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LEBANON INDUSTRY VALUE CHAIN DEVELOPMENT (LIVCD) PROJECT

POME FRUIT VALUE CHAIN ASSESSMENT REPORT
FEBRUARY 20, 2013

Table of Contents

Table of Figures

Pome Fruit Value Chain Assessment Introduction

The LIVCD Pome Fruit Value Chain Assessment is comprised of an assessment of the apple value chain, Chapter 1, and an assessment of the pear value chain, Chapter 2.

Each of these chapters may be considered as a stand-alone report. There are many parallels between the two, reflecting the similarities between the apple and pear fruit sectors in Lebanon, as well as some differences in areas like production, marketing and business development services.

Some of the similarities arise because many of the actors in the two value chains are the same. Many producers grow both apples and pears; in many cases such a producer will obtain inputs for the two crops from the same sources, and may also sell the harvest to the same buyer. The two products often flow through the same actors to reach the end consumers, such as wholesalers, exporters, and retailers including supermarkets and fresh fruit markets. While there are some specialized actors who deal only with apples, nearly all actors working with pears are diversified into other crops, often including apples. There is also overlap in the opportunities and upgrading strategies for pears and apples. The two crops have common cultivation and post-harvest handling requirements to achieve production efficiencies and quality, and share a need for cold storage infrastructure to take advantage of seasonal marketing windows.

However, as shown in

Figure 1, there are also significant differences between the apple and pear value chains in terms of market opportunities, production requirements, and Business Development Services (BDS) required:

FIGURE 1: KEY DIFFERENCES IN THE APPLE AND PEAR VALUE CHAINS

	Apples	Pears
Export Market Opportunities	- Regional market for apples is competitive - A small domestic processing industry exists	Better export potential: - Regional demand for high quality pears is growing strongly - Regional demand for lower quality pears has surged due to drop in Syrian production and exports - Limited competition from regional exporters
Production Improvement Potential	- Yields are high by international standards - Apple trees have shorter life span; orchards are largely reaching end of productive phase - Sector and geographically dispersed	- Yields are well below international standards - Pear trees have longer life span; orchards are largely still in productive phase - Sector is small and geographically concentrated; lead farmers with good practices and high quality and yields exists
Business Development Services Needs	- Certified, disease-free apple rootstock is available from nurseries - Significant donor investment and NGO involvement in the sector	- A supply of certified, disease-free pear varieties or rootstock is not available, must be developed through field trials and controlled multiplication - No NGO projects currently addressing pears

The two chapters that follow explain in greater detail the findings of the assessments and identify opportunities and upgrading strategies to increase competitiveness and income in the apple and pear value chains.

Apple Value Chain Assessment

1. APPLE VALUE CHAIN OVERVIEW

The apple value chain in Lebanon is relatively fragmented, particularly at the production and marketing levels. Total land planted in apples is approximately 13,500 ha according to 2011 FAO estimates. The average apple farm size is less than one hectare, and many apple farmers are engaged in a variety of income generating activities in addition to apple production. Apple orchards are an attractive component of a diversified livelihood strategy since they require relatively low management and labor costs during the season, compared to field crops.

Lebanese apple production is modestly increasing. Unofficial 2012 estimates are around 264,000 tons. Lebanese farmers are adept at apple production and obtain yields that are high by international standards. There is strong domestic demand for fresh apples, as well as a strong and growing regional demand, with the fastest growing segment in the high quality, higher priced fruit of new varieties. Estimates put Grade 1 apple production at 10 percent- 15 percent of total production, which is mostly consumed domestically and receive higher prices, while traditionally the lower-quality fruit has been exported. However, the Grade 1 Lebanese apples that are exported regionally to the Gulf markets do receive a premium. The largest destination of low quality Lebanese apples is Egypt.

Lebanon does not have sufficient production of Grade 1 apples to meet domestic demand, nor is there sufficient production of Grade 1 apples of the right variety to meet the demand of consumers in export markets. Competitiveness is further constrained by high production costs from inefficient farming and post-harvest practices, such as over application of pesticides, inappropriate transport methods, and below-standard cold storage. As a result, high quality Lebanese apples are more expensive in export markets than competing products from the U.S. and South America. In addition, in the traditional export markets for low quality Lebanese produce, there is demand for high quality product, but Lebanese exporters lack linkages to the high quality buyers, and are further constrained by the poor reputation of Lebanese produce in these markets.

Thus, despite high yields, and the fact that Lebanese farmers receive some of the highest farm-gate prices in the world, $0.33 - $1.00 per kg, typical Lebanese apple farmers are still struggling to generate positive net income. LIVCD can work with value chain actors to create new value and increase competitiveness utilizing the following upgrading strategies:

1) Work with “lead partners” to introduce regionally focused programs of improved production and post-harvest handling methods to reduce cost and increase output of Grade 1 apples;

2) Develop business development service providers to address critical needs in the chain;

3) Respond to the growing regional markets by supporting Lebanese exporters to develop necessary contacts, linkages, trade and analytical capacity to react to export market opportunities;

4) Support and promote processing operations to improve margins and diversify market channels for producers.

2. VISION FOR APPLE VALUE CHAIN

A competitive and profitable industry that dominates regional markets in terms of quality and value, offering good returns to participants and stimulating reinvestment.

Achieve the following within the industry:

- Employ modern agriculture practices that promote healthy, efficient, and profitable production;
- Provide diverse and profitable sales channels for farmers;
- Stimulate investment in rural enterprises with a focus on production and processing leading to increases in income for rural actors;
- Viewed as a highly competitive, regional player that defines the market and can supply every consumer segment demanded.

3. END MARKET ANALYSIS – APPLES

EXPORT MARKETS

GLOBAL EXPORTS AND IMPORTS

In 2011, the global apple trade was worth over $7 billion, compared to $5.6 billion in 2007, representing a 25 percent increase. However, the apple trade tonnage has remained flat growing at less than 1 percent annually since 2007. The global apple trade is dominated by 10 countries that account for about 85 percent of total supply.

The largest exporters by both volume and total value are China, the U.S., and Italy. The U.S. and Italy exported high value apples in 2011 at prices averaging $1.14 per kg and $1.01 per kg respectively. Prices of Chinese apple exports averaged $0.88 per kg in 2011, closer to the world average of $0.86 per kg. Thus, while China led global exports in terms of volume (1,034,635 tons in 2011), Italy led in terms of total value closely followed by the U.S. All three countries saw the total value of their exports grow faster than the global average of 4.2 percent. For example, the value of Chinese apple exports has risen over 15 percent per annum since 2007, mostly due to increases in prices (annual average growth of 15.5 percent from 2007 to 2011) as opposed to growth in quantity (annual average growth of 0.3 percent in the same period). In contrast, the U.S. and Italy also saw growth in total value at 9 percent and 6 percent respectively, with this improvement resulting from increases in volumes rather than increases in prices paid.

The EU has dramatically expanded into new markets, with France now exporting to over 102 countries, followed by the U.S (90 countries) and Italy (84 countries). Italy, already leading global apple markets in terms of value of exports, will likely eclipse China, which has seen the number of markets for its apples fall by 25 percent, as the leader in terms of volume as well. This growth will be spurred by EU agriculture free trade agreements going into effect, including agreements with Lebanon's largest trading partner, Egypt.

Russia is the world's largest apple importer, at 1.15 million tons per year, almost double the amount of the second largest importer, Germany. Russia imports low quality apples, with an average price of $0.65 per kg, mostly from Eastern Europe, Central Asia, and China. However, Russia's imports in terms of quantity and value are growing at four times the five-year world average.

Interestingly, the fastest growing import markets are in emerging economies of Asia and the Middle East. The most significant growth in apple imports is in India and Indonesia, where annual growth in volumes imported has surged by 35 percent and 9 percent respectively. India imported a total of 212,685 tons in 2011, while Indonesia imported 179,015 tons in the same period. Further, the price paid in these markets is higher than the world average, reaching $1.04 per kg in India and $0.88 in Indonesia. This trend has attracted attention from global suppliers as India is supplied by over 67 countries, up from just seven in 2007.

The MENA countries of Egypt, UAE, and Saudi Arabia are among the top 14 importers of apples globally. Five years ago, these countries were importing mostly low quality, low priced apples, though now they are importing apples at above the 2011 world average price of $0.87 per kg, and well above the 2011 MENA average price of $0.68 per kg. Prices in both UAE and Saudi Arabia are up over 30 percent from 2007. Egypt, long regarded as a low value importer that paid prices averaging around $0.55 per kg in the past few years, paid on average $0.85 per kg for apples in 2011. This is most likely due to the EU free trade agreement that came into effect in 2010, resulting in Italy becoming the largest supplier to Egypt.

FIGURE 2: TOP APPLE EXPORTERS - GLOBAL

Countries	Quantity Exported, mt (2011)	Annual Growth in Quantity Exported (2007-2011)	Annual Growth in Value Exported (2007-2011)	Average Unit Price $USD per kg (2007-2011)	Unit Price $USD per kg (2011)	Annual growth Unit Price (2007-2011)	Number of Export Markets Supplied (2011)
China	1,034,635	0.29%	15.67%	0.67	0.88	15.15%	64
Italy	976,128	4.46%	6.21%	0.99	1.01	1.43%	84
USA	833,249	5.12%	9.26%	1.03	1.14	3.28%	90
Chile	801,167	0.68%	3.84%	0.67	0.84	3.06%	77
France	721,285	0.81%	1.24%	1.00	1.02	0.42%	102
Poland	526,475	3.41%	11.40%	0.42	0.52	6.86%	36
Netherlands	380,907	0.14%	0.62%	0.97	0.96	4.70%	70
South Africa	333,435	-0.05%	7.20%	0.74	0.87	7.26%	83
Belgium	269,576	-4.24%	-4.44%	0.80	0.77	0.26%	45
Argentina	234,148	-3.46%	3.92%	0.72	0.81	8.94%	52
Republic of Moldova	195,790	29.97%	31.51%	0.30	0.30	6.30%	10
World (average)	***8,179,929***	***0.76%***	***5.05%***	***0.78***	***0.86***	***4.15%***	**65**

Source: Trademap

FIGURE 3: TOP APPLE IMPORTERS- GLOBAL

Countries	Quantity Imported, mt (2011)	Annual Growth in Quantity Imported (2007-2011)	Annual Growth in Value Imported (2007 -2011)	Average Unit Price $USD per kg (2007-2011)	Unit Price $USD per kg (2011)	Annual growth Unit Price (2007-2011)	Number of suppliers (2011)
Russian Federation	1,157,724	4.86%	13.40%	0.54	0.65	6.86%	40
Germany	663,650	-0.16%	1.43%	0.95	1.00	1.59%	40
United Kingdom	459,501	-2.43%	-4.05%	1.17	1.11	-1.83%	24
Netherlands	326,229	-1.80%	-1.69%	1.07	1.03	0.12%	27
Spain	244,789	-1.08%	-2.05%	0.96	0.95	-1.01%	20
Indonesia	212,685	9.27%	13.38%	0.83	0.88	2.78%	14
Canada	198,618	2.00%	2.43%	0.99	1.01	0.38%	14
Mexico	198,481	-1.94%	-2.80%	1.08	1.07	-0.96%	5
India	179,015	35.12%	50.08%	0.96	1.04	5.45%	62
Belgium	166,245	-5.39%	-4.30%	0.97	0.95	0.48%	22
Saudi Arabia	159,144	1.59%	7.03%	0.86	1.00	5.05%	16
Chinese Taipei	155,268	2.21%	7.03%	0.88	0.93	4.35%	8
United Arab Emirates	151,198	0.49%	7.06%	0.86	0.95	6.43%	28
Egypt	149,621	3.02%	18.25%	0.58	0.89	13.23%	22
World (average)	***315,870***	***1.33%***	**3.95%**	***0.82***	***0.87***	***2.47%***	***25***

Source: Trademap

MENA EXPORTS AND IMPORTS

There are seven major apple-exporting countries in the Middle-East and North Africa (MENA) region: Iran, Turkey, Lebanon, Syria, Israel, UAE, and Tunisia. Note that all UAE exports are re-exports, as UAE does not produce apples. Figure 5 shows that exports of every exporter, except Lebanon, are growing at an exceptional pace in terms of volume and value. From 2007 to 2011, the region averaged growth of 11.9 percent per year in terms of volume exported, while value of exports grew at an average of 30 percent per year. The trend for Lebanese exports is below average relative to its competitors; in the same period, the volume of Lebanese exports grew by only 3 percent, while the value of exports actually decreased by 0.4 percent. Lebanon exports did have a good year in 2012, as Syrian exports faltered due to civil strife.

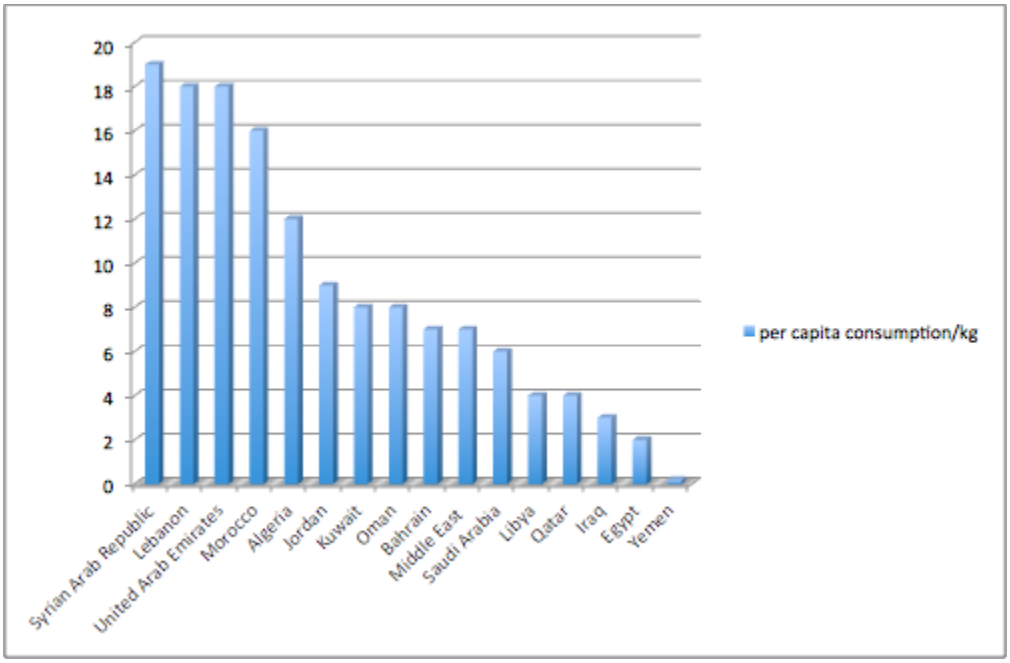
These producers in the MENA region, with the exception of Israel, export apples at below the MENA and World average import price.

