertilizer planning, pesticide planning, irrigation issues, hail and frost protection, optimum harvest time (assessing the maturity of vegetables), vegetable picking, and advanced agricultural machinery. There is a possibility that in specific cases, the project will support procurement of agricultural machinery, irrigation, and protection systems.</p>	Medium-term (1–2 year) impacts
		<p>Develop loan programs to support POs and trade/export-processing companies, working with recognized financial institutions such as MAFWM, the Vojvodina Development Fund, and commercial lenders (ProCredit, Hypo Alpe Adria, etc.).</p>	Medium-term (1–2 year) impacts
		<p>Link the project with existing donor-funded initiatives and local institutions (such as SIEPA, VIP, and MAFWM) to address growth potential in the vegetable subsector.</p>	Medium-term (1–2 year) impacts

A. Major Growth Opportunities	B. Key Constraints	C. Specific Actions / Interventions	Expected results
		Build POs' capacity in farm management skills through training in production cost monitoring and management, PHH, and storage.	Short-term (1 year) impacts
		(TA) Training for improved post-harvest handling (PHH) techniques (grading, sorting, and packing). Cross-cutting issue addressing various constraints (poor quality control, low productivity, value-added packaging)	Short-term (1 year) impacts
		(STTA) Training in new technologies in vegetables storage (cross-cutting issue with Constraint a.)	Short-term (1 year) impacts
		(STTA) Cold Chain Improvement Training (cross-cutting issue with Constraint a.)	Short-term (1 year) impacts
		Technical support to PO's in set-up of regional consolidation hub centers (cross-cutting issue with Constraint a. and b.)	Medium-term (1–2 year) impacts
	Access to improved ABD services	Develop a network of ABDS providers to train farmers / organizations on farm management, using from farm to fork approach.	Medium Term (1–2 year) Impact
	Value added packaging	Technical assistance in the areas of modern processing/packaging technologies. Supporting introduction of quality retail packaging.	Medium-term (1–2 year) impacts
	Sales and marketing	Develop farmers' umbrella organization and train members of the board (coop managers) in governance and marketing. This is a cross-cutting issue and refers also to low productivity.	Medium-term (1–2 year)
		Develop export consortium consisted of trade and processing companies and provide logistics in export promotion and marketing	Medium-term (1–2 year)
		Develop market linkages between farmers organizations, trade/processing companies and hypermarket chains	Medium-term (1–2 year)
		Improving producers marketing communication: visual communication—packaging, promotion materials, personal communications with the distributors, processors, exporters, foreign importers. Participants: PO's, marketing service providers.	Short-term (1 year) impacts
		Research and sales development studies concentrated on selected commodities on their production potential and marketability. Targeting markets with high potential, product quality and packaging demand research. This activity is prerequisite for number of proposed activities.	Medium-term (1–2 year)
		Strengthening capacities of producer export associations —promotion activities, targeted trade fairs.	Short-term (1 year) impacts

APPENDIX

FIGURE 3. SERBIA'S POTATO EXPORT MARKET TRADE INFORMATION (IN SERBIAN)

Krompir

Uvoznik (količina, rast, CIF)	Konkurenti (količina, CIF cena)	Srbija (količina, FOB cena)	Komentar
BiH (7.000t, 92% rast, 0,18\$/kg)	<ul style="list-style-type: none"> •Austrija (284t, 0,42\$/kg, -5%) •Egipat (400t, 0,29\$/kg, 315%) •Makedonija (200t, 0,4\$/kg) 	<ul style="list-style-type: none"> •5.500t (u 2006. – 2.200t) •0,12\$/kg 	-Bosna na ne CEFTA 41%
Hrvatska (17.179t, 53% rast, 0,37\$/kg)	<ul style="list-style-type: none"> •Egipat (3.500t, 0,42\$/kg, 99%) •Kipar (2.100t, 0,6\$/kg, 55%) •BiH (3.560t, 0,34\$/kg, 85%) 	<ul style="list-style-type: none"> •4.230t •0,17\$/kg 	-Hrvatska carina za CEFTA 33.7%, 37% Kipar, 54% Egipat
Crna Gora (1.250t, 0,16\$/kg) u 2006. - 550t	<ul style="list-style-type: none"> •BiH (137t, 0,12\$/kg) •Makedonija (8t, 0,13\$/kg) 	<ul style="list-style-type: none"> •1.100t •0,16\$/kg 	-C.G na ne CEFTA 45%
Irak (u 2006. 123.000t, 17% rast, 0,19\$/kg)	<ul style="list-style-type: none"> •Iran (90.000t, 0,2\$/kg FOB, 81%) •Jordan (4.000t, 0,3\$/kg FOB, 164%) •Sirija (13.000t, 0,2\$/kg FOB, 30%) 	<ul style="list-style-type: none"> •220t u 2007. •0,15\$/kg 	-n/a
Rusija (u 2006. 360.000t, 25% rast, 0,25\$/kg)	<ul style="list-style-type: none"> •Holandija (78.000t, 0,22\$/kg, 8%) •Kina (70.000t, 0,24\$/kg, 107%) •Egipat (71.000t, 0,23\$/kg, 204%) 	<ul style="list-style-type: none"> • 78t in 2007. (60t u 2006.) •0,37\$/kg 	-Rusija 11% Kina i Egipat, 15% EU, Srbija 0%

