



**ARMENIA DRIED FRUIT REPORT  
ASME Market Development Project/USAID**

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*for:*

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# **Armenia Dried Fruit Report**

**George Jeffrey, Ken Swanberg**

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## **1. Introduction: Overview and Purpose**

**1.1. Purpose of the Study.** This study was designed to analyze the potential for expanding the markets for dried fruit from Armenia. Market analysis has been carried out in the U.S., Europe, and the Middle East. Little information was available from other former Soviet Union states during the time of this study, and comments by traders within Armenia suggest that those markets that exist are not fully reliable.

The study observed those fruits that were in the process of being harvested and dried during August and September. Field visits were made to most fruit growing areas of the country, and observation tours were made of several processing facilities. The fruits of principal interest were apricots, figs, peaches, plums, apples, persimmon, tomato, cherries and some berries. Each has its advantages and disadvantages, and these will be pointed out in the report.

The report analyses the costs of production, processing and marketing of some fruit (namely apricots, figs, and tomatoes), the fruits with the greatest potential. Although the report does not analyze other forms of processing, it recognizes that if the industry is to fully recover, other product forms will also have to be developed, such as canning, jarring, freezing and even fresh. The pricing analysis is done only on dried fruit, and several price series are presented from the U.S., Europe and the Middle East.

The report is divided into eight sections. Section 1 presents the purpose of the study and an overview of fruit production in Armenia. Section 2 discusses imports of dried fruit in the U.S., Europe, Middle East and elsewhere, though with more limited information. Section 3 gives a brief commodity review and section 4 details each field visit. Section 5 depicts production and marketing costs and Section 6 describes the possibilities for each product form, in terms of limited scale niche markets and the potential for larger scale volumes. Section 8 gives the consulting team's recommendations, and Section 9 presents the consultants results of market contacts in California with the sample fruits from Armenia.

**1.2. Armenia's Role in Fruit Production.** During the Soviet era, Armenia was designated the fruit capital of the empire. Fruit was processed into preserves, compote, puree, and canned and jarred in massive factories. The volume of output was almost unimaginable. Today's output is a far cry from those heady days when factories ran at full capacity, people were fully employed, and markets were guaranteed. Those who lived and worked on the collective farms and were employed in the State-owned factories long for a return to those days. Their embracement of the free market was short-lived. Almost all of their former markets have evaporated or can not be counted on, and trying to find new, reliable markets in Europe, the U.S. or Middle East has not been easy. Free world markets are volatile, demanding, quality conscious and require huge steady volumes.

Although the number of fruit trees that produced the abundance during the Soviet era still remain in the ground, their production has diminished and their quality has fallen off. And for the fruit that is produced the farmers claim that there are no markets, so why should

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one care for the trees and take care of the harvest. Fruit often rot on the trees or the ground. The question arises, then, as to how can this industry be revitalized and rehabilitated, so that it can play the major role in Armenia's economy that it once performed. The key to solving this dilemma is to find new markets for the fruit that is currently being produced, and to place that fruit in those markets in a form that meets the tastes of the consumers.

**1.3. Setting the Context.** Fruit was processed during the Soviet era in Armenia because of the difficulty of transporting fresh fruit and because consumers had little refrigeration with which to preserve fresh, perishable commodities in the former Soviet Union. However, with the break up of the Soviet Union, the market for Armenian fruit has changed. Although some demand remains for the traditional processed products – canned, compotes, purees, etc. – these markets are low cost and limited in scope due to the continued economic problems in those NIS countries. As a result, it has been perceived that a new product is needed, one that can still be relatively non-perishable, but for which a niche market or up-scale market can be reached. It is believed that this product form is the dried fruit – apricots, figs, tomatoes, peaches, plums, pears, apples, cherries and some berries. Grapes (raisins) and prunes are included in the market analyses but the potential for production in Armenia is limited at this time, and demand is generally served by other large producing countries, most notably the U.S. Not all of these products command large markets and demand for some are minimal. The report will show the differences amongst these fruits in dried form.

In dried form the fruit is of less volume than in fresh form, ranging from 4 to 1 (figs) all the way up to 20 to 1 (tomatoes). This allows for easier shipment in dry containers rather than refrigerated containers, and by truck, rail and ship rather than by air. Not all of the product produced can be processed as dried fruit. Selection must be made as it is for all high quality products. This leaves some product behind – what is known as waste – which is then processed into spirits or paste, as is normal for any processing activity.

**1.4. Current Situation.** Production of fruit in Armenia stretches from one end of the country to the other. In the far southern reaches of the country, on the border with Iran, one finds the concentrations of fig production, in Meghri. Berries are also plentiful in this region and persimmon is found there as well. The apricots, peaches, plums and pears are found though out the Ararat Valley, and plums, pears, peaches and apples are also grown more to the North. Peaches are well known in the Noyemberian valley near the border with Georgia.

## 2. Global Markets: Locations, Volumes and Prices for Dried Fruit Markets

### 2.1. The U.S. Market

**2.1.1. Overview.** The U.S. market for dried fruits is expanding. Nine products were analyzed over a period of 29 years, from 1970 until 1998 (the last year for which data was available). However, not all of these products experienced growth. Apricots and raisins showed significant growth during this period, but the growth rate of demand for raisins fell off in the last ten years. On a per capita basis, consumption of apples increased 1.41% annually, apricots 3.92% annually and raisin consumption rose 1.50% per year. In terms of total fruit consumed in the United States, i.e. taking into consideration total population growth along with per capita consumption, consumption of apples increased 2.34% per year, apricot consumption grew by 4.85% per year and raisins 2.39% per year. Although prune consumption was positive its rate of growth was not statistically significant. Table 2.1.1. presents the total disappearance and per capita consumption for each dried fruit included in the analysis, and also gives the annual rate of increase of that consumption and whether that increase is statistically significant or not.

Table 2.1.1. Consumption of Dried Fruit in the U.S., 1970-1998

Dried Fruit	Total Disappearance (Short Tons)	Rate of Annual Change	Consumption Per capita (pounds)	Rate of Annual Change
Apples	19,630	+2.34% *	0.14	+1.41%
Apricots	16,450	+4.85% *	0.12	+3.92% *
Dates	24,300	-1.32%	0.18	-2.25% *
Figs	17,850	+0.57%	0.13	-0.44%
Peaches	2,675	+0.77%	0.02	-0.17%
Pears	1,100	+1.42%	0.01	-0.73%
Prunes	76,070	+1.32%	0.56	+0.30%
Raisins	225,440	+2.39% *	1.66	+1.50% *
Totals	383,515	+1.81% *	2.82	+0.87% *

\* signifies that the rate of change is statistically significant, at least above 80% confidence limit.

Source: USDA/Economic Resource Service

From Table 2.1.1. it can be seen that raisins account for almost 60% of the total dried fruit consumed and consumption per capita is increasing. Although prunes rank second in terms of the total amount consumed in the U.S., the rate of change in consumption is not statistically significant. The next group of fruits show total consumption ranging from 25,000 tons to 15,000 tons, starting with dates at .18 lbs/pc, followed by apples at .14 lbs/pc, and figs at .13 lbs/pc and ending with apricots at .12 lbs/pc. In this group, date consumption is declining by 2.25% per year on a per capita basis and highly significant while fig consumption is also apparently declining but not significantly. On the other hand, both apple and apricot consumption is increasing and both significantly on a total consumption basis. Total tonnage of dried peaches and pears are rather insignificant and

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this is also reflected in their per capita consumption rates, both being in decline though insignificantly so.

Consumption of many of these fruits in the U.S. is in forms other than dried. All of these fruits are consumed fresh, canned, frozen and in some cases as juice, in addition to dried. Canned fruit is popular for apples, peaches and pears but their per capita consumption rates are falling. Apples and tomatoes are most popular in fresh form and their consumption is increasing. Cherries and other berries are often consumed frozen with little distinction as to whether consumption is increasing or decreasing. Although demand for fruit in general is falling rapidly, and the demand for frozen fruit is increasing though not nearly enough to replace what has been lost from per capita consumption of canned or other forms of fruit. Table 2.1.2. gives some basic figures for fresh, canned, juices and frozen fruits in the U.S. Table 2.1.3. shows the case for frozen fruit berries, and depicted in Chart 2.1.

Table 2.1.2. Per Capita Consumption of Fruit in the U.S. (Pounds)

<b>Fruit</b>	<b>Year</b>	<b>Fresh</b>	<b>Canned</b>	<b>Frozen</b>	<b>Dried</b>
Apples	1970	16.3	5.64	0.80	0.11
	1998	18.4	4.50	0.80	0.14
Apricots	1970	0.10	1.12	0.10	0.06
	1998	0.10	0.30	0.90	0.12
Cherries	1970	0.50	0.50	0.68	0.00*
	1998	0.50	0.35	0.87	0.01*
Dates	1970				0.26
	1998				0.18
Figs	1970				0.22
	1998				0.13
Peaches	1970	5.50	6.69	0.35	0.02
	1998	4.60	3.53	0.53	0.02
Pears	1970	1.80	3.27		0.01
	1998	3.20	3.24		0.01
Prunes	1970	1.40	0.45	0.05	0.69
	1998	1.10	0.13	0.00	0.56
Raisins	1970				1.25
	1998				1.66
Tomatoes	1990	16.80	69.40		0.00
	1998	17.40	75.60		0.02*

\* Author's estimates.

Source: USDA/Economic Research Service

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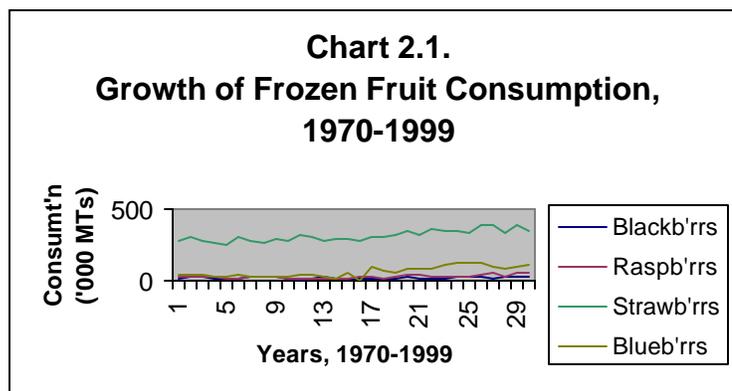


Table 2.1.3. U.S. Per Capita Consumption of Frozen Berries, (Pounds)

Year	Blackberries	Raspberries	Strawberries	Blueberries	Total Berries*
1970	0.10	0.16	1.32	0.21	1.86
1999	0.09	0.18	1.28	0.39	1.96

\* Includes boysenberries, loganberries and other berries.

Source: USDA/Economic Resource Service

**2.1.2. Imports of Dried Fruit.** Most of the dried fruit that are produced in Armenia are imported into the U.S. except for pears, for which we have no information. However, the quantities imported for each differ widely. Table 2.1.4 shows that dried apricots lead the way in imports followed closely by raisins. The difference between the two, though, can be seen by the fact that California produces 341 thousand tons of raisins and only one thousand tons of dried apricots. Clearly the majority of the U.S. dried apricots consumed in the U.S. are from imports. Comparing numbers with Table 2.1.1. indicates that the U.S. almost imports more than is consumed per year. This allows for export of domestic production and possibly some re-export of imported products.