Turkey has emerged as the biggest player in apples in the MENA region over the past five years, with apple exports growing by a dramatic 161 percent per annum since 2007.

Turkey has maintained its position as a low price, low quality producer, exporting at an average price of $0.42 per kg in 2011. Taking advantage of trade agreements, Turkey went from exporting 10,000 tons in 2007 to 87,303 tons in 2011, directly competing with Lebanon in its traditional markets of Egypt, the Kurdish areas of Iraq, and Syria. Lebanon faces additional regional competition from Iran; in 2011, 80 percent of Iranian apple exports or 350,000 tons went to Iraq. Although these data may not be accurate, the sheer volume of apples flowing into Iraq from both Turkey and Iran shows the competitive environment that Lebanon faces not only in Iraq, but throughout the entire region.

The MENA countries also import seven times more apples than they export. The main importing countries are Saudi Arabia, Egypt, Algeria, and Iraq. Libya has become an important market for apples, doubling the quantity of imports since 2007 at a five-year average price of $0.91 per kg. Direct sea connections between Lebanon and Libya started in 2012, resulting in a trickle of apples from Lebanon after a two-year hiatus.

FIGURE 4: PER CAPITA CONSUMPTION OF APPLES/KG



Source: FAOStat; Stakeholder Interviews; World Bank

There are two distinct markets for apples in MENA countries: markets which strictly prefer high quality, therefore, high value apples like UAE and Saudi Arabia, and markets like Iraq and Algeria which prefer smaller, lower quality apples at some of the lowest prices globally.

Egypt seems to be the only country that takes in high volumes of both high and low quality apples, with the low quality produce coming mostly from Lebanon. Lebanese apples enter Egypt unsorted and are auctioned off by ocean container, at an average price of about $0.56 per kg in 2012 according to interviews with exporters. Lebanese traders

interviewed estimate that only 10 percent- 15 percent of the Lebanese apples in these shipments contain Grade 1 apples. According to a large Lebanese apple trader, Egyptian buyers do not accept a shipment of purely Grade 2 or 3 apples. The buyers sort the shipment after auction, and depend on the Grade 1 apples for higher margins. Apples imported into Egypt from all other countries are purchased according to pre-arranged quality standards and prices that average 40 percent more than Lebanese apples, according to traders.

FIGURE 5: TOP APPLE EXPORTERS- MENA

Countries	Quantity Exported, mt (2011)	Annual Growth in Quantity Exported (2007-2011)	Annual Growth in Value Exported (2007-2011)	Average Unit Price $USD per kg (2007-2011)	Unit Price $USD per kg (2011)	Annual growth Unit Price (2007-2011)	Number of Export Markets Supplied (2011)
World	***8,179,929***	***0.76%***	***5.05%***	***0.78***	**0.86**	***4.15%***	**65**
Middle East Average	111,062.5	11.90%	30.09%	0.64	0.68	11.41%	17
Iran	421,424	12.35%	52.17%	0.63	0.86	31.27%	18
Turkey	87,303	161.05%	114.78%	0.48	0.42	-5.12%	19
Lebanon	61,455	3.03%3.	-0.42%	0.52	0.48	-3.00%	14
Syria	73,253	36.39%	18.15%	0.59	0.70	2.28%	17
Israel	11,999	46.61%	30.46%	0.85	1.01	-4.85%	8
UAE*	10,941	7.10%	17.44%	0.95	1.10	8.52%	28
Tunisia	4,375	3.66%	12.59%	0.65	0.74	7.55%	3

*Data from 2009
Source; COMTRADE

FIGURE 6: TOP APPLE IMPORTERS- MENA

Countries	Quantity Imported, mt (2011)	Annual Growth in Quantity Imported (2007-2011)	Annual Growth in Value Imported (2007-2011)	Average Unit Price $USD per kg (2007-2011)	Unit Price (2011)	Annual growth Unit Price (2007-2011)	Number of Markets Supplying (2011)
World	***8,128,490***	***1.44%***	***3.95%***	***0.82***	***0.87***	***2.47%***	***210***
Middle East Average	42,508	5.93%	13.16%	0.73		5.58%	46
Saudi Arabia	159,144	1.59%	7.03%	0.86	0.95	5.04%	16
Egypt	149,621	3.02%	18.25%	0.58	0.89	13.23%	22
UAE	151,198	0.49%	7.06%	0.86	1.00	6.41%	28
Algeria	128,620	8.16%	23.52%	0.54	0.65	10.92%	11
Iraq*	88,723*	176.86%	104.92%	0.50	0.38	-7.31%	15
Libya	54,772	13.45%	19.08%	0.91	0.96	3.76%	15
Iran	29,862		0.00%	0.97	0.95	-2.33%	8
Jordan	28,714	7.50%	22.05%	0.93	1.00	10.59%	15
Oman	22,787	-1.92%	6.35%	0.82	1.06	9.14%	21
Kuwait	22,004	-4.10%	-2.10%	0.80	0.85	2.52%	18
Israel	11,266	38.83%	-0.57%	1.35	1.49	4.68%	4
Morocco	10,475	15.19%	4.96%	0.71	0.74	1.81%	7
Bahrain	9,334	2.01%	12.33%	0.75	1.02	9.38%	16
Qatar	7,709	-8.12%	-1.26%	0.82	0.97	11.56%	26
Syrian Arab Republic	7,692	69.55%	78.91%	0.41	0.54	2.09%	21
Turkey	5,592	2.20%	4.46%	0.95	0.96	2.03%	14
Yemen	5,276	-7.47%	-8.61%	0.66	0.67	-1.82%	19
Mauritania	2,510	68.38%	42.89%	0.22	0.35	-5.77%	10
Lebanon	1,076	-6.26%	9.06%	0.87	1.03	22.29%	9

*W/O Iran data

Source: Trademap

The importance of apples as an agricultural export from Lebanon have been increasing over time and Lebanon's largest market- Egypt- continues to grow, taking 60-70 percent of total exports, though at the lowest end of the price range and with unfavorable payment terms. However, with older varieties, variable apple quality and increased competition from the EU, Lebanon seems to be losing its foothold in higher-value, more demanding regional markets in the Gulf States.

FIGURE 7: IMPORTS OF APPLES FROM LEBANON BY COUNTRY, 2008–2012

Reporting Countries	Exported Quantity, Tons				
	2008	**2009**	**2010**	**2011**	**2012***
Egypt	37,610	40,650	52,912	37,148	48,665
Saudi Arabia	6,846	6,489	8,309	7,400	6,990
Jordan	2,398	1,692	2,398	1,388	5,761
Iraq	53	239	666	1,639	3,893
Kuwait	3,583	3,719	4,534	4,050	3,651
Syria	2,872	4,963	6,032	5,276	:3,583
Oman	1,143	1,168	1,275	1,582	1,612
United Arab Emirates	1,726	1,343	1,726	1,035	986
Qatar	798	1,043	1,249	931	803
Sudan	753	271	271	304	740
Bahrain	279	309	671	674	605
Libya	1,134	1,028	0	0	276
Angola	0	0	44	22	18
Algeria	108	109	23	0	16
Colombia	0	0	0	0	4
Ivory Coast	0	0	0	0	4
Nigeria	0	0	0	0	2
Congo	0	0	1	1	2
Yemen	0	0	0	0	1
Canada	0	0	0	3	0
TOTAL	**59,387**	**63,072**	**79,168**	**61,455**	**77,610***

Source: COMTRADE data. * 11 months ending November

In terms of overall market size, UAE and Saudi Arabia are the largest, each importing $151 million worth of apples in 2011, followed by Egypt and Algeria, with $132 million and $84 million respectively. Only in Syria, however, does Lebanon capture significant market share, although by how much it is difficult to say since Syria has not reported accurate trade statistics in recent years.

Reliable data are a major issue with trade statistics in the MENA region, specifically with valuations. Lebanon seems to be making inroads into the Kuwaiti market capturing about 19 percent market share based on tonnage. Yet, this promising figure drops to only 1.8 percent based on value fetching just $0.33 per kg. GCC countries, UAE, Qatar, and Kuwait have limited their official customs data since 2008, while Lebanon grossly underreports its export values.[1] Using quantity data provides a clear picture of the situation in the GCC. Large, lucrative markets exist for those apple growers and traders

[1] Based on unit prices calculated for some importing countries, LIVCD believes that either volumes or prices are underreported as total annual values per kg for some countries were below $0.20, which is far too low for any reasonable exporter to accept.

capable of meeting the quality, variety, and quantity specifications of buyers. In recent years, Lebanon has lost market share to competitors who were able to provide the variety and quality of apples demanded by consumers. Lebanon is not a significant player in the UAE and Saudi Arabia.

FIGURE 8: IMPORTERS OF LEBANESE APPLES, WITH LEBANESE MARKET SHARE (2011) - TONNAGE

Country	2007	2008	2009	2010	2011
Syrian Arab Republic	25.5%	68.1%	61.2%	69.7%	68.6%
Egypt	28.4%	27.8%	27.3%	33.3%	24.8%
Kuwait	11.7%	12.9%	19.2%	21.0%	18.4%
Qatar	4.1%	4.9%	10.2%	15.4%	12.1%
Bahrain	4.1%	1.8%	4.0%	7.7%	7.2%
Middle East	7.7%	9.4%	8.5%	9.0%	7.1%
Oman	4.5%	3.3%	4.8%	4.9%	6.9%
Jordan	4.8%	11.4%	7.2%	9.0%	4.8%
Saudi Arabia	4.8%	11.3%	12.8%	4.7%	4.6%
Iraq	1.7%	0.7%	0.3%	0.9%	1.8%
United Arab Emirates	1.2%	1.1%	0.8%	0.4%	0.7%
Libya	0.0%	3.7%	2.5%	0.0%	0.0%

Source: LVCID Calculations from FAOStat, Trademap; Lebanese Customs Data

SELECTED EXPORT MARKETS

UAE Market The UAE is a highly attractive market for Lebanese apples given its proximity, volumes demanded, high per capita consumption, and potential for re-export to the rest of the region. In 2011, the UAE imported $152 million worth of apples, at an average price of $1.00 per kg with Chinese, American, and French apples holding equal market shares of around 17 percent each. Recently, China and Chile have seen their market share fall to European production. France has more than doubled its exports to the UAE, while Italian exports have risen by more than 1,300 percent since 2008 displacing mostly Chinese and South African apples. This reflects a trend seen across the entire MENA region. The UAE does not apply a duty on fresh apples.

Lebanon is currently a small player in the UAE apple market. In 2011, Lebanon exported about 1,000 tons of apples into the UAE, making it the ninth largest supplier with a mere 0.7 percent market share. Lebanon's position has been eroding. Exports to the UAE have decreased by 60 percent from 2007 to 2011, from 1,700 tons to 956 tons. Prices have remained stagnant at $0.56 per kg since 2007. Lebanon is a niche player in the UAE market, exporting relatively low quality apples.

FIGURE 9: UNITED ARAB EMIRATE IMPORTS OF APPLES

Country	Quantity Imported, Tons (2011)	Annual Growth in Quantity Imported (2007-2011)	Annual Growth in Value Imported (2007-2011)	Average Unit Price $USD per kg (2007-2011)	Unit Price (2011)	Annual growth Unit Price (2007-2011)	Number of Markets Supplying (2011)
United Arab Emirates	151,198	0.49%	7.06%	0.86	1.00	6.41%	28

Source: Comtrade

Lebanese apples in the UAE market are priced significantly lower than the major apple exporters into UAE. With the exception of Chile, all major competitors' prices have increased between 10 percent and 37 percent since 2007, while Lebanese prices have remained stagnant. According to the largest importer/wholesaler in the UAE, Barakat, this is in large part due to the varietal selection of Lebanese apples compared with other countries' premium varieties. Compounding this issue, Lebanese apples have the reputation for being poorly graded and thus highly variable in fruit size and color, leading to high rejection rates by buyers.

FIGURE 10: CHANGE IN PRICE OF APPLE EXPORTS TO THE UAE, 2009–2011

	Principal Varieties	2009 Price $USD)	2010 Price $USD	2011 Price $USD	% Change 2009–2011
China	Fuji	0.76	0.87	1.04	36.9%
Chile	Royal Gala, Braeburn, and Fuji	0.72	0.70	0.66	-10.1%
South Africa	Braeburn, Granny Smith, Pippin	0.60	0.68	0.75	25.0%
France	Elstar, Scarlett, Granny Smith, Pomme d'Api	1.11	1.14	1.21	9.9%
Lebanon	Golden and Red Delicious, Sans Pareille	0.55*	0.55*	0.56*	0.0%

Source: DAI calculations based on COMTRADE statistics. * Estimate based on interviews

Lebanon is therefore losing its already small foothold in this important market. Total exports are declining, its market share has decreased, and prices are flat. A few large producing countries are crowding out the competition, and Chilean and South African apples compete directly with Lebanese on price with more appealing aesthetic qualities. Lebanon can capture significant UAE market share, yet significant changes must be introduced in terms of varietal selection, quality standards, and grading and product differentiation.

EGYPTIAN MARKET The Egyptian apple market, especially for the premium apple segment, has grown significantly over the past five years, with an average annual growth in value of 18.3 percent. In 2011, the average import price was $0.89 per kg, up from $0.53 per kg in 2007. With the exception of 2011, the quantity of imports into Egypt has been growing briskly. Italy is now the largest exporter of high value apples to Egypt,

achieving an average price of $1.04 per kg, almost double the price Lebanese apples sell for in Egypt. In 2010, the Agricultural Agreement of the European Union-Egypt Free Trade Agreement reduced tariffs on European pears and apples from 20 percent to 0 percent. This has not yet threatened Lebanese market share, though it has reduced imports of high value apples from the U.S. and China. Egypt applies no tariff on imports from the League of Arab States and COMSA country members of the FTA. For most other countries, Egypt applies a 20 percent tariff.

The threat to Lebanese market share in Egypt is coming from Turkish apples. Turkey is making enormous inroads into the Egyptian market, moving from 1,000 tons in 2007 to over 16,000 tons prior to the Egyptian revolution in 2011. Turkish apples are considered the same quality as Lebanese apples, and sold for about $0.49 per kg, or $0.04 cheaper than comparable Lebanese apples.