FIGURE 4. SERBIA'S ONION EXPORT MARKET TRADE INFORMATION (IN SERBIAN)

Crni luk

Uvoznik (količina, rast, CIF)	Konkurenti (količina, CIF cena)	Srbija (količina, FOB cena)	Komentar
Slovenija (12.800t, 13% rast, 0,7\$/kg)	<ul style="list-style-type: none"> •Holandija (4.800t, 0,6\$/kg, 5% rast) •Austrija (3.100t, 0,6\$/kg, 15% rast) •Italija (2.400t, 1,1\$/kg, 31% rast) 	<ul style="list-style-type: none"> •890t (in 2006 - 465t) •0,55\$/kg FOB 	EU 0% carina za većinu, Kina 6%, SAD, Argentina 9% 34% na ne CEFTA zemlje
Bosna i Hercegovina (6.200t, 44% rast, 0,4\$/kg)	<ul style="list-style-type: none"> •Holandija (2.400t, 0,66\$/kg, 80%) •Hrvatska (812t, 0,3\$/kg, 128%) •Makedonija (145t, 0,27\$/kg, 90%) 	<ul style="list-style-type: none"> •464t (in 2006 – 326t) •0,22\$/kg FOB 	
Slovačka (18.600t, 20% rast, 0,31\$/kg)	<ul style="list-style-type: none"> •Holandija (1.600t, 2,7\$/kg, -11%) •Češka(1.000t, 0,4\$/kg, 151%) •Nemačka (800t, 0,3\$/kg, 26%) 	<ul style="list-style-type: none"> •417t (in 2006 – 244t) •0,27 \$/kg FOB 	
Velika Britanija (370.000t, 12% rast, 0,67\$/kg)	<ul style="list-style-type: none"> •Holandija (125.000t, 0,63\$/kg, 22%) •Španija (94.000t, 0,6\$/kg, 5%) •Novi Zeland (47.000t, 0,61\$/kg, -2%) 	<ul style="list-style-type: none"> •85 t (in 2006 – 0t) •0,7\$/kg 	
Nemačka (240.000t, 6%, 0,72\$/kg)	<ul style="list-style-type: none"> •Španija (70.000t, 0,58\$/kg, 3%) •Holandija (55.000t, 0,67\$/kg, 5%) •Argentina (20.000t, 0,97\$/kg, 4%) 	<ul style="list-style-type: none"> •45t (in 2006 – 0t) •0,6\$/kg 	

FIGURE 5. SERBIA'S CAULIFLOWER AND BROCCOLI EXPORT MARKET TRADE INFORMATION (IN SERBIAN)

Karfiol i brokoli

Uvoznik (kolicina, rast, CIF)	Konkurenti (kolicina, CIF cena)	Srbija (kolicina, FOB cena)	Sezona
Madarska (5.800t, 58% rast, 0,76\$/kg)	<ul style="list-style-type: none"> •Italija (1.400t, 0,8\$/kg, 33%) •Nemacka (800t, 1\$/kg, 50%, •Poljska (670t, 1\$/kg) 	<ul style="list-style-type: none"> •28t (u 2006. 11t) •0,35 \$/kg (u 2006. 0,7\$/kg) 	- EU: za Srbiju carina 0%, za Kinu EU carina 6%, za SAD 9% -Bosna: za ne CEFTA 14% -Rusija: za Srbiju, Uzbekistan, Ukrajinu 0%, za EU 15%, za ostale 11%,
Rumunija (800t, 76% rast, 0,53\$/kg)	<ul style="list-style-type: none"> •Italija (280t, 0,65\$/kg, 87%) •Nemacka (85t, 0,9\$/kg, 600%) •Francuska (118t, 0,4\$/kg, 40%) 	<ul style="list-style-type: none"> •22t (u 2006. 0t) •0,22 \$/kg 	
Bosna i Hercegovina (350t, 24% rast, 0,8\$/kg)	<ul style="list-style-type: none"> •Italija (308t, 0,8\$/kg, 25%) •Francuska (11t, 0,6\$/t, -35%) •Španija (5t, 1,1\$/kg, 21%) 	<ul style="list-style-type: none"> •0t (u 2006. 9t) 	
Velika Britanija (124.000t, 14% rast, 1,3\$/kg)	<ul style="list-style-type: none"> •Španija (92.000t, 1,3\$/kg, 16%) •Francuska (23.000t, 1,3\$/kg, 17%) •Nemacka (5.000t, 1,4 \$/kg, 26%) 		
Rusija (9.000t, 31% rast, 0,6\$/kg)	<ul style="list-style-type: none"> •Francuska (5.000t, 0,54\$/kg, 30%) •Poljska (1.500t, 0,7\$/kg, 60%) •Kina (1.900t, 0,5\$/kg) 		

LIST OF CONTACTS

EXPERTS CONSULTED IN ASSESSMENT

Experts referred too for information during this assessment phase for Vegetable Subsector Analysis:

- Z.Z. Gospodjinci, Gospodjinci
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- Z.Z. Agrokooperativa, Horgos
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- Institute for field crops and vegetables
- Agriculture Faculty Novi Sad
- Biotrend Donato—vegetable processor
- Aroma-Futog—vegetable processor
- Aretol-Novi Sad—frozen and processed vegetable producer
- Agro-Tejp—agricultural consulting company
- Vojvodina Association of Vegetable Producers
- Agrokombinat Subotica
- Vojvodina Investment Fond
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