Table 2.1.4. Imports of Dried Fruit ('00) and California Production ('99)

Dried Fruit	Imports, MTs, ('00)	Calif. Prod ('99)
Apples	3,022	
Apricots	16,619	1,160
Dates	4,665	22,200
Figs	4,244	14,200
Peaches	154	1,849
Pears		1,010
Prunes	460	165,000
Raisins	14,287	341,000
Tomatoes	2,651	*

\* Amount unknown but substantial.

Source: USITC, California Department of Food & Agriculture, Resource Directory 2000

Dates, figs, dried apples and dried tomatoes are imported at rates ranging from over four thousand to just under three thousand tons per year. For dates and figs these imports

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supplement local production, and also allow for some U.S. production to be exported. Apples and tomatoes, however, are produced in large supplies in the U.S. yet there is still substantial imports of these products, as well as exports. The amount of imported dried peaches and pears is minimal, and since the U.S. produces large supplies of prunes, imports are also minimal.

Dried fruit enters the U.S. from many countries but some countries dominate the markets for their respective products. Dried apples for U.S. markets come mainly from Chile (50%), Argentina (33%) and China (16%). Our dried fruit consultant was right on target when he said that Turkey dominates the apricot market in the U.S. Turkey ships 97% of the apricots imported to the U.S. Taiwan, Australia, Pakistan and Syria account for the rest. Dates come principally from Pakistan (65%) while China, Iran, Israel, Mexico and Jordan play minor roles. Figs are imported from Spain, Turkey and Greece. The small amounts of imported peaches come from South Africa and similarly, the prunes from Argentina and Taiwan. Chile, Mexico, Argentina and South Africa account for 95% of U.S. raisin imports. Turkey once again dominates the dried tomato imports (50%) and Spain, Mexico, Chile, China, Italy, Morocco divide up the rest of the market. This data clearly indicates that Turkey is the major competition for Armenian dried fruits, especially for apricots, figs and dried tomatoes.

**2.1.3. Import Prices for Dried Fruit.** Dried fruit prices vary significantly over the year in the U.S. The following charts (Charts 2.1.1. to 2.1.8.) show these variations for most of the dried fruit considered in this study. Table 2.1.5. presents the high and low prices and the average over the year for each product.

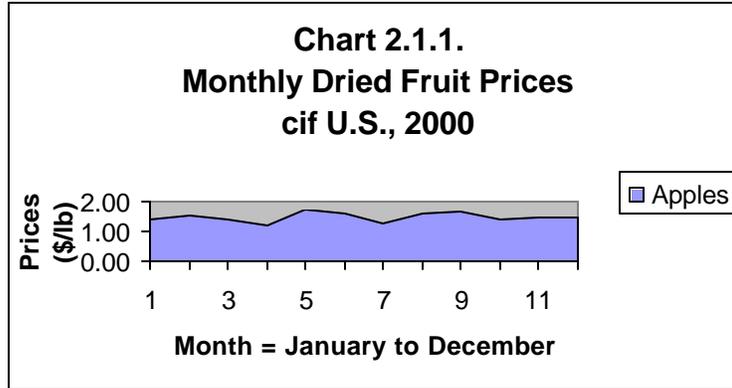
Table 2.1.5. High and Low Import Prices\* for Dried Fruit in U.S.,  
Year 2000  
 (U.S. \$ /lb.)

<b>Dried Fruit</b>	<b>High Price</b>	<b>Low Price</b>	<b>Average Price</b>
Apples	1.22	1.75	1.47
Apricots	.71	1.18	.89
Dates	.37	.61	.46
Figs	.43	1.17	.73
Peaches	.24	1.33	.53
Prunes	.60	1.40	.79
Raisins	.53	.68	.60
Tomatoes	1.45	2.02	1.62

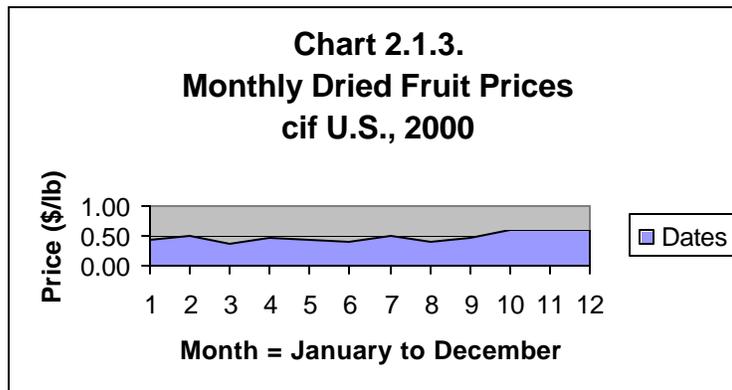
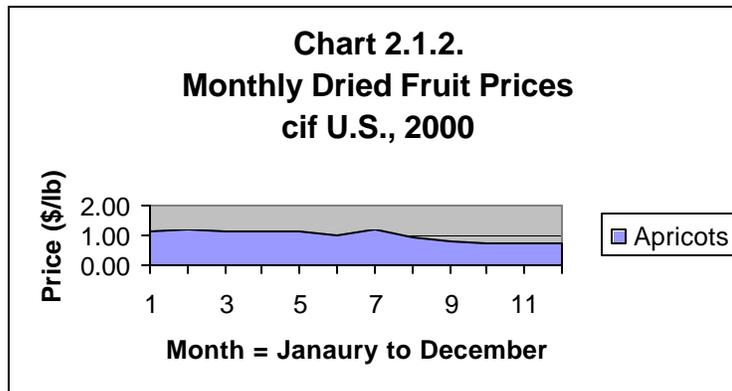
\* cif prices, U.S. ports  
 Source: USITC

Because prices vary extensively over the year, one should take care to try to place one's product in the market when the prices are high. With such a variation of price, this could mean the difference between profits or losses. However, if one's production and marketing costs, including transportation, packaging, shipment costs, and duties and fees

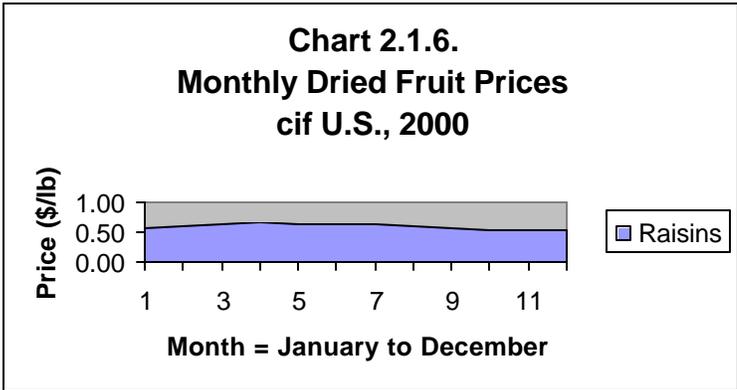
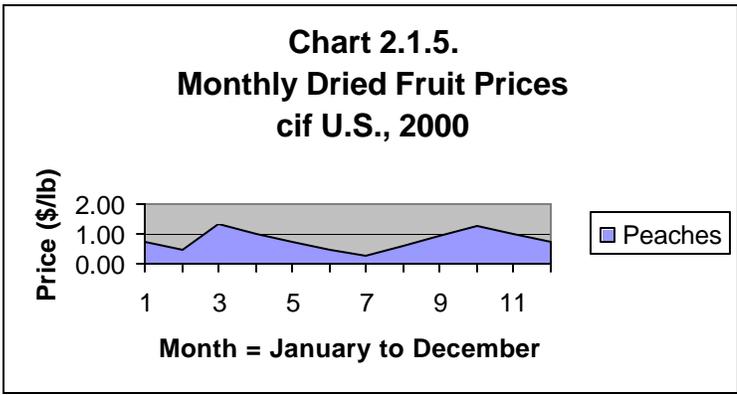
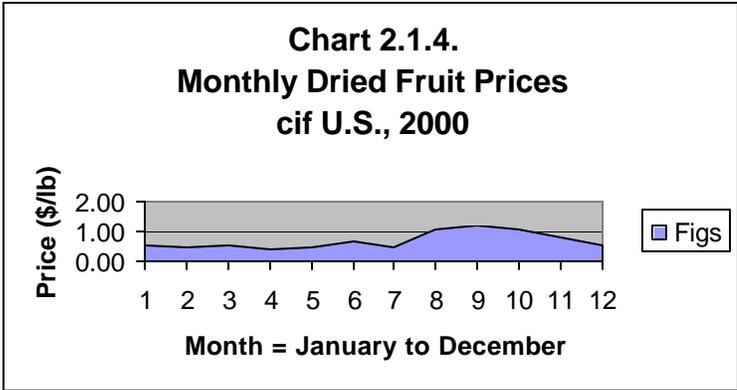
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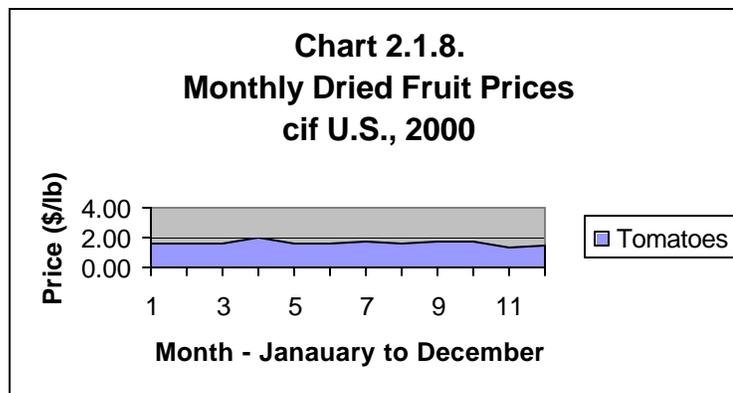
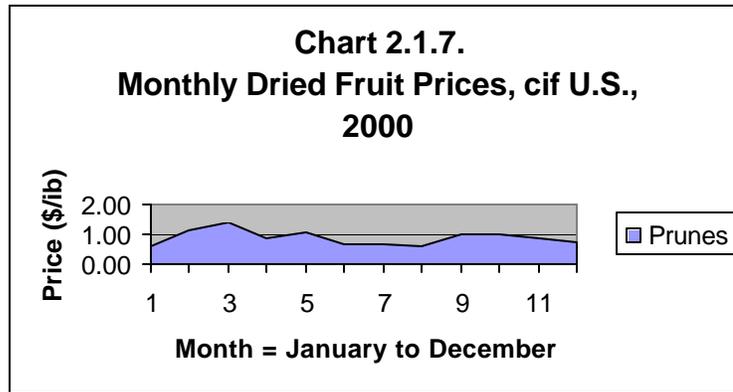
are less than the minimum price, then production and exports can be scheduled for anytime during the year, and profitable earnings will be generated. Care should be taken



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to schedule deliveries at the right time, and one must determine if production can be geared to hit these high points in the price fluctuation schedules.