The total volume of apples imported to Egypt has grown modestly from 2007 at about 3 percent per annum. The Egyptian market suffered from civil unrest in 2011, but seems to have recovered in 2012, and Lebanese exports have topped 2010 statistics. Lebanon seems to have filled the hole created by the reduction in import of Syrian apples. However, threats from comparable quality Turkish apples are not expected to subside.

Excluding 2011, when imports were down from all countries, Lebanon's apple exports to Egypt have increased significantly since 2007 in line with growth of the total Egyptian market. However, total market share has remained flat, averaging between 25 percent – 28 percent for the past 5 years.

FIGURE 11: EGYPTIAN IMPORTS

	Quantity Imported, Tons (2011)	Annual Growth in Quantity Imported (2007 -2011)	Annual Growth in Value Imported (2007-2011)	Average Unit Price $USD per kg (2007-2011)	Unit Price (2011)	Annual growth Unit Price (2007 - 2011)	Number of Markets Supplying (2011)
Egypt	149,621	3.02%	18.25%	0.58	0.89	13.23%	22

Source: Trademap

According to stakeholder interviews, the border price of Lebanese apples into Egypt is between $0.50 per kg to $0.53 per kg depending on the auction price, compared with $0.87 per kg for Chinese apples and $1.03 per kg for Italian apples.

This situation exists in large part because China and Italy are exporting premium varieties, including Royal Gala, Braeburn, Fuji, and Decio, while Lebanon exports older variants of Red and Golden Delicious. In addition, as noted earlier, Lebanese apples are auctioned upon arrival by ocean container. The auction is exclusive to Lebanese apples, as other imports are purchased with a pre-determined price and quality expectations.

This structure places Lebanon in the low-value end of the market, which in the short-term may not affect competitiveness, as Egyptian consumers largely continue to purchase the

lower-priced regional (Turkish, Syrian and Lebanese) apples. However, supermarket managers and industry insiders with whom the study team spoke indicate that the premium apple market is a swiftly-growing segment in Egypt. As consumer preferences evolve and become more demanding over time, Lebanese producers run the risk of further price and sales erosion without improvements in quality and variety.

The historic rise in Egyptian imports from Syria, coupled with bilateral free trade agreements with Turkey and the EU, also pose significant potential obstacles to continued expansion of demand for Lebanese apples in the Egyptian export market. The Agricultural Agreement of the European Union-Egypt Free Trade Agreement was ratified into force in June 2010 and helped boost the EU apple trade with Egypt.

FIGURE 12: EGYPTIAN APPLE IMPORTS AND LEBANESE MARKET SHARE (VOLUMES IN METRIC TONS)

	2007	2008	2009	2010	2011	% Change
Lebanon	36,900	37,610	40,650	52,982	37,148	0.13%
Syria	78,247	63,205	68,778	51,863	(N/A; Mirror) 44,645; Direct Data*	-43%
Italy	918	325	916	6,236	31,160	3300%
Chile	863	1,061	1,430	5,210	10,791	1150%
Turkey	1,315	3,333	7,954	16,815	7,580	476%
Greece	58	55		916	6,829	11674%
USA	7,487	12,485	13,839	12,725	5,020	-32%
China	3,108	13,908	14,449	9,863	3,073	0%
France	268	549	728	1,290	2,508	835%
Total Imports	**129,980**	**135,245**	**149,094**	**158,991**	**(104,976); 149,621**	**15%**
Lebanese Market Share in Egypt	28%	28%	27%	33%	25%	-3%

* Mirror Data were not available for Syria 2011; therefore direct data sources were used for all the Syrian statistics

Source: DAI calculations based on COMTRADE data.

OTHER MIDDLE EASTERN MARKETS In addition to Egypt and the UAE, other markets of importance to the Lebanese apple sector include Saudi Arabia, Syria, Kuwait, Jordan, and Libya. As shown in Figure 8, exports to Saudi Arabia have been decreasing each year; Kuwait has been relatively stagnant; while Jordan, Syria, and Libya have shown significant growth. These last three countries account for the total overall growth in Lebanese apple exports.

DOMESTIC MARKET

Lebanese per capita consumption is difficult to gauge accurately due to wide variance between official and unofficial production numbers. However, it is possible to estimate domestic consumption using estimates of production and adding the negligible volume of imports, then subtracting apples that are exported, and those used in processing.

FIGURE 13: 2012 PRODUCTION AND CONSUMPTION IN LEBANON

	Total Production	264,000 mt [2]
+	Imports	809 mt [3]
-	Exports	154,077 mt [4]
-	Jams, other processing	1,000 mt [5]
-	Wastage	31,500 mt [6]
=	Domestic fresh consumption	78,232 mt

Source: LIVCD calculations using FAOStat, Comtrade, and World Bank

Considering a population of 4.2 million people, consumption per capita was 18 kg in 2012. This puts Lebanon among the top per capita consumers of apples in the region, along with Syria (19 kg) and UAE (18 kg).

Concrete data on fresh produce sales are not available, though interviews and field visits indicate that high quality apples stay in Lebanon, with size and a preference for deep color being the major discriminating factors between local and export apples. Top varieties demanded in Lebanon include varieties considered to be "old" internationally, but that are actually "new" in Lebanon: Gala, Fuji, Braeburn, Granny Smith, Top Red, Scarlet Spur, and Super Chief. In addition, the new generation of international varieties like Cameo and Pink Lady are also being introduced on a small scale. Depending on the season, all of these varieties command a premium of 50 percent or more over standard varieties, presenting a real market opportunity for apple producers. A small amount (approximately 4,000 tons) of these premium varieties are currently produced in Lebanon. If the success of these early adopters can serve as a demonstration to other farmers to plant new varieties, significant opportunities in the form of new markets and increased income exist.

In the domestic market, shops that specialize in fresh produce including high quality domestic and imported apples are rapidly expanding, competing with the traditional role of supermarkets as primary sellers of imported fresh produce. Spinney's, Charcuterie Aoun, TSC, and other supermarket chains are also rapidly expanding in Lebanon, and carry a wide range of local and imported produce at variable quality standards. With the entrance of Carrefour in 2013, demand for high quality apples will increase. This represents an excellent opportunity for producers that can sort, grade, and supply Grade 1 apples. Incidentally, all these supermarket chains in Lebanon claim to have difficulties trying to source local apples that can compete with imports in terms of year round supply, volume, quality, and packaging. Large supermarkets are price sensitive and put most importance on consistent quality and supply. They have mid-range quality requirements and purchase both directly from farmers, as well as wholesale markets.

[2] Unofficial estimate of 2012 production in Lebanon from interviews with traders and producers

[3] GOL 2012 Customs data

[4] GOL 2012 Customs data reports 88,077 mt. Figure used incudes unofficial estimates of unreported volume of exports mostly to Syria, from interviews with traders and producers.

[5] Estimates from interviews with industry actors

[6] Estimate based on expert opinion and global industry averages

Interestingly, many supermarkets such as TSC and Charcuterie Aoun are seen by farmers as unreliable payers, with payments taking in excess of six months with reports of non-payment. Spinney's is trusted by farmers, yet payments still take about 60 days. Thus, farmers generally do not prefer to sell to supermarkets.

Prices for apples in Lebanon have dropped by about 25 percent since 2009, due to an increase in production and resulting over-supply. Average supermarket retail prices generally hover around $2.00 per kg, though prices have ranged from $1.53 – $2.26 per kg for high quality apples. During the height of the 2012 season, Spinney's advertised Lebanese Golden Delicious apples from $0.50 per kg. At the top range of domestic apple prices are large, deep red apples priced at $3.16 per kg in high-end supermarkets such as O&C.

Those producers who are able to consistently produce and sort Grade 1 apples are sought after by supermarkets, and are able to sell their production directly for $1.33 - $1.83 per kg. The growing demand for high quality apples in both the domestic and export markets provides an opportunity for growers to make the necessary investments to "professionalize" their operations by improving production and post-harvest handling to increase the supply of Grade 1 apples.

Lebanon applies a 70 percent duty on all imported apples. Import figures into Lebanon dropped to 809 tons in 2012, from 928 tons[7] in 2011. However, as with the export markets, it seems clear that domestic market tastes are evolving to reward new varieties and better quality. According to supermarket purchasing managers in Lebanon, consumer preferences are becoming more sophisticated and demanding, a trend seen throughout developed and emerging economies. In 2007, Syria was by far the largest exporter of apples into Lebanon, taking about 53 percent of the market or 354 tons. Only four years later, Chile has surpassed Syria as the largest supplier into Lebanon, supplying premium varieties such as Gala and Fuji instead of the traditional Golden Delicious from Syria. Higher quality and more expensive Italian and French apples now dominate the Lebanese import market, reaching about 75 percent market share outpacing both U.S. and lower priced Chilean imports. Syrian imports, which have been dropping significantly since 2007, now amount to just 39 tons, while the market share of Chile and the U.S. market stands at 12 percent and 2 percent, down from 31 percent, and 10 percent respectively in 2009.

Retail data indicate that Lebanese consumers are shifting towards premium apple varieties, with Italian apples selling for $4.00- $5.00 per kg now accounting for 71 percent of imports in the premium markets. Starting in 2011, Greek Granny Smith apples appeared in local supermarkets, selling at the lower price range for imported apples at $3.00- $3.33 per kg. Although, Greek apples seem to be positioned to compete with high-end Lebanese apples on price and size, the quality and appearance of Greek apples are lower than comparable Lebanese apples.

[7] Comtrade data shows 1,076 mt in 2011, figures that differ from the GOL data used above.

KEY FINDINGS OF END MARKET ANALYSIS

1. Demand is growing rapidly both in regional markets and in Lebanon for Grade 1 apples—yielding very good market prospects for farmers who can achieve required production standards, yet Lebanese apple farmers and exporters have not yet begun to take the needed measures to meet this rising demand.
2. Demand in the Gulf for traditional lower quality apples exported from Lebanon is stagnant or declining as consumers seek higher quality apples and varieties that are not traditionally produced in Lebanon. Turkey is rapidly expanding its market share in the same lower quality segment of the Egyptian market that takes the bulk of Lebanese apple exports.
3. Lebanese exporter standards for sorting, grading, and handling are keyed to the low quality export market. There is a shortage of actors who are familiar with the higher standards that are applied at the upper levels of the regional market.

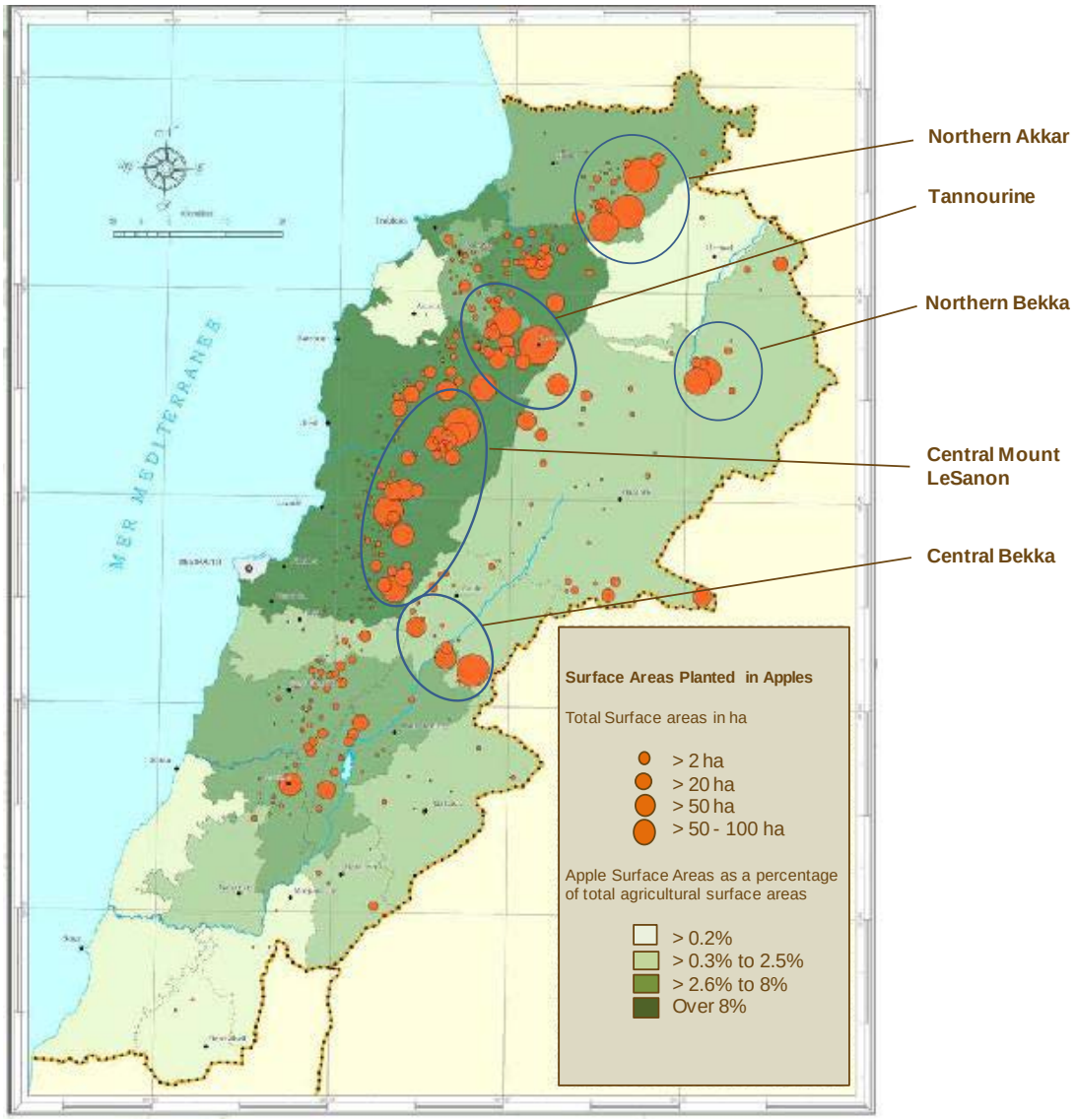
4. PRODUCTION AND PROCESSING

Apple production in Lebanon is relatively fragmented. With landholdings divided into smaller and smaller plots with each generation, apples are now produced on small fragmented plots. While precise data do not exist, experts estimate that the average apple farm size is less than one hectare. Farmers rely on traditional techniques passed down through generations of apple farmers, or obtain information about production techniques from a handful of input supply firms whose main concern is increasing sales of their products.

After olives, apples are the most important tree fruit crop in Lebanon in terms of planted areas and production volumes. Though precise numbers are not available, and there is a disparity between official numbers and unofficial estimates as described in the section above, evidence supports the conclusion that 2012 was a banner year for Lebanese apple producers. Unofficial 2012 estimates, based on interviews with producers, traders and exporters, put the production volume at over 264,000 metric tons. This estimate appears to be reasonable when considering Lebanon's total area of apple orchards are around 13,500 hectares, resulting in yields of a modest 19.5 tons per ha, well within typical apple orchard yields. Additionally, as of February 2012, when availability of Lebanese apples in the domestic market would normally tail off with only damaged and low quality product available, retail outlets are stocking a wide variety and selection of Lebanese apples including high quality selection. Cold store operators are reporting that all the storage facilities are still full, further supporting the conclusion that 2012 saw high production of apples with much of it remaining in Lebanon.

Major production areas for apples are provided in Figure 14. The highest concentration of apple trees are in the North (45 percent), particularly the zones around Fneideq, Akkar el Aatiqa and Tanourine, Mount Lebanon (35 percent), and the Central and Northern Bekaa Valley (12 percent). Stakeholders estimate that 10-15 percent of production is Grade 1 apples.

FIGURE 14: APPLE PRODUCTION AREAS



Source: Ministry of Agriculture Census 2005

Despite the poor reliability of the data, the study team believes that major production increases since 2009 are indeed happening and that they reflect a renewed interest among farmers for apples specifically, and fruit trees in general. There are two major reasons for this shift: The first is that fruit trees in general are efficient users of two relatively scarce resources- water and labor. Fruit tree orchards are found on hillsides and mountains and often utilize drip systems fed by a combination of water catchment reservoirs and wells. Fruit tree orchards on wetter mountain lands are able to function much of the year without pumping well water.

With respect to labor, once orchards are established, most small farmers with orchards of less than two hectares are able to supply most labor needs for land preparation, pruning, applying fertilizer, and pesticide application utilizing family labor. It is only at the

harvesting stage that the use of day laborers is required, which is mostly filled by Syrian workers. The conflict in Syria and influx of Syrian families has increased the supply of labor and lowered wages in the West Bekaa to around $10.60 per day. However, in the mountains daily wages have gone up to $16.60- $20.00 per day according to producers interviewed. Labor is usually supplied and paid for by the small scale traders or damans, who buy most of the apples at the farmgate. In contrast, potential alternative crops such as irrigated vegetables would require significantly more labor- requiring much higher levels of managerial oversight and cash investment. These reasons combine to make fruit trees a highly appropriate crop for families with mountainside land and family members engaged in economic activities other than farming, since labor inputs can be scheduled to accommodate competing needs, and oversight of production is not necessary needed on a daily basis.

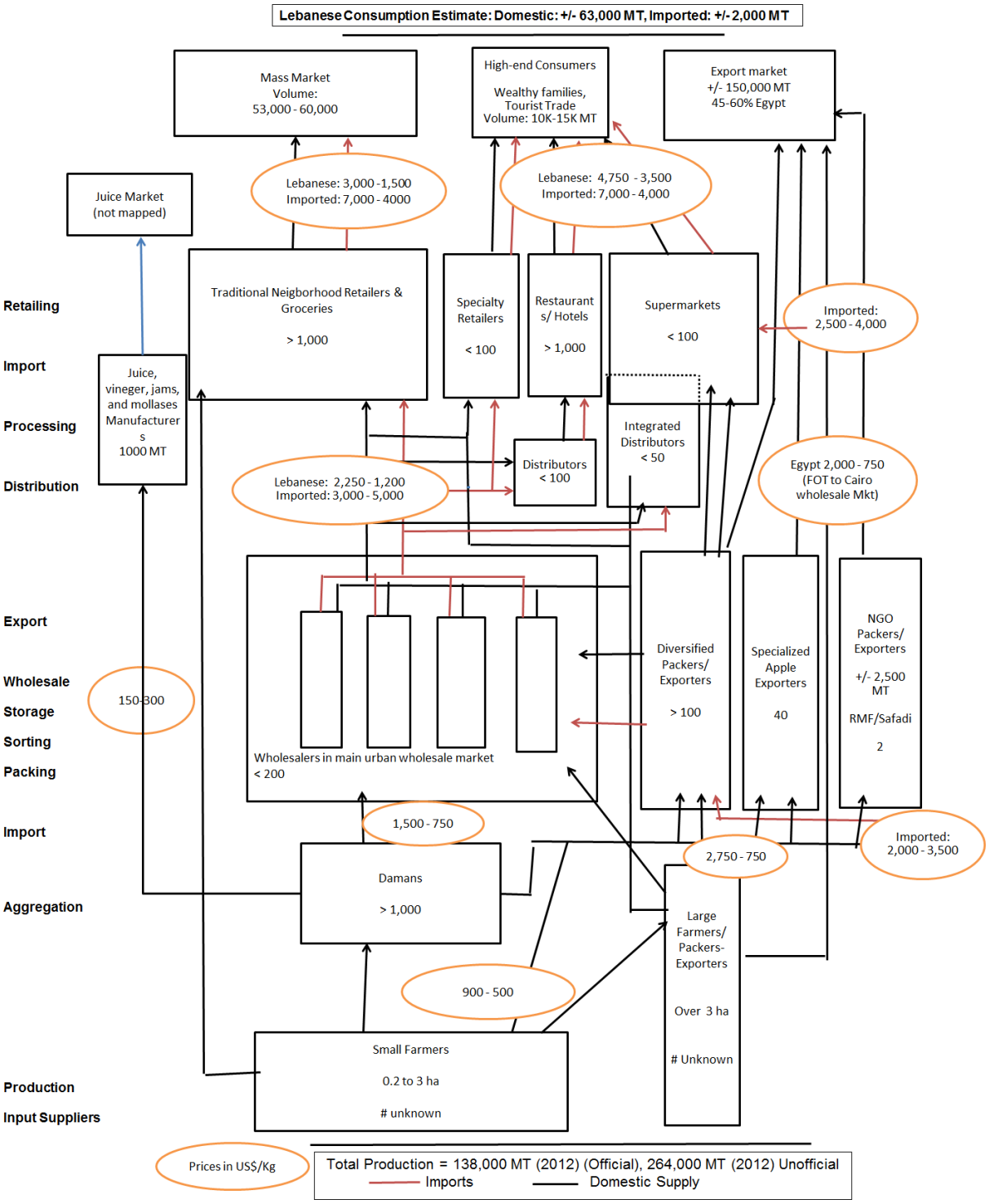
The number of apple farmers in Lebanon is not known precisely. The only recent baseline study of production completed for the FAO Integrated Pest Management (IPM) project in 2007 (Abou Zeid) did not risk an estimate. The Ministry of Agriculture produces graphical estimates of the distribution of apple farms by size (which are given in Figure 14), but the numerical data behind these estimates were not available to the study team.

Anecdotal evidence from the visits to production regions of Tanourine, Akkar Aatiqua, and Hrajel suggests that most apple farmers have less than 1 ha under cultivation, with a vast majority of farmers under this threshold than over it. If the MOA estimates of cultivated area are correct, this would imply that at a minimum, there are 10,000 apple farmers in Lebanon. In reality the total number is probably higher, though if the notion of "apple farmer" is narrowed to exclude the smallest category of actors who cultivate less than 1 ha- those who farm as a hobby- this figure is not an unreasonable estimate, albeit with a potentially large margin of error. However, the total area planted with apples is clearer. According to a 2007 FAO study, planted apple area was 9,391 hectares. Growth in planted apple orchards is very clear through stakeholder interviews and site visits, especially through the Mount Lebanon region. According to 2011 FAO estimates, the total size of apples orchards is now 13,500 ha.

The traditional varieties produced in Lebanon are derivatives of varieties introduced by Jesuit Monks in the late 1800s, as well as by Lebanese immigrants returning home after World War II. These include mainly spur and redder skin variants of Red Delicious (Starking, Double Red), and Golden Delicious along with Sans Pareille (*mouwachah*) apples. These are the traditional apples that have made Lebanon's name as an apple producer in the region, but are now seeing decreased demand. Newer varieties have been introduced by a variety of NGO and donor programs (see below) that include mainly Gala, Fuji, Top Red, Scarlett, Super Chief, and Granny Smith. The overall penetration rate of new varieties is still quite small. One major exporter estimated for the study team that less than 4,000 tons of new varieties are being produced per year.

5. VALUE CHAIN STAKEHOLDER ANALYSIS

FIGURE 15: APPLE VALUE CHAIN MAP



The apple value chain map shows the functional structure of the apple value chain in Lebanon. It is not based on any particular region, but shows a generalized schema that broadly represents all the productive regions.

SMALL FARMERS with apple surfaces of between 0.3 ha and three ha. This category of farmer includes families with enough land under cultivation for apple revenues to constitute an important piece of total family income, while not providing enough to be the only income-generating activity. These families are serious apple farmers who use pesticides and fertilizer and prune their trees, but are not true apple specialists. They are unlikely to invest in drip irrigation, using flood irrigation instead. They generally farm with mainly unpaid family labor, using paid labor only to prepare land and plant new orchards, and possibly for harvesting. Apple trees for this category of farmer are generally likely to be too old to achieve maximum production. The vast majority of apples produced in Lebanon today come from such farmers. These actors usually sell to damans, as described in the section "Aggregation" below, though they may also send product directly to the wholesale markets or retailers depending on their volumes, location, and access to transport.

LARGE FARMERS have three or more ha. This scale of activity, with at least 120 tons of production per year, provides gross income of around $100,000—more than enough to support a family. The number of such farms is quite low in comparison to small farmers. Farmers of this type consist of "true apple farmers" or "wood damans[8]," families who live mainly from apple income, as well as wealthier families who have income from non-agricultural sources or from family members in the Diaspora and wish to invest in commercial farming in their region of origin. Large farmers are more likely to have planted or grafted newer early-bearing varieties to benefit from high early season prices, use drip irrigation (both in the Bekaa and in mountain locations), and regularly invest in orchard regeneration. Large farmers are also much more likely to conduct their own harvesting and field packing operations with sales either to the local wholesale market or direct to retailers including supermarkets. At the larger end of the size spectrum, a fraction of large farmers engage in export sales to the region, directly sending shipments to Egypt or the Gulf States. These larger farmer/export operations also generally possess cold storage capacity.

AGGREGATION

Small farmer production is aggregated by a class of small scale collectors called damans. These intermediaries are essentially traders who, at a minimum, have a pick-up truck and a stock of plastic milk crates that can hold 20 to 22 kg of apples. Damans either organize labor for harvesting or will supply crates on demand and let farmers do the harvesting. They generally contract with small farmers to purchase all their production at a fixed price with add-ons for harvesting and packing if they are requested by the farmer. Larger damans may have cold storage facilities and simple packing facilities, such as packing

[8] A wood daman is a person who exploits land that he does not own, usually with a regular lease payment or a share of the crop harvest that will be remitted to the land owner.

tables. The business models of damans vary according to their financing arrangements. At least two major types of damans exist:

Small independent damans These are self-financed small traders who usually serve the wholesale markets. They are often farmers themselves or have links to farm families in the major producing regions. These actors usually have limited financial resources and carry significant commercial risks linked with serving the urban wholesale markets with sales on a consignment basis.

Damans acting as agents Many of the larger damans located in the production zones have exclusive relationships with exporters or larger packers. They are usually pre-financed by their buyer and have one or more trucks with employees who will circulate in the local production zone as well as in other zones following the progression of the season. They often have simple refrigerated cold storage facilities and may function as small-scale packing houses for their buyers by performing grading and sorting by size and color as apples are delivered to their warehouses. In most cases they will pack product into one layer cardboard boxes provided by their buyer for export or sale in the domestic wholesale markets. They follow packing standards determined by their buyer. If they are working for an exporter who does not have his own packing facility, they will serve as the pick-up point for international trucks contracted by the exporter to deliver product to Egypt (via ferry at Aqaba, Jordan) or the Gulf States. Otherwise, they serve as an intermediate staging area for shipments to the buyer's pack house.

Wholesale Trade, Packing, and Export

There are two main loci of wholesale level trade for apples in Lebanon. The most visible of these are the urban wholesale markets, of which the two Beirut markets (Sin el Fil and Sports City), and the markets in Jbeil and Tripoli are the major centers of trade. The second loci are the different categories of packers/exporters with warehouses and cold storage facilities located throughout Lebanon. Both types of actors buy from damans, small and large farmers, and trade volumes at the wholesale level. Each is described below.

Urban wholesale market operators Urban wholesale markets are run by associations of traders who occupy the designated spaces, collect rent for the warehouses, and organize cleaning and security. The biggest wholesale market in Lebanon is the Sports City market in South Beirut, with 80 stalls. Less than half of the stalls in urban wholesale markets have cold storage and these are used only to keep inventory from spoiling for several days—not for long-term storage. There is little specialization either by quality or by product among wholesalers. All operators deal in a variety of fresh fruit and vegetables. A portion of wholesalers in the market are owned by independent exporters/importers of fresh product who own packing facilities and cold storage outside of the urban wholesale markets. Imported products usually arrive in wholesale markets through these actors' affiliated stalls. The operations of wholesale markets in Lebanon are the source of some discontent among farmers and damans. Dissatisfaction centers around the lack of transparency in the dominant trade practice of consignment sales in which no price is contracted at delivery with prices fixed by the wholesaler according to market conditions, with the wholesaler taking an 8 percent to 15 percent commission on

sales. As a result of this system, there is strong incentive for sellers to bypass wholesale markets with direct sales to retailers or even consumers, which is a widespread practice for low transaction volumes. Still, interviews with the wholesale market operators and the distributors and wholesalers who buy from them indicate that the vast majority of neighborhood grocery shops, larger families, and some restaurants get the majority of their produce (including apples) through these operators.

DIVERSIFIED PACKERS/EXPORTERS Most observers agree that there are somewhere between 100 and 200 fresh fruit and vegetable exporters in Lebanon and most belong to the Fresh Fruit and Vegetable Export Syndicate. The number of packers has increased enormously over the past 10 years, as even small-scale traders have entered the export market and set up packing operations. There are 40-50 exporters who are full-time traders, while the others trade less frequently, reacting to one-off market opportunities. The range of capacity among packers in this category is broad. Smaller packers generally ship mixed containers of different types of product. Larger packers will specialize to some degree in a narrower range of products and try to avoid mixed containers. Packers dealing in apples tend to be located in the major production areas. Since many of these apple packers also have sales windows in the wholesale markets, they keep close watch on price differentials between the local and export markets. In general the largest sized apples will be sold into the domestic market while slightly smaller apples will be targeted for export to Egypt. The entry and exit of numerous small undercapitalized players into the export market presents a real problem in terms of maintaining a reputation for quality and consistency in the export markets.