## 2.2. European Market

**2.2.1. Overview of Dried Fruit Imports.** The European market is more robust than the U.S. market. For virtually every dried fruit considered in this study, imports to the European Union (EU) are significantly higher than to the U.S. However, the sources are relatively the same. Turkey dominates the apricot, fig, raisins and dried tomato markets, with almost monopoly control of apricots and figs. The U.S. plays a major role in the European prune market, a minor role in the dried tomato market and is negligible in the other product markets for dried fruit. Table 2.2.1. presents the total annual imports of dried fruit to the EU for 1999 (latest available figures) and the principal country source of those imports. Although the markets for peaches and pears are wide open in the E.U., that is there are many countries shipping in product, their volumes are still low, though significantly higher than for the U.S.

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Table 2.2.1. Imports of Dried Fruit to the European Union  
Year 1999

Dried Fruit	Imports, MTs, ('00)	Principal Source
Apples	6,668	Chile (26%), Turkey (19%), China (18%)
Apricots	25,545	Turkey (95%)
Dates	50,578	Tunisia (44%) Iran (21%), Algeria (20%) USA (3%)
Figs	33,507	Turkey (98%)
Peaches	1,243	China (67%)
Pears	1,460	China (56%)
Prunes	36,869	USA (77%)
Raisins	242,269	Turkey (64%), USA (18%)
Tomatoes	3,354	Turkey (60%) USA (1%)

Source: EUITC

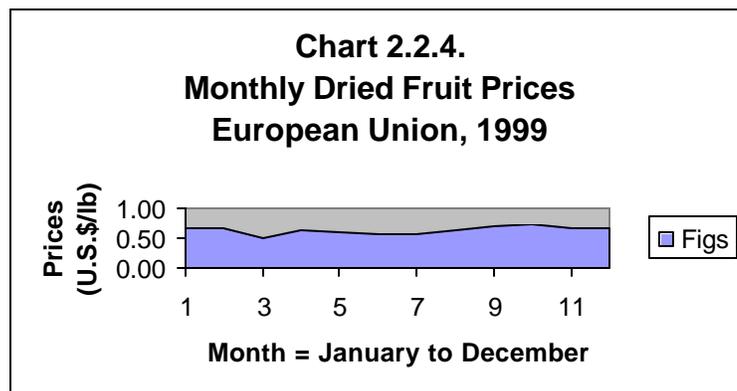
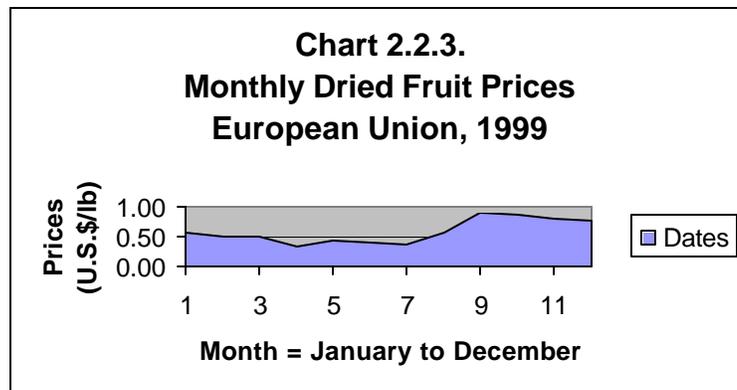
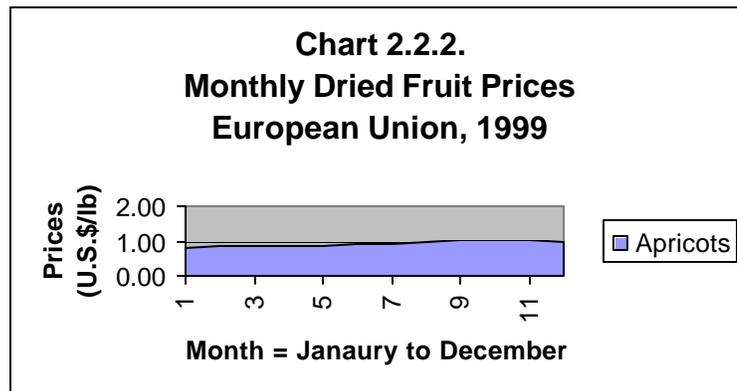
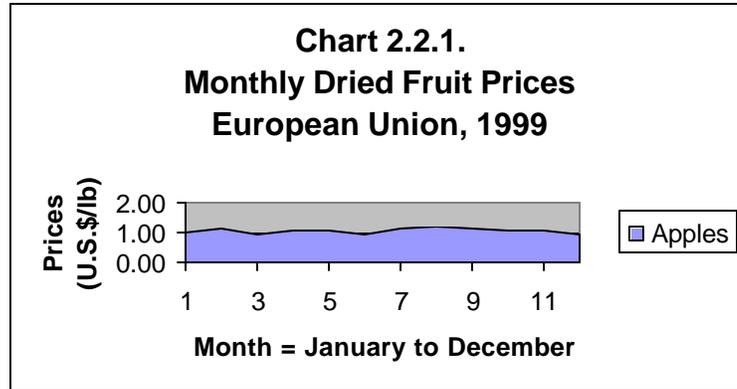
**2.2.2. Import Prices for Dried Fruit.** Prices for dried fruit in the E.U. also vary considerably over the year. It is difficult to make any conclusions as to comparisons with prices in the U.S. Averages for 1999 in Europe were lower than year 2000 prices in the U.S. for apples, figs and raisins, about the same for apricots and prunes, and significantly higher for peaches and dates. Table 2.2.2. gives the high price, the low price and the average price for 1999 imports to the E.U. Charts 2.2.1. to 2.2.8. show the fluctuations during the year. Prices tend to rise near the end of the year, but it is hard to discern a clear trend of any kind for any given fruit or for the industry as a whole. It is not certain that these fluctuations would repeat themselves each year at the same time.

Table 2.2.2. High and Low Import Prices for Dried Fruit in E.U.,  
Year 1999  
(U.S. \$ /lb.)

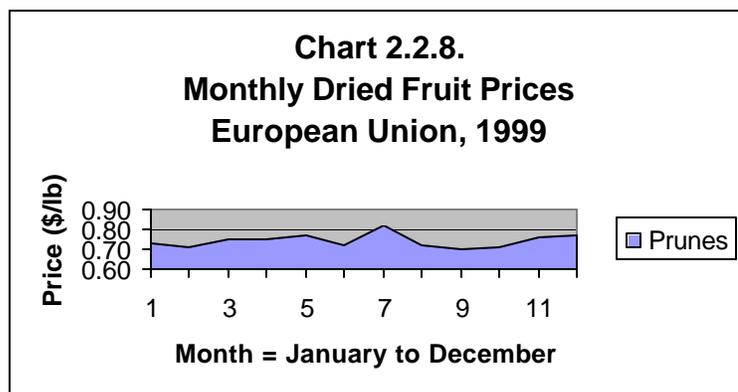
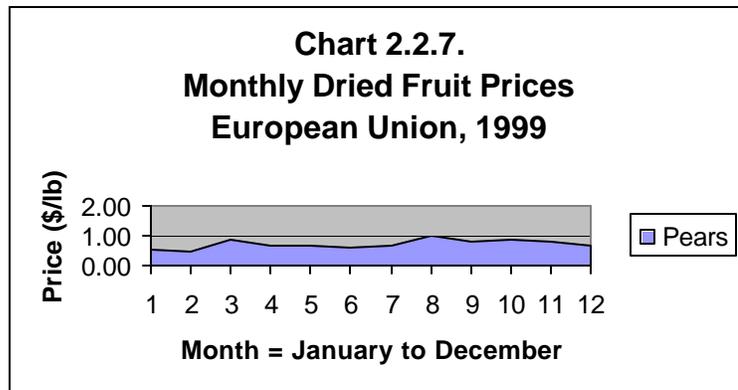
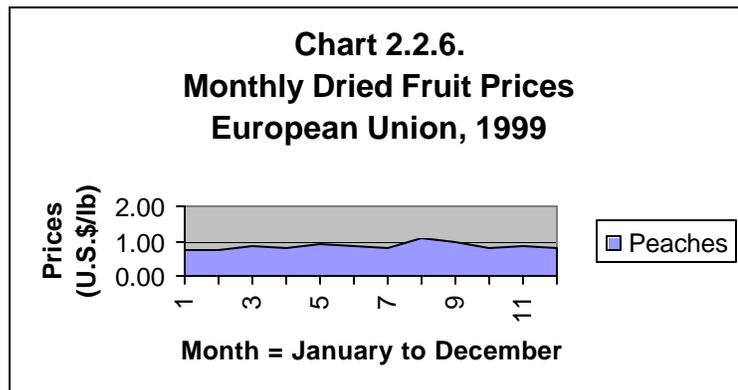
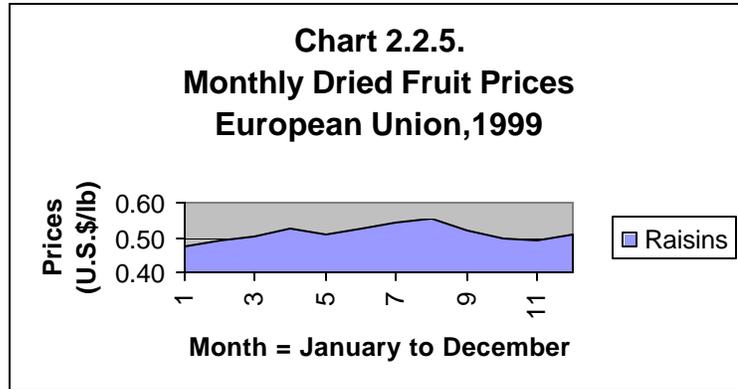
Dried Fruit	Low Price	High Price	Average Price
Apples	.92	1.22	1.05
Apricots	.81	1.03	.93
Dates	.34	.89	.70
Figs	.49	.74	.67
Peaches	.72	1.08	.83
Prunes	.70	.82	.74
Raisins	.47	.55	.51
Tomatoes	.47	2.38	*

\* Not possible to calculate  
Source: EUITC

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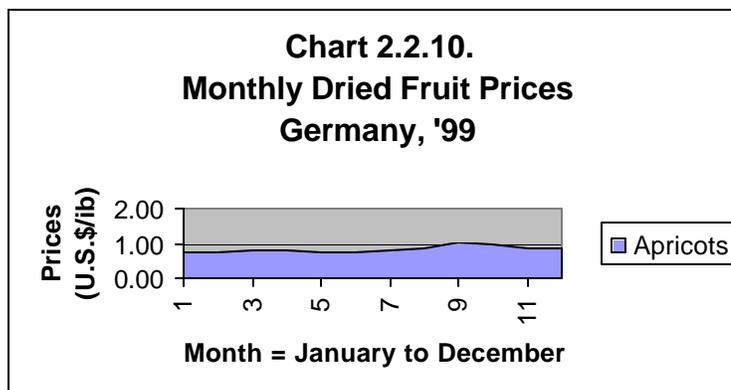
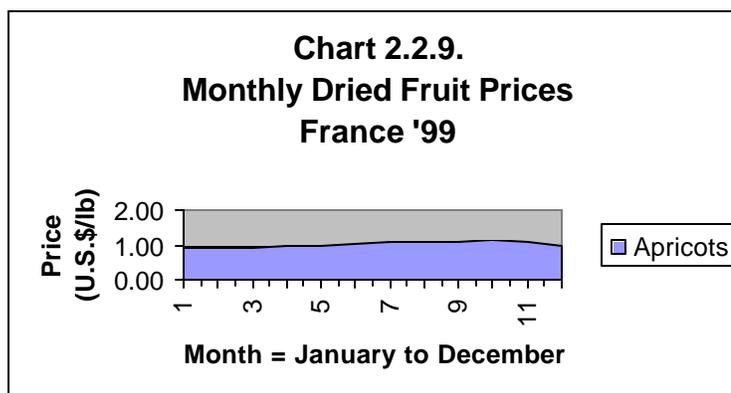
### 2.2.3. Volumes and Prices for Dried Fruit In Four European Markets.