SPECIALIZED APPLE EXPORTERS These market actors are similar to the diversified packers/exporters, but with a product focus on apples alone. In general they tend to concentrate entirely on exports with little or no sales into the domestic wholesale markets. Industry observers estimate that there are around 40 or so specialized apple exporters, but only 20 or so with substantial cold storage facilities and a minimum degree of packing facilities. These actors generally have strong links to apple farmers in the zones surrounding their packing facilities while also maintaining networks of damans in all major zones through which they procure the bulk of their apples. Also, as mentioned above, many of these actors also simply assign packing and cold storage responsibilities to damans, obviating the need for virtually any fixed infrastructure. Thus at the smaller end of the spectrum, these players are akin to brokers who provide financing and packaging and arrange the export transaction with little physical contact with the actual product. Larger players here may also have their own orchards.

NGO PACKERS/EXPORTERS At present Réné Moawad Foundation (RMF) and Safadi Foundation each operate an automated packing/cold storage facility in North Lebanon that handles apples along with other goods. RMF is reportedly exporting product under its own brand name. Estimated volumes for RMF apple exports are around the 2,500 ton/year level.[9] A second NGO packing facility with pre-cooling, automated cleaning and waxing capacity was financed by the U.S. Department of Agriculture (USDA) for the Safadi Foundation near Tripoli. However, the volume of apples passing through this

[9] Based on a total volume figure of 5,000 mt of apples packed by RMF in 2007 from stakeholder interviews in 2010 .

facility is unclear. LIVCD can leverage this USAID investment to work with apple farmers in the Akkar.

Distribution and Retail

Lebanon is characterized by a wide variety of retailers and distributors, as follows:

Distributors: These stakeholders assemble a variety of fresh produce from the wholesale markets and directly from farmers and deliver them on a regular schedule to retailers or hotels/restaurants who do not want the trouble of actually going to the urban wholesale markets on a daily basis. There are two main types of distributors*: independent distributors* who market mainly upper-level restaurants and hotels under contractual agreements and "*integrated distributors*" who generally lease space or pay a commission fee to run the produce department of supermarkets. Most independent supermarkets in Lebanon operate with these types of embedded integrated distributors.

Neighborhood retailers: In a country without a strong tradition of open air markets or farmers' markets, apples and other produce are sold by small neighborhood shops. In most cases these retailers make daily trips to the urban wholesale markets to procure produce. They have arrangements with local restaurants or juice bars to take unsold stock.

Specialized produce retailers: A small but growing trend in Beirut is the emergence of retailers that seek to differentiate themselves in terms of product quality and the physical layout of the store with mark-ups over neighborhood groceries that vary from next to nothing to 20 to 30 percent. These are often jokingly referred to as "pharmacy" stores—emphasizing that they are clean with almost medical hygienic standards in comparison to the normal down-trodden image of the neighborhood shop. Such retailers make a more concerted effort to source the best produce from the wholesale markets or directly from a regular circle of farmers or damans. This category of retail shop has only emerged in the last 10 years and is a small but growing percentage of the retail outlets.

Restaurants and hotels: Urban up-market restaurants and hotels provide another important market for high quality apples. Most are supplied mainly by specialized distributors, although some will send their own trucks to the wholesale markets.

Supermarkets: The supermarket segment of the market is rapidly expanding- following a familiar path with that of other middle income countries. The major chain supermarkets, TSC, Charcuterie Aoun, and Spinney's all have centralized purchasing of produce either out of the urban wholesale markets or, in the case of TSC, from its wholly owned packing subsidiary in the Bekaa Valley that is promoted as a house brand. Independent supermarkets tend to work with integrated distributors as produce department contractors. The chain supermarkets also import apples directly.

PROCESSORS

JUICE MANUFACTURERS: There were at least two industrial apple juice processors in Lebanon, but neither is operating at present. Al Marj, which ran a 10 mt per day line in the Mount Lebanon area found the business to be profitable but has stopped operating because the foreign owners left the country, although they are interested in continuing with local management. The Kassalty-Chataura company ceased operations of a 40 ton per day line in the Central Bekaa in 2011 after a two year trial due to difficulty in amassing enough smaller third-grade apples with the right organoleptic characteristics to maintain production for more than several weeks a year. Additionally, the lack of consumer awareness in differentiating between nectar, concentrate, and fresh juices, and the required costs of a promotional campaign contributed to the halt in production.

JAM, MOLASSES AND VINEGAR PRODUCERS: Lebanon has about five relatively large commercial producers of apple products, (mostly jams and vinegar) and over 1,000 artisanal producers. Most artisanal producers sell their products on-site and in ad-hoc farmer's markets within their region. About five artisanal producers, such as Mymoume, have professionalized their production with improved branding and packaging and sell their products in supermarkets, large neighborhood shops, and high-end grocery stores, as well as into export markets in the U.S. and UAE.

BUSINESS DEVELOPMENT SERVICE PROVIDERS

Actors in the apple value chain are supported by a number of critical service providers that determine a large part of the value chain's growth potential and efficiency. These include:

NURSERIES: There is a wide variety of fruit tree nurseries in Lebanon, ranging from individual farmers who will plant seedlings from seeds of selected trees and either sell or give them away to neighbors, to commercial nurseries that import rootstock and graft saplings from selected scion-wood trees. The supply of seedlings is not an obstacle; however the quality offered by most nurseries in terms of genetic purity and, more importantly, absence of viruses is questionable[10]. in 2003, an Italian project with the MOA aimed to improve nurseries, established a program to offer certified virus-free seedlings with periodic sample testing done at the MOA laboratory in Tal Amara. Nurseries participating in this program are grouped into the recently-formed Machatel Lebnan Association. In addition, two NGOs, The Frem Foundation and RMF also established nurseries using imported rootstock to produce disease-free seedlings for commercial use in their areas of operation. Interviews of stakeholders in apple production

[10] AUB Plant Pathologists Yousef Abou Jauodeh estimates that 20–25 percent of Lebanese fruit trees are infected with viruses—causing significant losses in productivity.

areas indicate that many farmers are developing seedling production as an adjunct to fruit production with widely varying levels of technical competency.

The major programs of the foundations involved in the apple value chain (Safadi, Frem, and RMF) provide improved germplasm largely in the form of imported rootstock that is grafted with scion-wood with new varieties in nurseries supported by their programs. While these activities respond to a real need of the value chain, given the shortage of good quality disease-free young trees, many farmers express skepticism about the seedlings being promoted by these programs based on the sub-par yields of these trees in farmer fields, at least as reported by the small sample met during the study team's investigations. The reasons for poor performance are unclear. They are most likely related to the difficulty of acclimatizing imported rootstock into different production climates in Lebanon without clear guidance or research, and to an imperfect understanding among farmers of the technical requirements of new types of rootstocks.[11]

INPUT SUPPLIERS: Lebanon has a healthy competitive market for agricultural inputs. Dealers in most major towns are able to provide a range of fertilizers and pesticide products and drip irrigation equipment. Several of the larger dealers maintain trained agronomists on staff in field locations and produce a full range of crop-specific extension materials. These staff and extension materials provide virtually the only guidelines on fertilization and pest treatments that actually reach small apple farmers. In some cases, these recommendations are not congruent with best agricultural practices or with farm-level profit maximization.

COLD STORAGE PROVIDERS: The Lebanese countryside is dotted with small warehouses equipped with refrigeration. Many of these cold storage units are owned by damans or by large farmers who use them for their own apples, and also rent space to anyone wishing to store apples. Many farmers store their product in the peak season (harvest through March) at a cost of $3.00- $4.00 per 20-kg crate. Although the cooling technology used (no pre-cooling, mixing of different products, questionable temperature, ventilation, and humidity control) could be improved, these cold store service providers allow many farmers to benefit from expected off-peak seasonal price increases. Large traders have made significant investments in modern cold storage facilities; for example, Jean Zgheib in Balamand constructed a facility that holds 400,000 cases or 8,800 tons.

[11] A detailed evaluation of the vegetative performance of seedlings planted with various types of imported rootstock in different production climates over the past several years would be of enormous value. The generally negative impressions gathered by the Study Team in talking with nursery operators and farmers is by no means authoritative, and should be considered only as an imperfect indication that a more systematic investigation by LIVCD is warranted.

6. BUSINESS ENVIRONMENT FACTORS AFFECTING THE VALUE CHAIN

Key elements of the environment surrounding the apple value chain are described below.

ACCESS TO FINANCE

Lebanon's commercial banking sector is one of the most advanced in the region, with 54 commercial and 10 specialized banks (including four Islamic banks), 23 MFIs, multiple finance companies, and leasing offered through retailers and manufacturers. Government and donor support for lending to small and medium-sized enterprises (SMEs) is strong, including: the Kafalat loan guarantee; BDL interest rate subsidies and reserve requirement exemptions for SME loans; the Economic and Social Fund for Development providing capital, BDS services, de facto guarantees for commercial SME loans; and IFC support for SME lending and trade finance. Specific to agriculture, a recent partnership between the Ministry of Agriculture and Fransabank aims to increase agricultural lending. Two of the largest MFIs (Al Majmoua and ADR) have developed agricultural loan products, and the Lebanon Investment in Microfinance (LIM) program supports increasing microfinance for agriculture.

Despite the potential of this large and sophisticated sector, with an impressive array of incentives, credit to small and medium enterprises and the agricultural sector remains limited. The banking sector invests primarily in treasury bills, with loans to the private sector representing only 24 percent of total assets. The largest share of this credit is disbursed within the greater Beirut area. A high concentration of this credit goes to the trade and services sectors, and to a very small number of larger businesses – about one percent of borrowers benefit from about 50 percent of private sector loans. Loans to the agricultural sector account for only one percent of all lending. Access to finance is also hindered by the mismatch between terms and conditions of available loan products and the needs and capacities of SMEs, including high interest rates, high collateral requirements, and a lack of seasonal loans structured for agriculture. Incentives intended to mitigate the "crowding out" influence of public borrowing have so far failed to catalyze macro-economically significant lending.

The chief program for promoting SME lending is the Central Bank's Kafalat loan guarantee program that has been operating since 2007. Under this program, a private finance company, Kafalat, has been set up with central bank support to offer guarantees to qualifying SME loans made by participating commercial banks in three separate windows. The lowest window (Kafalat Basic) covers loans under $200,000 and provides a 75 percent guarantee on the loan principal along with subsidized interest up to a set level. Current interest rates are such that the Kafalat subsidy covers all but 0.05 percent of the interest. The borrower also pays Kafalat a 2.5 percent administration fee. Other windows offer higher levels of guarantee for larger loan amounts along with similar interest subsides. Kafalat issues guarantees on examination of loan dossiers that originate in the commercial banks that are responsible for the loan. The Ministry of Agriculture has been an active proponent of this scheme and has publicly supported the use of Kafalat guarantees as a way of supporting investment in agriculture. As of the end of 2012, $51.6

million in loans, about 37.4 percent of all Kafalat loans, had been approved for agriculture sector uses. Banks such as Byblos, Fransabank, and Credit Libanais have been the most aggressive originators of Kafalat loans to agriculture. There is little doubt that the Kafalat program can, if correctly accessed, provide an attractive source of commercial financing for medium and small-sized apple chain farmers and packers. The main hurdle for such smaller actors will be fulfilling the loan application document requirements imposed by the participating banks- most notably the potential borrower must have a business plan.

Product Traceability Regulations

In 2010, the Ministry of Agriculture launched a voluntary policy requiring farmers to register and, for wholesale market sellers, to record the origin of produce moving through the wholesale markets. In 2011, these regulations were to become mandatory, but have since been delayed. While implementation of this program has been difficult, particularly in crops such as apples where many small farmer lots are mixed by damans, the motivation for these regulations—to bring a level of traceability that will give the consumer confidence in the product being sold and to hold farmers accountable for pesticide residues—is valid. It has yet to be determined how these regulations will be enforced, but many damans, wholesalers and larger farmers in the apple sector are aware of them and state their readiness to comply.

Extension Services and NGO Support Programs

Apple farmers receive little to no extension support. Larger farmers will occasionally hire agronomists from American University of Beirut or the MOA to advise them on new investments in commercial orchards. But smaller farmers have virtually no source of advice on improved techniques and will often rely on neighbors or the local nursery for advice, which often serves to replicate dangerous practices such as uncontrolled grafting. The other source of information about apple production is the handful of big input supply firms whose main focus is on encouraging the use of their products. In addition, some large NGOs including RMF, Frem Foundation, Safadi Foundation, and Hariri Foundation employ agronomists as part of donor-funded activities who provide extension to producers in the areas in which these NGOs operate.

The MOA is in the process of reorganizing and recruiting extension staff that will be mandated to visit fields in the upcoming year. The existing budget is for 50 agents to cover all of Lebanon. These agents, if well-trained and managed, are a potentially valuable source of production advice for Lebanese farmers, the benefit of which could be extended with the integration of crop-specific experts, on whom the agents could call to get advice on specific problems.

Business Culture

The Lebanese business culture has elements that offer important levers to the development of the apple value chain. The first of these is a wealth of entrepreneurial individuals, coupled with a cultural ethos that emphasizes ties to “the family land” or to the home region. These two factors combine to provide a fertile pool of wealthy

individuals who are interested in investing in agricultural activities in ancestral mountainous lands—often as part of a network of land holdings within an extended family. In many cases, these family networks may include members with resources or commercial inclinations to engage in packing and export. Many of the large farmers in the Value Chain Map in Figure 15 own family plots of several hectares that belong to individuals who have significant additional sources of revenue and take great pride in developing lands located in their region of origin. These individuals form an important potential anchor for regional fruit tree development activities. They can also be an important vector for socially-oriented investment from Diaspora Lebanese looking to contribute to their home communities. Another, less positive, aspect to the presence of strong family links in Lebanese business culture is the strong tendency of businesses to want to integrate vertically through alliances with related family businesses. This often interferes with or slows the development of inter-firm cooperation.