**Apricots.** Germany imports the most dried apricots of the four countries, with total imports of over 6,000 metric tons in 1999. Prices ranged from 72 cents/lb. to \$1.01/lb., with an average of 83 cents/lb., compared to \$1.05/lb. for the European average. France was next at 5,671 metric tons imported, and prices were higher. Prices were from 92 to 110 cents/lb, averaging 102 cents/lb. Holland imported 2,543 metric tons with prices of 87 cents to 108 cents/lb, averaging 87 cents. Italy imported the least amount, at 1,100 metric tons with prices averaging 96 cents/lb.

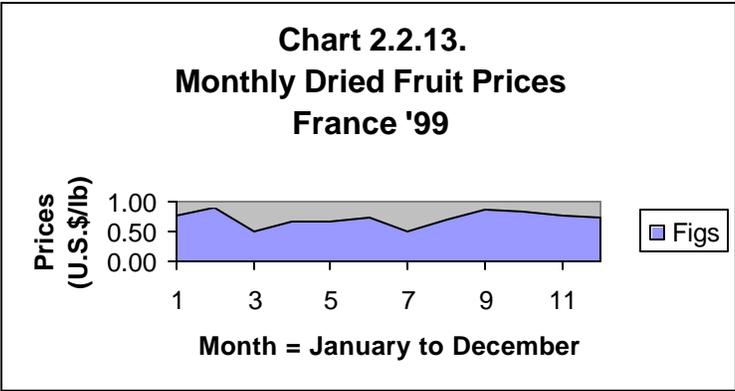
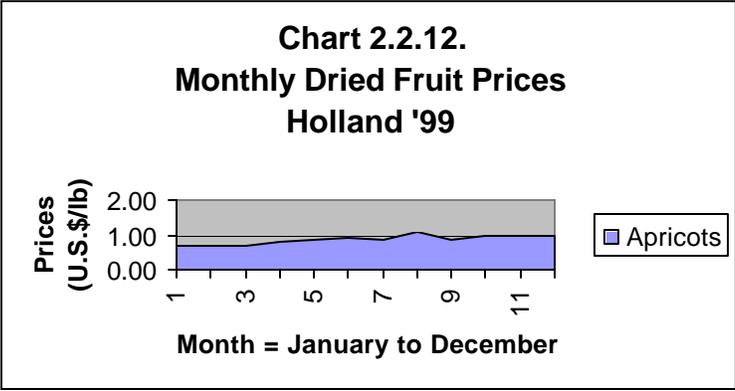
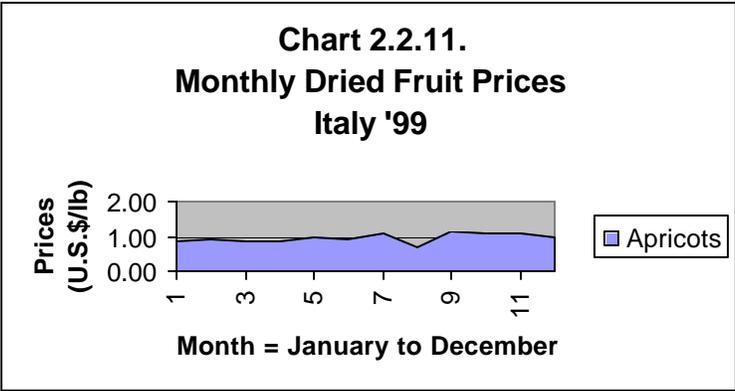
**Figs.** As was pointed out in Table 2.2.1., more figs are imported into Europe than apricots. Germany imports 9,375 metric tons, with an average price of 61 cents/lb. France follows next at 6,905 metric tons and a price of 67 cents/lb. Italy imports 5,756 metric tons and Holland 2,025 metric tons with 63 and 71 cents/lb average price. Prices vary the most in Holland, ranging from 41 cents to 110 cents/lb.

**Peaches.** A small amount of peaches are imported by these countries, with the most imported by Germany, 754 metric tons. France imports 18 metric tons with a higher price of 101 cents/lb. average compared to Germany's price of 83 cents/lb.

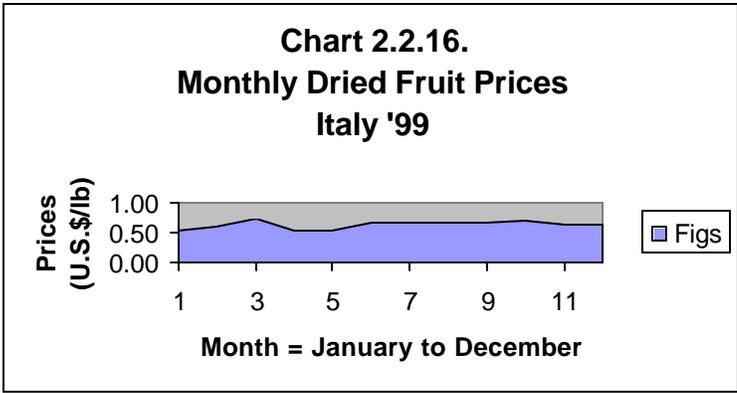
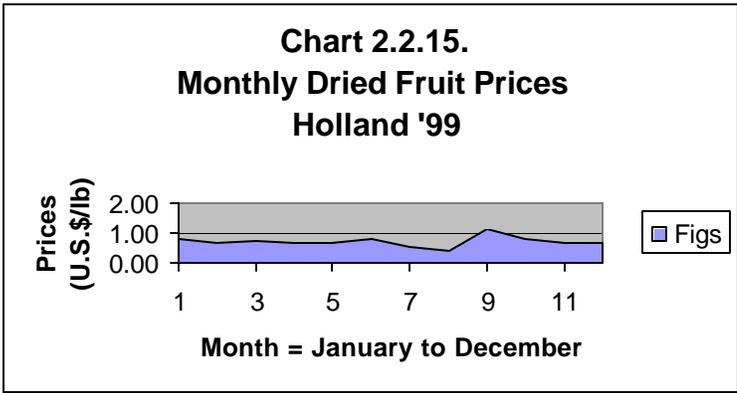
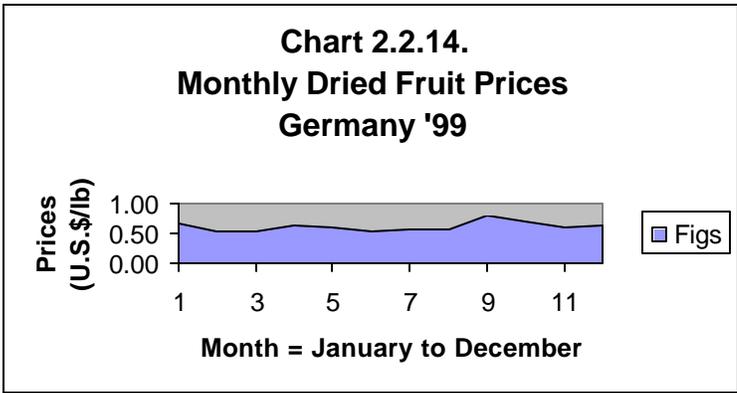
Charts 2.2.9. to 2.2.20 show monthly prices for these products and countries.



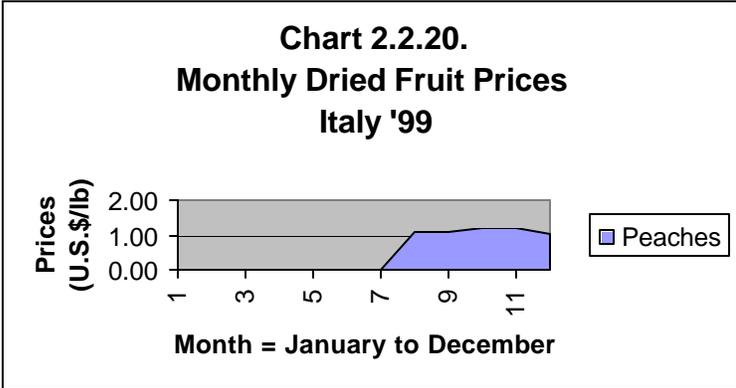
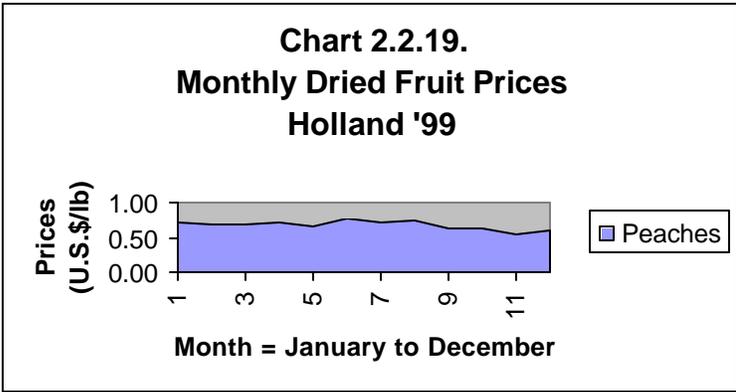
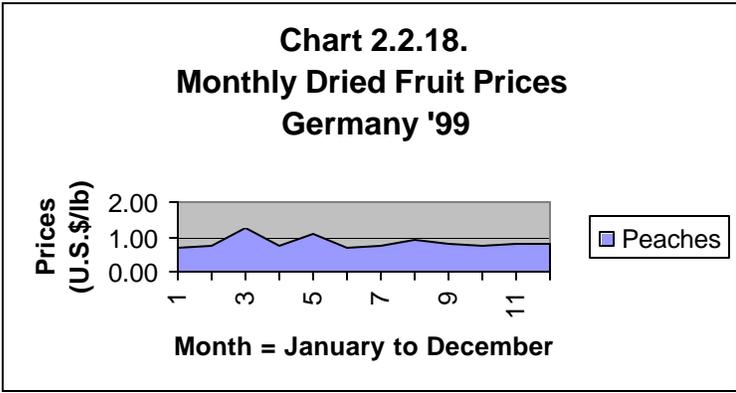
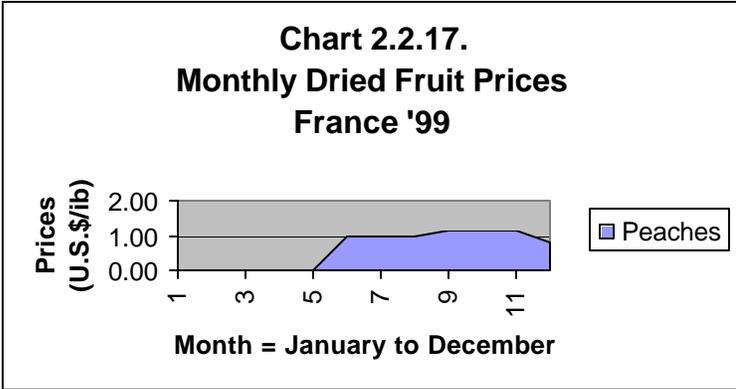
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### **2.3. Middle East Markets, Russia and Former Soviet Union, and Far East.**

**2.3.1. Market Volumes.** The nearby markets in the Middle East are limited and generally low priced. However, they may also absorb relatively lower quality fruit although this is not for certain and little evidence exists to support this contention. The quantities purchased are 850 metric tons of figs for Saudi Arabia (average over last four years, '96 - '99) and 108 metric tons for Kuwait (1999). Kuwait also imports 841 metric tons of raisins (1999) and 1,250 metric tons of dates (1999). For Kuwait there are 202 metric tons of dried fruit including apricots, prunes and peaches (in 1999). Data for dried tomatoes was unavailable. Saudi imports of apricots was 360 metric tons (average over the last four years, '96-'99).