7. DYNAMIC TRENDS

There are two distinct dynamic trends in the apple value chain:

1. Apple production ***is profitable and has attracted recent renewed farmer investment.*** In consultation with local and international experts, the LIVCD Team constructed three typical models of apple farms that are broadly characteristic of existing and possible types of apple farms in Lebanon. The details of these models are presented in Annex 1, Figures 1-3 at the end of this case study. The price, cost, and yield assumptions for apples in Figure 16 below are based on prices and conditions for mountain apples and show generally good returns for all models once the orchards reach at least 50 percent of full productivity. With lower Bekaa Valley apple prices dropping to a floor of around 500 LBP per kg or $0.33 for second quality apples sold to damans, these models would require significant adjustment, with a portion of higher-quality apples added into the sales mix, but would also likely still show good profitability.[12]

FIGURE 16: ESTIMATES OF APPLE ORCHARD PROFITABILITY

Percentage of Full Production	**Model 1:** Low-investment, low-labor, "civil servant retiree" model, sells to damans, 2 ha (60% of orchards)	**Model 2:** "Small commercial farm" model with moderate investment, improved spur variety rootstock, staking, hired labor and packing investment, sells direct to exporter or local wholesale market, 4 ha (35% of orchards)	**Model 3:** Semi-Dwarf rootstock, "intensive commercial farm" with high investment (packing and trellising), high labor, sells direct to exporter or local wholesale market, 4 ha (5% of orchards)
Per Kg Costs of Production at % of full potential production ($USD per kg)			
At 100%	$0.21	$0.55	$0.31
At 50%	$0.42	$1.01	$0.62
At 25%	$0.84	$2.02	$1.26
Average Sales Price of Apples ($USD per kg)			
	$0.50	$0.99	$1.04
Net Returns ($USD per kg)			
At 100%	$0.29	$0.44	$0.73
At 50%	$0.08	-$0.02	$0.42
At 25%	-$0.34	-$1.03	-$0.22

For additional detail regarding apple orchard profitability, see Annex 1

[12] These estimates are based on 15-year cash flows in Supplemental Tables A-8 to A-10, with a 10 percent discount rate. Costs of production are calculated as simple annualized arithmetic averages of 15-year investment and operational costs. Full NPVs and IRR figures are discussed below in the Value Chain Upgrading Plan's discussion of LIVCD's orchard regeneration program.

The generally good profitability of apples appears to have attracted new investment as evidenced by new orchards and obviously renewed nursery activity in the main producing areas in the mountains. This phenomenon seems to be strongest among larger wealthier families, but it is also being replicated on a less dramatic scale by their more modest neighbors. As no reliable data are available to document this, the extent of this movement is uncertain, as is the date at which it began. It appears that the upswing in production shown since 2004 coupled with the four-to-seven year lag between planting and production means that this phenomenon probably started in the first half of the 2000s and seems to be continuing.

2. ***The arrival of smaller traders has undercut the market power and leverage of larger packers and exporters.*** The entry of numerous small exporters into the export trade has significantly weakened the relationships between farmers and the larger packers/exporters. The "broker-exporters" with little physical storage or packing equipment have increased competition between exporters for the services of the larger damans with cold storage and generally weakened the vertical linkages in the value chain between the better equipped exporters, damans and farmers. In terms of value chain governance models, this has contributed to a movement over the past ten years from a "balanced" system, where buyers and sellers have regular year-to-year relationships and some incentive to cooperate, to a pure "market" governance system where buyers and sellers become interchangeable and competition is overwhelmingly based on price. This development has contributed to the reluctance of Lebanese exporters to respect contractual sales terms. Whereas Lebanese exporters used to be paid by their Egyptian buyers through letters of credit (which is still the case for Turkey, according to one exporter), the most common terms of sale now for apples into Egypt is on a consignment basis with no set price and payment only after the goods have moved through the market. As a result, sellers are uncertain what price they will receive, and Lebanese apples receive a lower price than imports from other countries because of this system. In the absence of any attempt to enforce higher standards on exporters,[13] it will be necessary to help Lebanese apple exporters to improve sorting, grading, and quality control capacities through positive reinforcement built around specific market opportunities.

The main constraints faced by value chain actors in the context of these two dynamic trends include:

PRODUCTION

LACK OF PUBLIC SECTOR EXTENSION SERVICE: As described above, apples farmers have few options for extension support, with access especially limited for small farmers who are unable or unwilling to invest in technical advice. Some NGOs including RMF and Frem Foundation focus on apple production and provide information and extension in their areas of intervention.

[13] The Fruit and Vegetable Exporters Syndicate, which represents all fresh produce exporters and has more than 200 members, has no plans to limit access or tighten requirements for registering fresh product exporters.

SMALL FARM SIZES MAKE PRODUCTION COSTLY: Lebanese apple orchards average less than one hectare in size. Unable to achieve economies of scale this causes a fragmented and inconsistent supply of quality produce, expensive input supplies, and less than fair farm gate pricing. This is exacerbated by the historical ineffectiveness of the cooperative model in Lebanon.

POOR QUALITY AND EXPENSIVE GERMPLASM: Farmers seeking apple seedlings in Lebanon are faced with an array of imperfect choices. At the most expensive end of the market they can purchase imported rootstock from a private nursery for $10 to $12 a plant and do their own scion; at the next price level, for $3 to $4, they can try to obtain a grafted certified seedling with rootstock derived from imported rootstock from the RMF or Frem Foundation or from a Machatel Lebnan nursery; at the next level down for $1 to $2 they can purchase a non-certified grafted seedling from any nursery. The higher price points are justified by the virus free certification that comes from testing, and the use of imported rootstock as the mother plant, as a guarantee of the absence of contamination. However, farmers say they have a preference for local rootstock for better growth characteristics. The reality is that most small farmers seem to prefer using their own or neighbors' trees to produce seedlings from seeds (with unknown genetic purity), or they will purchase uncertified seedlings as rootstock and graft onto them desired varieties from their own or neighbors best performing trees. As a result, genetic impurity, disease propagation and unmatched scion wood-rootstock pairing continue to be prevalent. Apple farmers have yet to understand the advantages of using certified disease-free seedlings of known genetic purity.[14]

LOW QUALITY FROM OLD AND/OR POORLY MANAGED ORCHARDS: Optimally managed apple orchards in the mountainous parts of Lebanon should be yielding around 60 tons of apples per hectare according to most apple production experts. Ministry of Agriculture figures put average yields at around 12.5 tons per hectare on a national basis. Experts generally agree that the primary reason for this low productivity is the advanced age of apple trees.[15] Additional reasons include the high prevalence of viruses and sub-optimal agricultural practices: primarily poor pruning and poor irrigation practices (combined with lack of drip irrigation).[16] Low yields from older orchards are unprofitable. For small farmers without significant outside sources of revenues, negligible revenue from a diseased tree is better than no revenue at all for five years. Thus the required investments to renew orchards (mainly new grafted varieties with micro-climatically appropriate disease free rootstock) mean lost income, which constitutes a significant obstacle. An important ancillary problem is the overuse of pesticides and fertilizers and lack of adherence to recommendations or regulations regarding the timing of spraying in relation to harvesting. This continues to be a problem in marketing, and especially exporting of apples.

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[14] Of course public regulations establishing mandatory standards and licensing for nurseries to ensure a market for certified seedlings would be an option, but in reality this is not now feasible nor desirable as testing capacities and procedures (as well as public confidence in them) are not in place to make this work. In this context, the "positive reinforcement" in the form of voluntary standards piloted by Machatel Lebnan is a reasonable strategy.

[15] No recent figures on average tree ages are available. But the severity of this problem is confirmed by a number of sources, such as the Abou Zeid Baseline study for the FAO and in discussions with farmers.

[16] According to Abou Zeid, only 30 percent of apple farms in Lebanon have drip irrigation.

POOR QUALITY/LACK OF HOMOGENEITY: The problem of quality, mainly in terms of lack of homogeneity, is related to low yields. With trees of varying vigor, poor irrigation and non-standard pruning, the degree of variability in fruit size and color within most orchards is much greater than international standards. This magnifies the sorting and assembly challenges faced by downstream packers who already are dealing in small lot sizes (the largest exporters do around 2,000 to 3,000 tons per year). The packers find it difficult to assemble lots with homogenous size and color to get top pricing. An added problem is that the supply of apples is still heavily weighted to the old varieties, with shortages in the supply of the highly demanded new brighter red apple variants (Scarlett, Red Chief, and Top Red) as well as Gala and Granny Smith.

LACK OF KNOW-HOW TO MITIGATE CLIMATE-RELATED RISKS: Farmers lack the knowledge and equipment to protect their orchards from extreme weather and temperature fluctuations. This makes investments into orchards and operations more risky and depresses interest in investment in the sector. Small farmers sell their production as quickly as possible at the lowest prices, resulting in unripe, low quality fruit earning the lowest prices of the season.

In 2011, heavy snowfall caused major damage to newly planted orchards in the apple producing areas of Kesourwan and Tannourine. With no government or private sector support, many orchards were left as-is, reducing yields, and stifling additional investments in apple production. The introduction of modern plant protection and IPM practices as risk management tools will enable farmers to focus on profitability and achieving the highest value for their production.

PACKING AND STORAGE

POOR HARVEST AND POST-HARVEST HANDLING: With a large number of small orchards and small-scale daman traders responsible for collection and aggregation, poor handling during and after harvest contributes to high losses in the marketing chain and diminishes product quality. There are a number of simple logistical measures and investments that could be implemented to improve shelf-life and reduce damage to fruit. These include: using simple field shelters or storage facilities to provide shaded storage and loading spaces for harvested production; improving loading zones in packing plants/cold storage facilities with plastic sheeting to reduce air exchange during loading of refrigerated trucks and using pre-cooling chambers with forced-air to speed heat-loss in apples entering into storage. Harvesting decisions are also often poorly timed with farmers responding to damans' buying schedules rather than actual fruit maturity. Small scale farmers and damans seldom test for fruit maturity, sweetness, starch content or firmness. As a result, fruits are often harvested too early-particularly at the start of the season when prices are generally higher. The simple use of a refractometer to measure sugar levels before harvest could make a significant difference to harvested quality.

Processing

Inconsistent supply (quantity and quality), and inappropriate varieties of apples for processing: Processors face an inconsistent supply of low-priced apples of the appropriate variety for processing, a consequence of the fragmented nature of apple production and the lack of sorting and grading, at the farm level up to the wholesale level. This constrains sustainable operation of processing at a commercial scale. In turn, this lack of processing and demand for low-priced apples does not provide farmers an incentive to sort and grade. Instead, they combine their Grade 1 apples with lower grade output, receiving a price for the entire quantity that is lower than the Grade 1 price, yet still results in higher earnings than if the lower quality apples were not sold at all.

Lack of business and marketing skills among artisanal processors: Small processors, especially cooperatives, generally produce high quality products such as apple molasses, jam and vinegar. However, the quality of the finished products is compromised because these processors use low-quality, generic packaging and labeling for these products. In addition, cooperatives do not pay attention to managing costs and margins, which affects profits. They engage mostly in direct sales and have little experience in dealing with commercial buyers and managing supplier relationships. Improved marketing efforts through upgraded packaging and labeling, sponsored trade events and supplier and vendor training will open up marketing channels and raise incomes for farmers and processors.

Low availability of processing grade apples for juice and molasses manufacture: The most common complaint processors and distributors have when asked about sourcing locally is the lack of consistency in quantity and quality of supply, compounded by annual price fluctuations. The cessation of operations of the Kassalty-Chtaura juice operation mentioned above provides a concrete illustration of the consequences of the lack of appropriate lower quality apples for processing.

Distribution and Marketing

Producers, traders, and packers/exporters are accustomed to traditional markets such as Egypt: The Lebanese apple sector is an old industry that has relied on traditional export markets, such as Egypt, to purchase most of its production. These relationships have existed over generations, without contracts and payment guarantees. Entering new markets or changing the way business is done is risky and time consuming, making it problematic for stakeholders to adjust their business model to maximize returns.

Lack of capacity to create linkages and diversify into new markets for low quality produce: Excluding Egypt, Lebanon does not supply or hold significant market share in any of the large markets, particularly those for low value apples. Lack of diversified export channels heightens risk throughout the apple value chain, as stakeholders lack options to sell their product in the event of a crisis.

THE LACK OF MARKET ANALYSIS CAPACITY AND TENDENCY TO MAKE BUSINESS DECISIONS BASED ON INSUFFICIENT ANALYSIS: Neither individual exporters, nor the Fruit and Vegetable Exporters Syndicate, nor any local consulting firms or public export promotion bodies provide any type of market analysis of opportunities in the region or elsewhere for apple exporters. This is a problem that goes beyond the apple value chain—as it is common to all fresh produce sectors. This lack of market analysis capacity hinders exporters' ability to react to changing conditions in their focus markets and to take advantage of emerging opportunities elsewhere. Indeed one of the larger exporters told the team that when conditions are not right for sale in to Egypt, he prefers to leave the market altogether, since he had no contacts in other countries that he trusts. This points out a serious need—not only for some level of market analysis capacity building, but also for assistance to exporters in establishing the needed market relationships in new target markets.

8. VALUE CHAIN OPPORTUNITIES

Four major opportunities exist for creating a more competitive apple value chain.

1. Focus on needed improvements in the production and post-harvest systems to produce Grade 1 apples in sufficient quantities and qualities to supply both the fresh high-end local market and export markets in the Gulf.
2. Respond to the growing regional markets by supporting Lebanese exporters to develop the needed contacts and analytical capacity to react to export market opportunities.
3. Leverage investments in new orchards to lower production costs by improving fruit tree production and plant protection practices to raise margins at the farm-level.
4. Support, develop, and improve processing operations to diversify sales channels for farmers and rural processors, incentivizing grading and sorting and a supply of low priced apples, thus minimizing the risk to producers of having unsold low quality apples, and risk to processors of not securing a consistent supply to low price apples for processing.

OPPORTUNITY#1: CAPITALIZE ON HEALTHY DOMESTIC AND REGIONAL DEMAND BY INCREASING PRODUCTION OF IMPROVED QUALITY APPLES OF THE RIGHT VARIETIES

Premium fruit exporters stress that UAE and Saudi Arabia could easily absorb another 15,000 tons each of Grade 1 apples, giving Lebanon a modest 10% market share. Furthermore, apple exporters estimate that with better packing, more homogenous lots in terms of color and size standards, and an increased quantity of the apples with intense red color from new varieties (Scarlett, Super Chief, Top Red, and Double Red), Lebanese apples could earn significant premiums in the Egyptian market and consistently fetch above $1.30 per kg (2,000 LBP per kg).

With the growing trend of high-end produce retailers, the domestic market is poised to absorb a greater volume of higher quality apples in the near future. Already the domestic market skims off the highest quality apples (mainly defined in terms of size). Increased production of Grade 1 apples displacing production of Grade 3 apples, and potentially displacing the approximately 1,000 tons of imports (which retail at more than double the price of Lebanese apples), returns to actors able to produce and sell into this part of the market are likely to be favorable for the foreseeable future.

To do this, however, it will be important to adopt the sort of agricultural practices that will guarantee larger-sized apples with good color and with increases in production of new varieties. To respond farmers must plant new tree stock and regenerate old orchards with the right combinations of virus free rootstock/scion wood. The Global GAP standard provides a standard set of practices covering production, harvest and post-harvest activities including pruning, fertilization, pesticide application, record keeping, location, and harvest timing. Use of these correct practices contributes to production efficiencies and influences pesticide residue, homogeneity and intensity of color and

overall appearance which is important for marketing, even though Global GAP is not yet demanded in the domestic or regional Gulf market.

At present, with much genetic mixing of old varieties occurring in the uncontrolled scion-wood grafting going on in nurseries all over Lebanon, the issue of genetic purity along with freedom from viral diseases will also continue to pose problems to investors in orchards. This could harm their ability to consistently produce the highest levels of quality needed to capture market premiums in both local and export markets.

The most important challenges that will need to be overcome to exploit this opportunity include:

1. Increasing areas or renovating old orchards on a large scale with the introduction of improved agricultural practices to support production of higher quality, more standard fruit in varieties demanded in the market, through:
2. Large-scale acceptance of Global Gap practices.
3. Developing supply of the new variety red apples most in demand in the region, by developing sourcing of good quality rootstock and scion-wood at prices that will attract small farmers
4. Increasing capacity of small producers to access subsidized loan programs to improve their orchards and produce Grade 1 fruit.
5. Improving coordination between producers and traders/packers to ensure respect of quality harvesting and post-harvest handling protocols.
6. Increasing the ability of Lebanese exporters to meet international standards, which will likely require the emergence of larger better equipped exporters.
7. Increasing investments in modern post-harvest and cold storage facilities, including upgrades to existing but below-standard facilities.
8. Moving entrenched traders and exporters away from traditional markets and trading practices
9. Supporting market analysis to identify new markets and develop strategies for initial market penetration

Opportunity #2: Facilitate New Contacts and Linkages with Regional Food Buyers via Study Tours, Trade Show Participation, and Buyer Visits

By providing regional apple importers with a consistent supply of high quality apples, Lebanon can capture significant market share and value. For instance, a 25 percent market share in the premium apple market in Saudi and UAE would result in exports of 77,500 mt valued at approximately $75.6 million (net increase of 60,000 mt valued at

approximately $59 million over current exports). This increase in market share can be achieved through the production of better quality apples and establishing new market linkages to higher quality buyers. Figure 17 below shows the value in US Dollars and the total volume that could be exported if Lebanon was able to capture 10 percent or 25 percent market share in the following countries.

FIGURE 17: MARKET SHARE CALCULATIONS AT AVERAGE IMPORT PRICE PAID 2012

	10%		25%	
Country	**Value (million $USD)**	**Tonnage**	**Value ($million USD)**	**Tonnage**
Oman	2.4	2,279	6.0	5,697
Jordan	2.8	2,871	7.1	7,179
Saudi Arabia	15.1	15,914	37.7	39,786
Iraq	3.4	8,872	8.5	22,181
United Arab Emirates	15.1	15,120	37.9	37,800
Libya	1.7	2,765	6.8	6,912
Algeria	8.4	12,862	21.1	32,155
Total	**40.5**	**47,822**	**104.0**	**119,554**

Source: Trademap

The United Arab Emirates in particular presents a promising opportunity for Lebanese apple producers able to supply the varieties, quality, quantity, and consistency demanded by this lucrative and growing market. First, the economic recovery is well underway in UAE, and its rapidly growing population and affluence once again demand high quality and specialty foods, particularly larger quantities of fresh fruits and vegetables.

Second, the UAE is an excellent initial market for producers wishing to enter higher value export markets, but that do not yet have the technical capacity and certification (for example, Global GAP) to enter the EU. Third, the UAE is the major re-export hub to other regional markets in the Middle East and Asia. Therefore, suppliers able to establish business relationships with Dubai or Abu Dhabi-based importers benefit from a larger overall market, which would include both the UAE as well as other apple importing countries.

There are three major market opportunities for Lebanese growers and traders in the UAE: the food retail sector, the food service industry, and major importers/wholesalers. In order to enter the UAE market, exporters need to develop direct linkages with institutional buyers such as Choithrams, Spinney's, and other large supermarket chains.

9. VALUE CHAIN UPGRADING STRATEGY

The LIVCD project's upgrading strategy will increase revenue in the apple value chain in the long-term, by increasing the overall competitiveness of the value chain measured by the percent change in share of domestic and targeted international markets for goods and services provided by LIVCD-assisted enterprises.

The upgrading strategy exploits opportunities related to the two dynamic trends identified above, namely 1) working with Lebanese growers to improve production and increase yields of Grade 1 apples of the varieties demanded in domestic and export markets, and 2) working with exporters and traders to counter the negative dynamic trend of one shot transactions of low quality fruit, and instead take advantage of opportunities for supplying high quality, higher priced apples.

The LIVCD project Upgrading Strategy includes providing technical assistance, some targeted financial support and, most importantly, helping actors at different parts of the value chain come together and collaborate over some simple concrete projects in which they have a common interest. LIVCD will use Public-Private Partnerships with qualified lead partners as a tool to leverage private investments to meet development objectives. One positive aspect is that significant investment has already been made into the production of new varieties and the volumes from the trees already planted will continue to increase as those trees mature.

The Upgrading Strategy rests on four main axes of intervention:

AXIS 1: WORK WITH "LEAD PARTNERS" TO LEAD FOCUSED REGIONALLY SPECIFIC PROGRAMS OF IMPROVED PRODUCTION AND POST-HARVEST HANDLING;

LIVCD will facilitate "orchard improvement" activities in collaboration with 'lead partners', or existing actors in the value chain who are interested in and willing to coordinate and even provide some investment support for portions of an integrated production and post-harvest handling support package for smaller farmers. The intention is for the activities to be the lead partners' initiative, with the LIVCD project in a secondary facilitating role as far as possible. Lead partners should be willing to defray some of the operational and investment costs in increasing production from small farmers, if they can negotiate longer-term agreements of cooperation that will ensure that they will receive the resulting product. Since the element of risk due to delays between planting and full production is relatively high for tree fruit, it will likely be necessary for LIVCD to contribute some financing to the package. A corollary to this is that the lead partner will have a large say in the selection of small farmer participants and on key facets of the technical package to be implemented.[17] LIVCD aims to reach 800- 1200 farmers cultivating 3,000 ha, in the six major apple regions: Dinnieh, Akkar, Tannourine, Mount Lebanon, Chouf, and Western Bekaa.

[17] The degree of control resting with the lead partner will, of course, be proportional to their share of the investment cost.

Potential lead partners include:

1. *LARGE FARMERS* In many zones large farmers, often wealthier families, may serve as estate-farm relay centers for organizing extension, nurseries, post-harvest storage, packing and marketing for their smaller neighbors. These could take the form of informal or formal cooperatives with the large farm playing the Apex body role, or they could be based on simple written agreements without any formal structure. These will be most successful where large farms already have some packing capacity and experience with exporting. LIVCD can also help them establish links to packers/exporters.
2. *SPECIALIZED APPLE EXPORTERS* The 20 or so larger specialized apple exporters who have significant packing plant capacity and cold storage, often located in one of the six targeted regions, are good candidates for investing in their small farmer neighbors, particularly those who have established especially strong long standing supply relationships.
3. *DIVERSIFIED PACKERS/EXPORTERS* Although they are not apple specialists, the larger diversified packers/exporters are the most sophisticated and largest players in the wholesale fresh fruit and vegetable industry in Lebanon. A number of these players have large fixed investments in packing lines for round fruit that are closed or not operating at more than a fraction of capacity.[18] The development of a loyal supply base of quality apple growers is likely to attract some of these players.
4. *SPECIALIZED PRODUCE RETAILERS* Some of the emerging produce retailers may also be interested in securing a consistent supply line providing traceability guarantees that they are unable to get in the urban wholesale markets. While these players are unlikely to be big investors in production, they may also be promising partners in alliances with producers who need market sales outlets.

Activities will respond directly to the constraints experienced by the participating actors, including:

1. *ESTABLISHMENT OF DEMONSTRATION ORCHARDS* LIVCD will provide demonstration farmers with technical guidance and sourcing of needed inputs (primarily seedlings, but also drip irrigation and trellises where appropriate). Demonstration farms will show proper orchard planting on new or regenerated plots, as well as proper pruning, thinning, fertilization and spraying practices that should begin to yield improvements in quality for existing production. Subsidization will be kept at a minimum, as lead partners and farmers will be encouraged to share in training costs.
2. *SUPPORT FOR PROCUREMENT OF SEEDLINGS OF GUARANTEED QUALITY* LIVCD will pre-vet appropriate sources of germplasm including NGO

[18] This seems to be especially true of the traditional citrus exporters on the coast around Saida and Tripoli.

Foundation nurseries, Machatel Lebnan nurseries and potential new sources of quality germplasm (see section below on Business Development Services (BDS). LIVCD will inventory all existing pilot sites in Lebanon for the main types of root stock and scion-wood. A study tour will then be organized with NGOs and the Machatel Lebnan Association to familiarize the actors with the most promising root stock and scion wood combinations for specific climates.

3. *EXTENSION VISITS AND TRAINING* In addition to lead farmers' demonstration orchards, LIVCD will work with available sources of fruit-tree expertise in the production areas including extension staff, foundation staff and input suppliers to work alongside them as they train personnel from these institutions on the appropriate apple production models. This assistance will also be linked to the MOA's new program for farmer registration to ensure that apples from participating farmers will be fully traceable.

4. *HELP WITH INVESTMENT FINANCING FROM OUTSIDE SOURCES* With Kafalat and other publicly supported bank financing plans for agriculture offering investment financing products,[19] prospects are good for financing a portion of program participants' investments in new orchards through medium to long term loans. LIVCD can contribute to this by putting into place business planning services for small farmers, orchard financing models and larger credit packages that will help small farmers fulfill loan application requirements and qualify for loan packages from commercial banks.

5. *NEGOTIATIONS OF CLEAR POST-HARVEST HANDLING PROTOCOLS* Finally, LIVCD will also work with lead partners to establish clear harvesting and post-harvest handling protocols for farmer participants in the program-specifying harvesting schedules based on maturity, making sure that spraying protocols are respected, and detailing field packing and sorting procedures to preserve fruit quality and respond to the buying firm's requirements.

AXIS 2: DEVELOP NEEDED BUSINESS DEVELOPMENT SERVICE PROVIDERS TO ADDRESS CRITICAL NEEDS IN THE VALUE CHAIN;

1. *SUPPORT FARMERS WITH BUSINESS PLANNING AND LOAN APPLICATIONS* The documentary requirements for accessing commercial bank credit including a simple business plan and cash flow model are beyond the capacity of most small and even many larger farmers. LIVCD will work with local actors and business schools such as AUB Oyalan School of Business, the University of Balamand, the Lebanese American University and USEK to hold certifying training sessions for business planning consultants, focusing on the major elements of the apple production models being financed, the key risk

[19] In addition to Kafalat loans, the MOA has recently signed agreements for subsidized loans for agriculture with Fransabank and with the Lebanese Bankers Association. These loans will provide lending for up to four years at rates at rates of around 5 percent. The Ministry's objective is to increase the number of farmers with access to private credit from 3–4 percent to 30–40 percent.

parameters for farmers and the modeling of orchard operations, and link potential apple value chain clients to these consultants.

2. *SUPPORT INPUT SUPPLIERS IN APPLE PRODUCTION AREAS TO IMPROVE THEIR EXTENSION CAPACITIES* With the new MOA emphasis on traceability and reducing excessive pesticide usage, input suppliers are coming under increasing scrutiny under the suspicion that they are advising farmers to overspray chemicals. Since it is generally believed that apple farmers do use excessive dosages of fertilizer and pesticides, LIVCD can work with input suppliers who are targeting fruit trees and train their sales and extension staff in the appropriate orchard models as well as make sure that these firms supply matches the input needs of the farmers, supplying help in finding new sources of inputs, if required.
3. *SUPPORT DEVELOPMENT OF NEW SOURCES OF FRUIT TREE GERMPLASM* The possibility of using tissue culture to reproduce clean locally-acclimated imported rootstock on a large scale under controlled conditions has the potential to introduce efficiencies that would significantly lower the cost of high quality tree fruit germplasm and lower the risk of contamination from unsupervised nursery operations. An even simpler approach is to establish stoolbeds, probably in the sandy Bekaa soils, and produce rootstocks locally, and then bud with virus free scions.
4. *HELPING TO IMPROVE OPERATIONS OF COLD STORAGE OPERATORS* Given the poor state of many cold storage facilities in apple producing zones, efficiency in this sector could be greatly improved with some simple energy use audits of existing facilities.
5. *DEVELOP MARKET ANALYSIS CAPACITY FOCUSING ON DOMESTIC FOOD MARKETS AND EXPORT MARKETS* Few firms in Lebanon are able to offer market analyses looking at traditional or new export markets to fresh produce exporters. LIVCD will work with firms interested in entering this sector by conducting a number of market analyses in the first year for key product/market pairs with senior international consultants/firms and selecting one or more Lebanese firms to twin with the expatriates during these assignments.

AXIS 3: RESPOND TO THE GROWING REGIONAL MARKETS BY SUPPORTING LEBANESE EXPORTERS TO DEVELOP THE NEEDED CONTACTS, LINKAGES, TRADE, AND ANALYTICAL CAPACITY TO REACT TO EXPORT MARKET OPPORTUNITIES.

LIVCD will help Lebanese apple traders compete in the fast-growing domestic and regional export markets for high quality fresh apples. Developing the capacity to identify new market opportunities; understanding and conveying market requirements upstream to growers, harvesters, and packers; and reaching mutually beneficial business arrangements with new buyers is critical to identifying opportunities for increasing income. LIVCD will assist apple producers, traders, and exporters in identifying new market opportunities

and establishing relationships with new buyers in the UAE and Saudi Arabia in three target market segments: the food retail industry, the food service sector (hotels and restaurants), and major wholesalers. This will include participation in relevant tradeshows—particularly Gulfoods and SIAL Middle East, study tours to the GCC to meet with prospective buyers to identify the quality requirements demanded, and assistance in supplying trial shipments to target buyers. Once traders understand the quality requirements they must be communicated down the value chain. This element is linked to the activities in Axis 1, such that production and post-harvest handling improvements are responsive to actual market demands.

AXIS 4: SUPPORT AND PROMOTE PROCESSING OPERATIONS TO IMPROVE MARGINS AND DIVERSIFY MARKET CHANNELS FOR PRODUCERS;

Support to processing operations provides farmers with additional sales channels for low quality production for industrial/commercial production, or opportunities for vertical integration into artisanal level processing.