**2.3.2. Market Prices.** The only prices available are for Saudi apricots and figs, which average 43 cents/lb for apricots and 40 cents/lb. for figs, compared to European prices of 93 cents/lb for apricots and 67 cents/lb. for figs.

**2.3.3. Russia.** Information available is limited. No price series or value-volume data was found. Informed sources indicated that a market exists but that prices are lower than European, but for lower quality fruit. This may or may not be an advantage. It definitely is not a viable market if payments are not received or substantially delayed, which appears to be the norm - more likely the former rather than the latter.

**2.3.4. China and Other Republics of Former Soviet Union.** Data is not readily available for these markets nor did time permit us to search them out. Presumably a market exists in all of these places, but it is not a secure market (in terms of receiving payments on time and in full). Not are prices significantly higher than other markets. The potential volume of these markets is not known though it could be substantial, especially for China.

**2.3.5. The Far East.** Data was not obtained for the Far East markets because it was felt that the transportation costs and business linkages were not adequate to make such markets feasible. However, these markets may offer opportunities for future sales if marketing arrangements could be made.

### 3. Commodity Overview

**3.1.** This section will discuss the quantity produced for each product in Armenia, the relative value of each, its labor generation capacity, relative prices and costs, and earnings margins. Field estimates were made from key informant interviews during the field visits for apricots and figs. Estimates were made for the other products based on the author's knowledge of each.

**3.1.1. Apples.** Our observation tours did not include apple production, however some of the dryers were drying apples. Imports to the E.U. are double imports to the U.S. for dried apples, at over 6,000 tons. What is surprising is the relative price per pound, \$1.05 in Europe and \$1.47 in the U.S. At these prices, Armenia should be very competitive, if they can produce the volume and quality needed by the market. This study was not able to analyze cost of production for apples, and the drying process should be similar to that of the other fruits. This product could become the sleeper.

**3.1.2. Apricots.** Estimates for total production of apricots vary from 50,000 tons two years ago to less than 20,000 tons for 2000. Production obviously varies from year to year according to the weather (availability of water), the age of the trees, new production from maturing seedlings, and cultivation practices. If 10% of the crop is reserved for fresh markets, and the lowest quality goes for vodka, then the amount available for drying, canning, freezing and preserves is only approximately 6,000 to 30,000 tons per year. If the dried fruit industry accounts for 40% of that amount available, then fruit destined for drying would be 2,400 to 12,000 tons. At a ratio of 6:1, dried weight equivalent would be 400 to 2,000 tons. The problem is that the majority of the current apricot trees are the Shala which are not appropriate for drying. The one best suited for drying is Satanee, and accounts for only 20% of the current crop. Much of the new plantings are more heavily weighted towards Satanee variety. Twenty percent of 50,000 tons is 10,000, and at 6:1 it is 1,667 tons of potential production during good production years. Given the demand for apricots in the world markets and Armenia's potential production, it is clear that there is strong economic potential for developing dried apricots.

**3.1.3. Figs.** Production of figs is limited. The estimates by the principal farmers indicate that there are 500 tons produced fresh, with a potential to double that figure. If 10% are sold fresh, and are of poor quality and sold for making into vodka, then the remaining 60% could be divided into top quality of 30% for dried fruit and 30% of medium fruit for canning or preserves. Thirty percent of 500 tons is 150 tons, and for dried figs, the ratio of fresh to dried is 4:1, such that the dried fruit product could only be 37.5 tons. The farmers of Meghri believe they could double this figure in a relatively short time period. This amount of product has no potential for influencing even the smallest markets. This represents less than two containers. However, one should not overlook the potential in fig production all over the Southern regions of the country, where it appears that Cheers has established dryers in local communities. With strong demand for figs, it appears that this product should be promoted and expanding.

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**3.1.4. Peaches.** Substantial production of peaches exists around the country and the Noyemberian peaches are known for their flavor. However, the demand for dried peaches is not as robust as it is for the other products. Nonetheless, peaches could be made into a gourmet product by glazing, or by processing in peach halves, compote, jams and preserves, and especially freezing. The Tamara group has recently begun freezing peaches, and claims to have a strong market in Russia, if they can produce and transport the product to that market with confidence of remuneration.

**3.1.5. Cherries - Sweet & Tart/Sour.** Dried cherries are a gourmet product but demand is minimal. Since Armenia produces so little dried cherry, virtually any country could afford the product that is being shipped today. Few plans have been presented for increasing cherry production.

**3.1.6. Plums.** The dried plums sampled appear to be of good quality but dried plums are not in high demand. It was unclear whether Armenia produces or could convert to the production of prunes. However, the markets for prunes are dominated by the U.S. and other well-established countries, and breaking into the prune market may be difficult because of its price and drying process.

**3.1.7. Blackberry and Raspberry.** Substantial amounts of berries are found growing everywhere, but a dried berry has not found a significant market as of this date. Nonetheless, information from the buyers in California suggest that dried berries could be part of a mixed fruit package.

**3.1.8. Dried Tomato.** Dried tomato probably has the largest potential for this project. Because it is an annual crop and Armenia has the correct variety, proper drying and processing could open up large markets for this product. However, some harvesting, handling and processing practices need improvements. And dried tomato consumption seems to be improving in several countries. It also has a good yield per acre, and the choice to grow tomatoes will depend on what other conditions there might be as incentives.

#### **4. In-country Field Visits to Farmers, Associations and Enterprises:**

**4.1. Syunik Marz -** Our host in the area was GTZ, who manage a Food Security Program in the region. Information was gathered from GTZ. Their activities are concentrated in infrastructure reform, health prevention activities and some income generating activities. There are several agribusiness factories in Kapan, but only one is related to the fruit industry - a small cannery. The others include a rehabilitated, privatized State-run poultry operation, a furniture factory that has closed down, and private milk processing plant, a meat operation, a flour mill and pasta facility, a textile mill and a shoe factory. We only visited the furniture factory, poultry operation and were unable to enter the food processing cannery. We have recently found out that GTZ does provide technical assistance training throughout the region, directed by Berndt Braedt. We also were informed that Shen has some fruit collection activities in Meghri, Vyuvadi, Tzay, and David-Bek.

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**4.2. Meghri** - Our first meeting was with Armen Sargsyan, Deputy Mayor of Meghri, representing the Union of Meghri Communities. We received an overview of the area and its production with a group of farmers and dryers in his offices. Forty percent of the production in the area is figs, 20% peaches and 40% persimmons. We discussed the consolidation model and solicited their interest, which was positive. They estimated that each farmer had from 100 to 150 trees each. Some farmers have both figs and persimmons, and even pomegranate. But the number of large farmers is limited to approximately 10 (that is, farmers with over 200 trees). We had several estimates of total fig production from the area, ranging from 15 tons dried to 500 tons fresh. There was potential for doubling production but this would take a major program of new area plantings and rehabilitation of existing trees (i.e. pruning, fertilizing (organic or inorganic), pest control and handling improvements).

The Meghri gorge is a relatively small area although it is renowned for its fruit production potential. Those we interviewed estimated that current production of figs was 500 tons and persimmons, 1,500 tons of fresh fruit. Pomegranate is also produced in the area, and there is substantial collection of wild berries. Plums are also found in the area but not of a significant commercial level of production.

It was estimated that 10% of the fig production is sold fresh and the remaining 90% is divided between top quality dried for export, low quality dried for local consumption and a waste product used for vodka production. Persimmon on the other hand produced 50% fresh quality product and 50% for drying, with a small part of the latter going to waste. Prices for the top quality selected fresh figs paid to the farmers by those doing the drying was 250 drams per kilogram and for the low quality figs, 150 drams/kg. They said they received the same prices for their persimmons. They said they received the same prices for their persimmons. This reflected the fact that the market for persimmons was not well defined nor reliable. Demand for persimmons is quite limited and almost non-existent on an international scale.

The ratio of dried figs to fresh figs was 1:4. Prices for dried figs were 1,000 drams/kg for top quality and 600 drams/kg for low quality. It was not clear what they received when they delivered the waste figs to the vodka processing, if anything at all. Prices for the dried persimmon were more likely to be near the 600 dram per kilogram level. Grading of the dried persimmon was not shown to us.

Production costs were minimal. None of the farmers interviewed could afford fertilizers. Manure sold for \$40 a ton in the area but all farmers used manure from their own stables and animals. The only labor used was family labor for production, harvesting and drying. (Many extended family members live together to make this feasible.) As a result they produced a very low cost fruit, and for that which was selected as top quality, it could be placed in the market quite competitively. However, the farmers were not able to make these kinds of calculations and determinations, and hence, prices tended to be fixed from year to year, product to product, at some predetermined rate quite unrelated to costs and returns.

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Costs of production compared to market price for dried figs is presented in Appendix A.

## 5. Technical Analysis by Commodity

**5.1. Costs of Production and Marketing.** Understanding of production costs is minimal, and as a result there is very little understanding of how to price the product. We have attempted to estimate the costs for each activity in the production, drying (processing) and marketing (transport and packaging, and exporting) process. Costs are estimated on a per pound (or per kilogram) basis for a hectare (or acre) of production. All costs and prices are presented in U.S. dollars, although field data was collected in local currency values. Costs are then compared with market prices as presented in Section 2, to determine to what extent the Armenian farmers should expand their dried fruit production.

**5.1.1. Fig Production.** Farmers in Meghri reported that their planting density was 5 meters by 5 meters, or 400 trees per hectare. This is quite high, and our consultant suggested we conduct our analyses using this figure and one with 250 trees per hectare. Data was collected by asking key farmers what costs they incurred, what levels of inputs they used and how they handled the product through drying and packaging. Yield levels were estimated per tree. Many inputs were provided from the farm on a no-cash, no-cost basis. This was often true for manure, water, land and family labor. Since the total amount of on-farm labor was low, most of the labor was family labor. Never the less, costs were estimated for each of these inputs and a high level technology was compared to a low level technology. The high level technology used chemical fertilizers and charged for manure and water. More labor was also used in the high level technology case. For the low level technology, manure and water were not charged, and labor use was less. (In most cases the farmers used manure from their own farms when they did not use chemicals.) These costs were derived based on an output per tree of 50 kilograms. Obviously, this level of output could vary by tree depending upon its age, and presumably many trees are no longer in production (old (no longer producing) or young (seedling)).

Most farmers agreed that the output from a plot of figs was distributed as follows, with the corresponding volumes and prices:

Table 5.1.1. Product Distribution, Yield, Prices and Revenues  
Figs in Meghri  
(per hectare in U.S. dollars)

Product/Market	%	Yield (Kgs) 400 trees	Price (dram/kg)	Revenue /ha	Revenue /acre
Fresh Market Sales	10%	2,000	250	\$952	\$381
Top Quality Dried	30%	1,500*	1,000	\$2,857	\$1,143
Med. Quality Dried	30%	1,500*	800	\$2,143	\$857
Low Quality (Waste for Vodka)	30%	1,500*	600	\$1,419	\$571

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- Dried weight equivalent, ratio 4:1 fresh to dried.

Table 5.1.1. presents the information derived for the production with 400 trees per hectare. However, our consultant believes this is too dense and has suggested using 250 trees per hectare. We were able to calculate what the costs and returns would look like using both densities. Table 5.1.2. presents these figures.

Table 5.1.2. Costs and Returns for Fig Production  
(different tree density rates - hectares and acres)

<b>Costs &amp; Returns</b>	<b>400 trees /hectare</b>	<b>100 trees /acre</b>	<b>250 trees /hectare</b>	<b>100 trees /acre</b>
Total Revenues	\$7,381	\$2,952	\$4,881	\$1,952
Production Costs	\$4,306	\$1,722	\$2,691	\$1,076
<b>Net Revenues</b>	<b>\$3,075</b>	<b>\$1,230</b>	<b>\$2,190</b>	<b>\$876</b>
Domestic Transp.	\$91	\$36	\$39	\$16
Export Costs	\$164	\$66	\$103	\$41
Export Costs (Top Qual. Only)	\$82	\$33	\$51	\$21
Labor Costs	\$715	\$286	\$447	\$179
Manure Costs	\$225	\$90	\$141	\$56
Water Costs	\$440	\$176	\$275	\$110

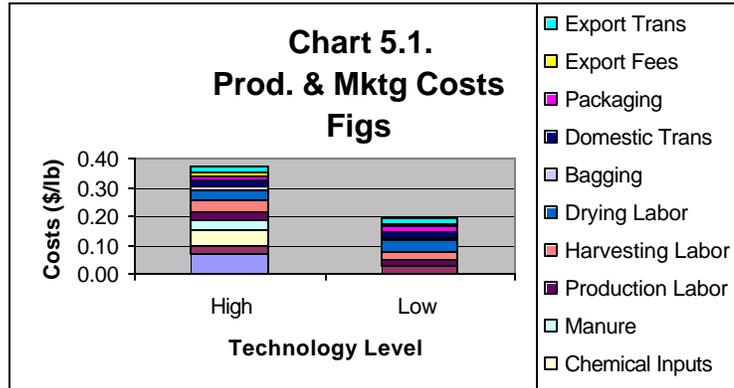
The table shows that net revenues (incomes) are quite high for the farmers producing dried figs, regardless of whether one plants 5m.x 5m. (400 trees per hectare) or 6m.x 6m. (250 trees per hectare). If one adds the income received for labor, manure and water, inputs that would generally be provided by the farmer from own resources, then one would add the last three rows of figures to the net revenue figures. This adds \$1,350 to the farmers income for the high density plantings and \$863 for the low density plantings.

The transportation costs are presented per hectare or acre for that part of the production that is marketed to the capital (Yerevan) - which we assume to be the fresh portion and the top two quality dried fruit portions, and the export costs are applied to the top and medium quality dried fruit or the top quality fruit only, as indicated. The reason why the export costs are so low is because only a small portion of the production is exported in dry form, i.e. one-fourth the fresh weight for each quality group. This adds \$1,350 to the farmers

The costs derived per pound are presented in Chart 5.1. Twenty-one percent of the costs are for labor, which we have already mentioned is usually provided by family members and not charged to the enterprise. The second highest cost is for water (if charged) and then followed by fertilizers. However, once again we found that virtually no one applies

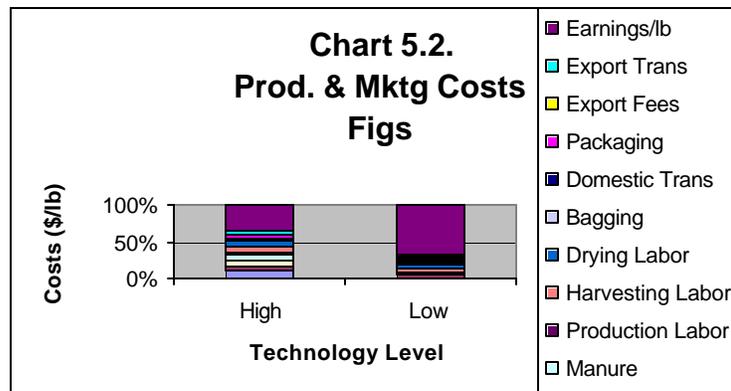
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chemical fertilizers. For this reason, we calculated two technology levels, one applying all the inputs at their price (wage rate), the "high" technology level; and the second where we

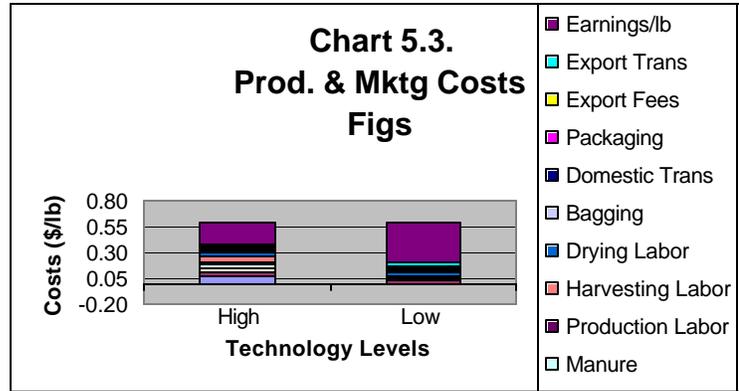


do not charge for water, manure, and fertilizers, and for which we reduce the labor rates to correspond to the lower output rate. This we call the "low" level of technology.

Chart 5.2. includes the derived value of earnings per pound of product, by subtracting the costs from the weighted average price paid for all of the output from the hectare or acre. This turns out to be 21 cents per pound for the high level of technology and 39 cents per pound for the low level, after accounting for domestic transportation, packaging and export costs, which amounts to 8 cents per pound. Table 5.1.2. above only shows costs and returns for the high level of technology. Although returns are higher per pound for the low level of technology, the total returns are less because of the lower production of high quality product. Chart 5.3. presents the costs per item of input or fee including earnings per pound.



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The earnings calculated in this study were derived from a market price of 59 cents per pound, which was the current average price received for the combination of fruit sold fresh (10%) and dried sold locally in the domestic market. This includes export costs and fees, and substantial net earnings. This price compares favorably with the prices reported on earlier in this report. The average fig import price in the U.S. was 73 cents/lb., in the E.U. it was 67 cents. Germany reigned in at 61, France at 67, Italy at 63 and Holland at 71, followed by Saudi Arabia, the lowest market of them all at 40 cents per pound. It appears that Armenian farmers could benefit significantly from increased fig production and by focusing on dried figs.

**5.1.2. Persimmon Production.** The farmers interviewed estimated persimmon yields at 50% higher than fig yields. And fewer inputs are used for persimmons. Also, prices received by the farmers are less than half that of figs. As a result, incomes from persimmon production are much less than for figs. Table 5.1.3. gives the numbers for persimmon production costs and returns.

Table 5.1.3. Costs and Returns for Persimmon Production  
(different tree density rates - hectares and acres)

<b>Costs &amp; Returns</b>	<b>400 trees /hectare</b>	<b>100 trees /acre</b>	<b>250 trees /hectare</b>	<b>100 trees /acre</b>
Total Revenues	\$5,000	\$2,000	\$3,125	\$1,250
Production Costs	\$3,519	\$1,408	\$2,199	\$886
<b>Net Revenues</b>	<b>\$1,481</b>	<b>\$592</b>	<b>\$926</b>	<b>\$370</b>
Family Labor	\$2,664	\$815	\$1,665	\$666

In Table 5.1.3. one can see that returns to persimmon production are considerably lower than for fig production. However, when it is recognized that the extra labor needed for the higher production is provided by family labor, than income increases significantly. The major reason for the lower returns is because the demand for dried persimmon is much

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lower than for any of the other major dried fruit products. The international market is almost non-existent and that is why there are no calculations including export fees and costs. A large increase in persimmon production would more than likely lead to a further erosion in the price.

**5.1.3. Apricot Production. Dried Apricots.** Estimates of the cost of production and marketing for apricots was obtained from the Cheer Company and corroborated against information from several other growers. Per kilogram costs for each input in the production of the fresh fruit were not obtained, but all dryers and buyers were paying roughly equivalent prices for raw fruit. This price varied from 40 drams per kilogram last year to 150-160 drams per kilogram this season. Some specialty buyers were paying 250 drams per kilogram for selected fruits. Transportation and marketing costs have been added to the price for the dried fruit to determine how competitive Armenia would be vis a vis the international markets. These calculations are presented in Chart 5.4.

These cost levels can then be compared to the international prices in surrounding markets, such as Europe and the Middle East. Some product could also be shipped to the U.S. but the transport costs would increase by 4 cents per pound. Clearly, with these costs and the average European price of 93 cents per pound, Armenia will have relatively little problem in being competitive, if the quality of the product were to improve and become standardized and reliable. Since Turkish apricots are currently entering the U.S. market near 40 cents per pound, Armenia will have to be aggressive in marketing their fruit in order to command these higher average prices. Nevertheless, this should be possible because of the taste and color, and the ability of the Armenians to penetrate markets where a large number of diaspora should aid them in this effort.

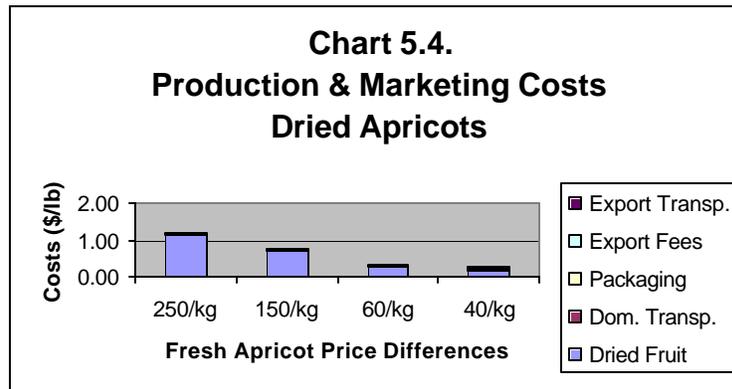


Table 5.1.4. Delivered Costs of Armenian Fruit Compared to Foreign Market Prices

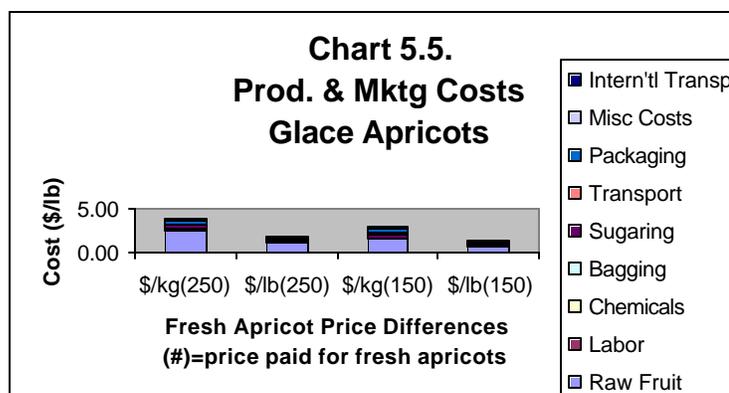
Armenia Fresh Price	c.i.f. from Armenia*	Destination	Import Price	Destination	Import Price
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250 dr/kg	126 cts/lb	U.S.	89 cts/lb	France	102 cts/lb
150 dr/kg	80 cts/lb	E.U.	93 cts/lb	Italy	96 cts/lb
60 dr/kg	39 cts/lb	Turkey	40 cts/lb	Holland	87 cts/lb
40 dr/kg	30 cts/lb			Germany	83 cts/lb

\* Add four cents to U.S.

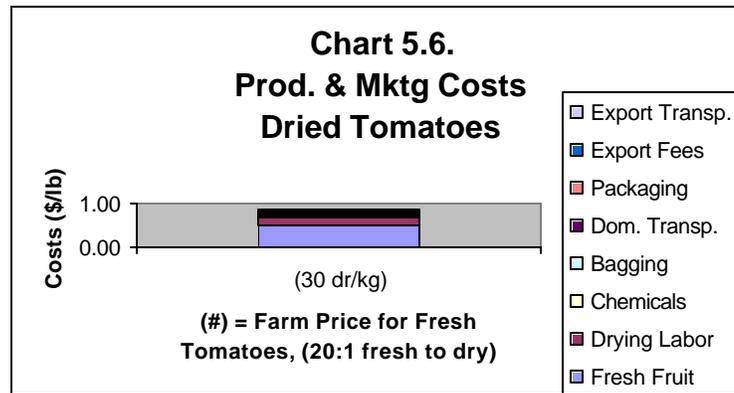
**5.1.4. Sugar-Coated (Glace) Apricots.** The sugar-coated apricots present an interesting position. Although the volume of coating that is feasible at this time is limited to roughly half a ton per year, more volume could be generated if the product were to be competitive in European and U.S. fancy-pack gourmet markets. The costs of glacing have been estimated from the information provided by the scientist who has introduced this product (although other sugar-coated apricots were found in the wholesale market), and added to raw material costs and transport and marketing. The figures are shown in Chart 5.5. It appears that the glace product could be placed in the foreign markets for \$1.35 to \$1.80. Refrigerated container to the U.S. could be 10 cents more per pound. These prices/costs are quite competitive, since U.S. importers of glace fruit are paying \$5.50 per pound for Australian fruit. Information suggest that the price in Europe could be \$8.00 to \$10 per kilogram or \$3.60 per pound. In both markets the sugar-coated, candied product could be



competitive. (See George Jeffrey's report in the last section of the reception of the glace samples taken to the U.S.)

**5.1.5. Dried Tomatoes.** Production costs for tomatoes are low on a per kilogram basis. This amounts to 50 cents per pound for the raw fresh fruit, since the ratio of fresh fruit to dried fruit is 20 to 1. In other words, 20 pounds of fruit must be purchased to produce 1 pound of dried fruit. Labor for drying for tomatoes is higher because it takes more fresh fruit to produce a pound of dried fruit than it does for the other products. Hence, labor for drying for a pound of dried tomatoes is roughly 16 cents per pound. Bagging costs double because it is a voluminous but light product (more bags per pound.) Hence, the cost to deliver the dried tomatoes to the E.U. would be 85 cents per pound. Chart 5.6. shows these figures.

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From our price information we found that dried tomato prices range from \$.47 to \$2.38 per pound in Europe, and from \$1.45 to \$2.02, with an average of \$1.62 per pound in the U.S. Since the production of tomatoes in Armenia is abundant and extremely viable, this product should become one of the leading exports.

**5.2. Replanting, Seedlings and Production Technology.** The Armenian Tree Project is generating good seed stock for replanting of most of the fruit trees in Armenia. Their contention is that most of the current stock is old and needs to be replaced. They have proposed a 10 hectare pilot model farm. They are waiting for financing. However, much of the current production, albeit from older trees, can still meet market requirements and perhaps should consider tree rehabilitation while waiting for the new model project and subsequent seedlings for distribution. Nevertheless, the nursery run by the project is producing significant numbers of seedlings of all fruit types and varieties suited to Armenia, and will be instrumental in assisting the fruit industry in its revival.

Fruit tree reproduction was not observed elsewhere although several groups are attempting to produce seedlings on their own. This activity may require special attention.

Fruit tree rehabilitation and fine-tuning is feasible. Proper tree management in terms of spacing, fertilization, organic or chemical, and pruning during production and afterwards, will go a long way in improving the size of the fruit and its quality. Another cultivation practice that may merit closer attention is the time of harvesting. There is some suspicion from the analysts in the U.S. who looked at the samples that were brought in that the yeast that appeared may be due to late picking. As a result the fruit is overripe at the stem and begins to break down in transit. This will have to be studied and farmers encouraged to pick sooner. However, the exact timing is a delicate matter and must be recommended accurately. This is true for the tree fruit and the tomatoes used for the dried tomato product. A complete technical analysis is required for each fruit in order to prepare a "best practices" set of recommendations for production, pruning, fruit care, handling, drying, bagging and packaging. The consultant is prepared to develop this manual. This information should then be given to all the producer groups for all the products. Although

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all of the products have not been analyzed it is suspected that similar problems will exist with each one, for peaches, apples, pears, plums, the berries, cherries, etc.

**5.3. Solar Panel Investments vs. Sun-Drying** The largest producer of dried fruit in California, Zoria Farms, processes the majority of their fruit under the sun without using solar panels or forced hot air. Perhaps the issue of the technology needs further study. However, if the drying is to be done in the open air the proper pre-treatment is required (i.e. sulfur treatment) to prevent bug infestation during drying, and proper handling and cleanliness will be essential.

With regard to the solar panels, which cost roughly \$7,000 for each unit, it appears that an investment program is warranted. At the present level of output, the total volume that could be placed in the market is limited. More product needs to be developed in order to be able to deliver a consistent quality product over a substantial time frame. This is not possible at the moment. An investment program, based on the analysis of this market, and the current production on the existing trees, merits significant expansion. However, before each unit can be built a complete diagnostic of the production capacity of the trees in the area will be needed. Tomato production can also supplement the tree fruit, but the entire business plan for each unit will have to be developed. Once the plan is developed, any of a number of investment programs can be approached for financing. Given the cohesive marketing plan suggested at the end of this report, and the current capacity to produce quality fruit, along with an extensive program of fruit tree rehabilitation and quality control, the farmer groups and associations should have no problem attracting financing.

## 6. Niche Market Prospects

**6.1. Sugar-coated, Glace Products.** An interesting sugaring process is developed. This product has the taste and flavor that could command a market in the E.U. and U.S. However, his production capacity is limited at present. This product could easily penetrate the market at this time, if production consistency and volume could be improved. Also, the product being sugared must be of highest quality, and harvesting and post-harvest care must be improved to deliver the quality product for sugaring. Sugaring could be done with virtually all of the fruits, especially apricots, pears, plums, peaches and apples. Cherries also would lend themselves to sugaring.

**6.2. Dried Tomatoes.** These products could have a strong market if the quality could be improved. The testing (see George Jeffrey's report in Section 7) has revealed that the yeast content is high and this could be due to late harvesting. However, the coloring and appearance of the fruit is good. This is a product that could command a large market at present, due to the fact that dried tomato consumption is increasing, Armenia produces a relatively high quality product, and the costs of production are reasonable, i.e. there is a good earnings margin.

**6.3. Chocolate Covered Fruit.** The dried fruit that is produced in Armenia could be covered in chocolate. One entrepreneur has imported high quality chocolate from Russia

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and has prepared a range of chocolate covered fruit products. However, his sales are limited. This product could have a market in the gourmet, fancy packs in the export markets, and further attempts to create this business enterprise are warranted.

**6.4. Fancy Pack Grade A Apricots.** The selections observed by the study team did not suggest that a fancy grade A product could be produced. If such selections could be made, such a pack would generate a market.

**6.5. Dried Cherries.** Although the volumes imported in the E.U. and U.S. are minimal, this product could have a substantial market for Armenia's small level of production. The product we tasted appeared to be of good quality.

**6.6. Regular and Organic Dried Fruit.** The dried fruit reviewed in this report are a niche market by themselves in the overall fruit market. This is precisely what one should do to create competitiveness in the fruit industry. Because of the minimalist approach to production, i.e. using little or no chemical inputs due to lack of working capital and minimal cash flow, the idea of organic production is feasible. However, when the fruit was prepared without sulfur treatment the color was not very appealing. Nevertheless, this product may be able to develop a market over time.

**6.7. Frozen Fruit.** The Tamara group is producing diced peaches at their Ashtarak factory. This product has the potential for large volume and good market demand. The data presented in Table 2.1.2. shows that the per capita consumption of frozen apricots, cherries and peaches in the U.S. is increasing, as the consumption of canned products decreases. If Armenia can produce a quality pack of frozen fruits, there would be ample demand in foreign markets. In frozen product form the berries have quite significant potential - blackberry, raspberry, blueberry and strawberry. Developing the frozen fruit product line would create an alternative market outlet for the fruit producers, and allow them to sell a higher percentage of their harvest at remunerable prices.

**6.8. Jams and preserves (berries).** Armenian producers have already demonstrated that they are capable of producing a relatively good jam and preserve product, using several of the fruit items available, especially the berries. Figs, apricots, plums, and the berries have all demonstrated relatively strong demand for the limited quantities available.

**6.9. Canneries for Fruits and Vegetables.** Several State-owned canneries have been privatized. These factories are currently producing fruit products in such forms as canned, in jars, bulk packs in plastic bags, tetra paks, juices, purees, compote, pastes and sports. As a lower priced outlet for the producers with excess volume, this would be a viable alternative market for their production. Currently operating canneries are the Tamara Group's Ashtarak Factory, Sadarapat, the Karmir Lolik plant, the Kapan factory, the Meghri facility, and Artashat. There are several other smaller facilities and perhaps other larger facilities that are either not yet privatized, or are simply not producing a notable pack. However, this was the product of the past which has lost its large volume market with guaranteed payments. It will be difficult to recapture the past. But if the dried fruit market, accompanied by the frozen product takes the top quality production, some

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processing into pastes, preserves, compotes, purees and spirits could possibly complement this group by absorbing the remainder.

**6.10. Almonds and Walnuts - Trail Mixes.** In addition to the fruit, Armenia produces almonds and walnuts, and these could be developed to combine with the dried fruit to produce a trail mix. The potential is there. Nut trees are currently producing and the Armenian Tree Project has seedlings for both crops.

## **7. Recommendations for Industry Rehabilitation and Market Promotion**

The marketing team has divided their recommendations into four stages of development, covering products currently ready for small, high-valued, fancy gourmet export markets to a more broad-based program that would cover the entire range of fruit and vegetables grown or with potential to be grown throughout the country. The first stage addresses the opportunities and constraints with regard to the market for sugar-coated, glacé apricots and peaches and the market for dried tomatoes. The second stage deals with a broader supply base for all fruit that could be dried or frozen. The third stage includes fruits and vegetables for fresh and processed marketing. The fourth stage embraces a promotional and marketing campaign tied into production and processing. Each stage requires different types of technical assistance, planning, marketing and financing.

**7.1. Stage I** Our marketing efforts have discovered that there is ready demand for the specially developed glacé apricots and peaches. ("Ready Demand" is defined as an identified market where volumes are significantly greater than what could be delivered at present and where prices are significantly been calculated for Armenian production and marketing.) As noted above the U.S. vendors are interested in volumes far above what the Armenian's can currently produce. The market is interested in both the sugar-coated apricots and peaches. Other fruit might also meet these market requirements, such as the cherries, pears, plums or apples.

A third product or product group could be added to this first stage of development, which are the berries - blackberries and raspberries. These products are already being processed into jams and preserves for the hotel industry and could possibly be prepared for freezing as well. However, this marketing assignment did not concentrate on the berries for processing, and there was little or no evidence of preparing berries in dried form.

**7.2. Stage II.** The consultants envisioned a second stage of operations that would involve improving the quality of the fruit drying in all cases, for apricots, peaches, pears, plums, cherries, figs, tomatoes and apples. Technical assistance would have to be offered to the producers and handlers of these products around the country, so that the quality requirements needed for the various markets for each product are followed. At the same time that the products are prepared for drying, a percentage of the crop could be prepared for diced freezing. This would only apply to peaches, apples and pears. Freezing could also be developed for the berries. Stage II would require a preliminary extension plan for improving the pruning, fertilizing, pest control, handling, transporting and processing

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activities. Proper packaging, cold storage and refrigerated transport are also important at this stage of development. The firms involved would expand during this stage of development.

**7.3. Stage III.** The third stage of development plan would be for a broader-based extension program that would assist farmers in the production, harvesting, and post-harvest handling of fruits in general, preparing the products for both fresh and processed marketing. Some of the top quality product would be sold fresh for export markets, and another percentage would be sent for local processing - canned, in the jar, pickled, dehydrated, sauces, juices, tetra pak, purees, compotes, preserves, jams, spirits, etc. A whole line of high quality products would be developed. Technical assistance would be provided not only for production and marketing but also for high-tech processing. Existing processing facilities would be renovated and new machinery would be introduced to compliment that part of the existing factories that could be salvaged. (Some of this kind of renovation is already underway.) Keen attention would be paid to making sure that high quality standards are followed at each step in the production to market process.

**7.4. Stage IV.** This approach to the rehabilitation and rebuilding of Armenia's fruit industry has been modeled after the Porter *competitiveness* diamond. The diamond stresses the need for constant, unmitigated and unrelenting improvements in four factors. The first deals with the resources - the raw material. Through constant upgrading, with new technologies and incessant training of farmers, processors, handlers and traders, the product being delivered to the market will always be a step ahead of the competition.

The second factor is related to demand. Porter believes (or should we say that the voluminous data collected by his staff indicates) that competitive industries create their own demand rather than accept current demand. Demand always exists; it depends on whether one can produce at a cost that is below the reigning price. If one can then market share will increase. However, it is possible to influence demand by raising the demand curve. One way to increase demand is to change product form to fit newly identified niche markets. This has been done in this case by identifying "dried fruit" as the new product form. A second measure that could be taken, and which has already been mentioned, is to market to the Armenian diaspora. Yet a third possibility with perhaps significant potential, would be to develop a unique brand identification for Armenia's quality fruit. It is doubtful that this could be done immediately but as the different stages of Development are embraced, there would be a significant volume of fruit being shipped to market that a branding program would be merited. A brand for Armenian-grown fruit may be more advantageous than branding each company. Or perhaps some form of federated cooperative or voluntary chain could be developed whereby each grower or packer could have a sub-logo of a national brand.

The third factor is "clustering", a notion which suggests that successful firms are always backed up by a "cluster" of support institutions and organizations, from suppliers of inputs (tree nurseries, research stations, pesticide advisors), to financiers, to traders and marketers, and many other infrastructure facilitators. These clusters often are brought

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together to discuss constraints and identify opportunities in local focus group meetings, led by all the key stakeholders in a region.

The last factor in the diamond is the need to develop a healthy rivalry amongst producers and processors. Although Armenia has taken bold steps to privatize her industries, in the agri-processing sector further release of restriction are necessary. Brands need to identify firms not regions. Prices must be set by the market and not through collusion amongst the leading players. However, if prices are so depressed as to be below costs, and farmers are not capable of reaching foreign markets, then one could consider a market order, which would prop up local prices (by controlling production), allowing producers to generate returns sufficient enough to allow them to make new investments. However, this does not appear to be the case in Armenia for dried fruit, especially at this stage of development due to the lack of opportunity cost for family labor. If wage rates were to rise sharply in the near future, than this situation could crop up, and a marketing order may be appropriate. (This requires significant understanding of the delicate balance between a free and open market and one that is partially regulated to avoid excessive volatility.)

For the most part, Armenia has addressed these key issues in *competitiveness*, and they are well on their way to creating an internationally competitive dried fruit industry. Following the recommendations in this report could assist them in achieving this goal.

## **8. Report on Marketing Interviews, Contacts and Laboratory Testing by Consultant George Jeffrey.**

**8.1. Meeting with Ron Lautrup, Natural Food Product Co. (NFP).** Ron is the head buyer for NFP. After a briefing on the objectives of the Armenian Dried Fruit initiative, Ron commented that Turkey was the key supplier and that they were very competitive. Could Armenia match them? George explained that this was not a sales meeting but a fact finding mission, to ascertain the level of interest in the buyers for an Armenian product and for them to consider the acceptance of the samples he had in hand. Ron had no interest in the sample products that were showed to him but inquired as to the possible availability of organic products. He was informed that there was a possibility in the future but not at present. As a large volume buyer, Ron was skeptical as to Armenia's ability to meet the standards of shipping consistency, quality and verification of organic. All of his current dried fruit are sourced from Turkey.

**8.2. Cal Polytechnic University.** Only the Professors in the fruit science department were interested in seeing these products. No further market information was obtained.

**8.3. Otis McCallister.** Met with Everett Golden of Otis McCallister, one of the largest import and export brokers in San Francisco. They handle all of Sunsweet sales overseas and have sold Cal Redi\_Date products into Latin America. Their observation of the dried product shown by the samples was mediocre at best. The product they thought was nice was the glace fruits, the main reason being the flavor. They felt it was superior to the Australian product. They currently do not handle glace fruits but they know the product and who handles it within the manufacturing-processing circle. They informed George

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about a company in Australia that manufactures and processes glaze fruit, named Roeburn, and who had offices in Los Angeles.

George later found out from Garry Packing that Roeburn had gone under. Golden wanted pricing on the glaze product which was not available to George. They would like to bring in 400 to 500 cases as a pilot sample for market testing. They were informed that the quantity of product was not available at this time.

**8.4. Culinary Farms.** Culinary Farms is a dried tomato processor and growing operation in Sacramento, California. George met with Don Jordan, head of sales for the operation. They currently handle about three million pounds of dried tomatoes per year. They supply all sorts of sizes as well as diced tomato products. There are five large dry tomato processors in the country and the total product handled is about ten to twelve million pounds per year. Twenty-five to thirty percent is imported. Don currently imports dried tomatoes from Turkey. The price for a twenty-foot container of 23,000 lbs. is \$1.40 to \$1.45 a pound delivered to Oakland, California. At present there is no alliance among the dried tomato companies, and it is always a guessing game as to how many pounds should be produced annually. Don thought the samples were very nice in color, and that they would be very suitable for dicing. He said he would run all the micros on the samples to look for lysteria yeast mold counts.

He asked about the variety but George was unable to tell him which it was. Don informed that slicing tomatoes are not good for drying. Typically a tomato with high juice content is a slicing tomato. Dried tomatoes are usually a variety that is low in acid and high in solids. There are 150 to 200 varieties of tomatoes that are suitable for drying. He definitely thought they came from a suitable variety. Because U.S. tomatoes are machine harvested they are of a thick-skinned variety, which is less suitable for drying.

Don observed that the tomatoes in the sample appeared to be high in yeast because of the spongy texture on some of the pieces. One can detect yeast problems by squeezing the fruit. Yeast starts in the field at the blossom end of the tomato. Don thought that the reason for the high yeast may be because they wait too long before harvesting to the point where the tomato is already starting to break down although it is not visible. Hand selecting fruit is important with tomatoes that are at full maturity and should not be used if there is the slightest evidence of breakdown.

**8.5. Garry Packing.** Garry Packing is the largest packer of dried fruit gift baskets and trays in the country. George met with Jim Garry, with whom Cal Redi-Date has worked with for many years by supplying him with deglet noor dates. He uses mainly California product but imports all of his glaze fruits from Marianni of Australia, a division of Marianni, U.S. Depending on the current price of the dollar, he pointed out that he was bringing into the U.S. a similar product, in size and shape to the Armenian product, at around \$3 per pound delivered. The imported pieces that Garry had did not stick to each other due to a piece of wax paper, compared to the Armenian product which was sticking together. The color on the Australian product was brighter and it was in an excellent package. One good thing Garry had to say was that the flavor was nice.

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**8.6. Zoria Farms.** Zoria Farms is one of the countries leading manufacturers of dried fruit in the country. George was given an extensive tour of the Madera, California facility by quality assurance manager, Dannie Cantos. The operation was simple yet extremely sophisticated. George left samples so that they could examine them more closely. The owner, John Zoria, could not be there and he will get back to George with the results of the testing.

Zoria Farms only deals with California product. They have two types of drying. The first type was straight tray sun drying. All of the sun-dried product was first cut and cored with Italian built machines. After cutting they were placed on trays and passed through sulfur chambers. After the sulfuring was completed, the trays were brought out to large drying yards, which were black top. The tomatoes were carefully placed under the sun for up to five days depending on the temperature. The reason the product does not get infested by birds, rodents or insects is because the sulfur acts as a natural repellent. The second style of drying is for the non-sulfured product that can be organic or for those or for those not wishing to have sulfur. The dryers ran from 145 to 165 degrees Fahrenheit. The length of time in the dryers was dependent on the size of the fruit and their moisture content. Usually the drying takes 4 to 8 hours.

**8.7. Sunsweet.** Sunsweet had no interest in the product at this time.

**8.8. Call Back on Lab Testing.** The results of the testing for yeast on the tomatoes showed that there were very high counts. This is probably due to late harvesting of the fruits. It is clear that a new extension program will have to be developed for the farmer groups who produce the dried tomatoes.