1. At the commercial/industrial processing level, support consistent supply of the correct varieties, invest in additional equipment, and provide marketing support for packaging, branding, and consumer awareness.
2. At the artisanal level, LIVCD will create an assistance package including commercial grade equipment, a selection of inputs such as jars and labels, branding and marketing support. This package would include a selection of inputs, for example a variety of packaging, to provide producers with a level of product differentiation.

Pear Value Chain Assessment

1. PEAR VALUE CHAIN OVERVIEW

The Lebanese pear industry is small, with annual outputs estimated around 33,000 tons. About 2,500 farmers produce on over 2,000 hectares of land. Ninety percent of pear production comes from small farmers with between 0.3 ha and three ha of land planted with pears, and the remaining 10 percent is grown by large farmers. Overall, about 10 percent-15 percent of Lebanese pear production, or 3,000 tons, is considered Grade 1. Like apples, pear orchards are an attractive component of a diversified livelihood strategy, as there are relatively low management costs during the season, compared to field crops.

Generally, Grade 1 pears are sold into the domestic market or exported to the Gulf while smaller pears are exported to Syria, Iraq, and Jordan. There is high demand for Grade 1 pears of all varieties, putting these producers in a good position vis-à-vis buyers including supermarkets, wholesalers, and exporters, who compete for this product. There is also demand for Grade 2 and 3 pears, which comprise the vast majority of Lebanese pear production, for the regional export markets. This demand has increased due to a gap left in the market by sharp declines of Syrian pear exports, which are also mostly Grade 2 and 3. Thus, there are good opportunities for all qualities of Lebanese pears. However, poor production practices result in yields that are below international standards, and inefficient practices result in high production costs. The small size and poor organization in the sector makes achieving economies of scale difficult.

LIVCD will work with value chain actors to create new value and increase competitiveness by exploiting opportunities associated with two dynamic trends: 1) Pear production can be profitable especially the Grade 1 product, and has attracted investment in conversion of orchards to modern varieties geared toward the export markets; and 2) There are strong regional markets for Grade 2 and 3 product, with additional demand in traditional markets created by a decline in Syrian exports. Upgrading strategies to exploit these opportunities include:

1) Increase availability of high quality genetic material for clonal propagation of rootstock and budwood;
2) Work with “lead partners” to lead focused regionally specific programs to increase production and improve post-harvest handling;
3) Develop needed business development service providers to address critical needs in the value chain.

2. VISION FOR PEAR VALUE CHAIN

A growing and profitable industry that is able to consistently supply a range of quality, marketable varieties offering higher returns to stakeholders and stimulating re-investment for maintenance of orchard productivity.

The industry:

- Employs modern agriculture practices that promote healthy, efficient and profitable production;
- Organizes its growers to meet changing consumer trends and access new markets;
- Provides diverse and profitable sales channels for farmers;

3. END MARKET ANALYSIS - PEAR

EXPORT MARKETS

The global pear trade grew 31.5 percent between 2007 and 2011, from $1.9 billion in 2007 to $2.55 billion in 2011. Export trade volumes have grown at a modest 1.9 percent per year since 2007 with over 2.7 million tons traded in 2011. However, the value of these exports has risen at a healthy 6.1% annually with 2011 export prices averaging about $0.95 per kg, up from $0.80 per kg in 2007. Rising prices is the main driver of this growth. Figure 18 below illustrates key statistics in the export of pears from the top exporters.

Ten countries account for 90 percent of the pear trade. Argentina, China, and Holland are the largest volume exporters reaching markets across the globe; Argentina and China are supplying 65 countries each and South Africa supplies 86 countries. Russia is the largest import market for pears, bringing in more pears than the second and third largest import markets combined at an average price of $0.91 per kg.

FIGURE 18: TOP PEAR EXPORTERS – WORLD

Countries	Quantity Exported, Tons (2011)	Annual Growth in Quantity Exported (2007-2011)	Annual Growth in Value Exported (2007-2011)	Average Unit Price $USD per kg (2007-2011)	Annual growth Unit Price (2007-2011)	Number of Markets Supplying (2011)	Unit Price $USD per kg (2011)
Argentina	472,470	0.78%	10.36%	0.75	9.21%	65	$.87
China	402,778	-0.12%	15.32%	0.52	15.54%	65	$.71
Netherlands	383,116	3.94%	5.22%	1.12	1.06%	57	$1.05
Belgium	287,609	0.22%	-0.13%	1.05	-0.34%	37	$.91
South Africa	181,580	0.76%	8.41%	0.78	7.36%	86	$.93
USA	178,222	2.99%	3.77%	1.03	0.69%	58	$1.05
Italy	162,850	-1.93%	-1.94%	1.43	-0.02%	56	$1.26
Chile	134,711	2.51%	7.85%	0.95	4.72%	54	$1.01
Spain	134,563	7.32%	7.64%	0.95	0.23%	65	$.95
Portugal	100,771	20.61%	25.01%	1.02	2.17%	29	$1.05
Lithuania	40,081	86.77%	84.58%	1.11	-0.41%	10	$1.01
France	33,577	-4.97%	-5.03%	0.93	-0.07%	46	$.86
Poland	25,195	131.09%	117.09%	0.80	-1.85%	19	$.78
Germany	21,111	8.13%	14.66%	1.39	4.65%	30	$1.42
Turkey	18,029	16.67%	3.76%	0.99	-1.32%	43	$.77
Average of top exporters	**161,933**	**2.09%**	**6.09%**	**0.90**	**3.75%**	**48**	**$.95**

Source: ITC calculations based on UN COMTRADE statistics

FIGURE 19: TOP PEAR IMPORTERS - WORLD

Countries	Quantity Imported, Tons (2011)	Annual Growth in Quantity Imported (2007-2011)	Annual Growth in Value Imported (2007-2011)	Average Unit Price $USD per kg (2007-2011)	Annual growth Unit Price (2007-2011)	Unit Price $USD per kg (2011)	Number of Suppliers (2011)
Russian Federation	422,518	2.29%	4.96%	0.91	5.81%	$1.07	33
Brazil	210,402	10.62%	21.74%	0.85	7.29%	$.97	8
Netherlands	204,437	9.49%	10.93%	1.13	0.98%	$1.05	28
Germany	171,383	-0.71%	0.98%	1.39	1.75%	$1.38	34
France	147,285	2.87%	2.83%	1.09	-0.04%	$1.01	26
United Kingdom	141,006	1.69%	-2.20%	1.24	-3.59%	$1.01	21
Indonesia	133,592	8.27%	11.14%	0.77	2.04%	$.80	13
Italy	126,759	2.55%	4.83%	1.11	2.03%	$1.15	18
Mexico	81,236	-1.07%	-2.53%	0.91	1.55%	$.95	4
USA	77,610	-5.59%	-4.71%	1.42	1.22%	$1.44	8
Viet Nam	73,207	15.14%	58.63%	0.35	24.63%	$.51	8
Canada	68,757	-2.64%	0.39%	1.13	3.47%	$1.23	21
Belgium	48,216	-6.99%	-8.01%	0.90	-1.57%	$.75	21
Spain	47,351	-2.71%	-0.57%	1.10	2.49%	$1.09	14
Average of top importers	**139,555**	**2.43%**	**4.22%**	**1.02**	**1.81%**	**$1.03**	**18**

Source: ITC calculations based on UN COMTRADE statistics

MENA EXPORTS AND IMPORTS

The MENA region imports twice as many pears as it exports. The UAE and Saudi Arabia are the largest importers in MENA, with UAE showing healthy growth in import volumes and unit prices over the last five years. The import strength of Yemen, and to a lesser extent Jordan and Algeria, has also been increasing.

Only a handful of countries in the MENA region have the climate to produce pears, including: Syria, Turkey Lebanon, Jordan, Tunisia, and Iran. In addition to these producers, the UAE serves as a broker to end buyers by importing and re-exporting. However, UAE exports have fallen 12.4 percent in terms of quantity and 7.1% in terms of value since 2007, as buyers bypass the broker and go directly to the exporters.

Syria, Lebanon, and Turkey are historically the largest pear exporters in MENA. The conflict in Syria has hurt its pear industry dramatically; estimates put 2011 exports at 2,000 tons, a sharp decline from 18,921 tons in 2010. Syria has become a net importer of pears, with imports increasing from 1,011 tons in 2009 to almost 6,000 tons in 2011. This suggests that domestic production has been affected and it will take time for its industry to recover.

Lebanon is one of the top pear exporters in the MENA region, in terms of volume and value traded. Lebanese pear export volumes grew at 8.5% per annum between 2007 and 2011, yet 2012 witnessed a 35% drop in export volumes compared to 2011, to 9,275 tons. This drop is a direct result of the Syrian conflict, which made it more difficult for Lebanese exporters to transport their product to export markets by road.

Lebanese pear exports fall into two classes: High quality, high value pears sent to the Gulf markets. These include both Bartlett and Coscia, although three times as many Bartlett pears are exported to high-end markets than Coscia pears. Pears in this segment attain prices of $1.33 to $2.00 per kg, and similarly graded Coscia and Bartlett pears command the same prices in export markets, according to one trader. Lebanon also exports lower value pears, mostly Coscia exported to Syria, Jordan, and Iraq at prices between $0.33- $1.33 per kg. These pears tend to be overwhelmingly Coscia variety.

The average export price of Lebanese pears in export markets has increased at a strong rate compared to global averages, averaging over 20 percent increases annually since 2007. In 2011, the price of Lebanese pears averaged $1.0 per kg, well over the world average of $0.90 per kg.

Turkish pear exports to the MENA region have nearly doubled since 2007 to about 18,000 tons in 2011, with Saudi Arabia and Iraq as the lead importers of Turkish pears. Turkey is emerging as a serious competitor in the traditional Lebanese markets and is eroding Lebanon's market-share in the GCC. However, MENA represents a large enough market to accommodate both Turkey and Lebanon, especially with the apparent elimination of Syrian competition in the short to medium term.

FIGURE 20: TOP PEAR EXPORTERS - MENA

Countries	Quantity Exported, Tons (2011)	Annual Growth in Quantity Exported (2007-2011)	Annual Growth in Value Exported (2007-2011)	Average Unit Price $USD per kg (2007-2011)	Annual growth Unit Price (2007-2011)	Unit Price $USD per kg (2011)	Number of Markets Supplying (2011)
Average of Top World Exporters	**161,933**	**2.09%**	**6.09%**	**0.90**	**3.75%**	**0.95**	**48**
Syrian Arab Republic	2,000[20]	5.59%*	56.05%	0.67	34.82%	0.92	17
Turkey	18,029	16.67%	3.76%	0.86	-7.04%	0.72	43
Lebanon	14,256	8.50%	37.24%	0.89	20.17%	1.04	15
Middle East Average	9,593	-1.95%	6.33%	0.76	9.17%	0.85	9
Tunisia	4,043	1.86%	9.31%	0.64	6.81%	0.72	9
United Arab Emirates	1,909	-12.14%	-7.13%	0.68	12.77%	0.86	24
Iran (Islamic Republic of)	398	-13.11%	-8.46%	0.33	13.53%	0.40	7

[20] Down from 18,891 mt in 2010.

* Figures are growth 2007-2010; 2011 data not available
Source: ITC calculations based on UN COMTRADE statistics

FIGURE 21: TOP IMPORTERS OF PEARS – MENA

Countries	Quantity Imported, Tons (2011)	Annual Growth in Quantity Imported (2007-2011)	Annual Growth in Value Imported (2007-2011)	Average Unit Price $USAD per kg (2007-2011)	Annual growth Unit Price (2007-2011)	Unit Price $USD per kg (2011)	Number of suppliers (2011)
Average of top importers	**139,555**	**2.43%**	**4.22%**	**1.02**	**1.81%**	**$1.03**	**18**
UAE	23,490	8.58%	15.75%	0.88	5.02%	$.99	20
Saudi Arabia	17,120	-0.40%	8.24%	0.86	8.82%	$.91	10
Algeria	8,695	34.51%	50.57%	0.78	5.89%	$.91	10
Libya	8,359	1.62%	3.68%	0.81	1.91%	$.81	9
Morocco	6,749	126.56%	61.97%	0.81	-8.81%	$.68	8
Syria	5,987	59.83%	77.45%	1.12	4.42%	$91	2
Middle East Average	5,658	7.51%	14.47%	0.81	5.06%	$.86	23
Oman	5,146	-1.80%	7.96%	0.69	10.73%	$.93	13
Jordan	4,579	5.70%	7.70%	1.01	1.56%	$.90	9
Yemen	3,870	57.56%	87.25%	0.69	7.66%	$.89	14
Israel	3,856	69.67%	-3.23%	1.44	-16.26%	$.52	3
Kuwait	2,930	-1.64%	6.72%	0.58	9.10%	$.69	14
Iran	2,892	-40.72%	-40.98%	0.69	-1.37%	$.69	5
Iraq	2,241	1.44%	48.45%	0.58	54.80%	$.71	7
Bahrain	1,930	6.81%	193.47%	0.87	10.69%	$1,04	24
Egypt	1,483	54.34%	34.09%	0.61	-5.45%	$.60	13
Turkey	1,382	41.56%	34.09%	0.63	-2.43%	$.64	6
Qatar	673	-11.25%	-8.21%	0.66	6.93%	$.74	15
Lebanon	463	41.73%	63.10%	0.95	6.92%	$1.04	6

Source: ITC calculations based on UN COMTRADE statistics

Selected Export Markets

FIGURE 22: PEAR EXPORTS FROM LEBANON (QUANTITY AND VALUE)

Lebanon	2007	2008	2009	2010	2011
Tons	10,005	12,546	12,995	11,014	14,256
Value ($'000)	5,188	9,945	10,248	14,287	14,848
Unit Price($/ton)	518	793	789	1,297	1,042

Source: ITC calculations based on UN COMTRADE statistics

FIGURE 23: LEBANESE PEAR EXPORTS BY COUNTRY (TONS)

Reporting Countries	2008	2009	2010	2011	2012
Saudi Arabia	3,094	2,190	2,065	1,800	2,287
Kuwait	1,603	1,195	1,270	1,050	1,426
Syria	2,925	5,059	4,202	5,780	1,287
Jordan	2,087	2,341	998	2,243	1,198
UAE	1,366	941	910	622	819
Iraq	31	108	189	1,247	672
Oman	485	311	374	272	483
Qatar	394	356	396	304	389
Egypt	0	227	287	647	386
Bahrain	346	235	297	280	276
Libya	0	0	0	0	47
Ivory Coast	4	2	2	2	4
United Kingdom	3	2	2	1	1
Angola	18	0	0	0	0
Congo	184	0	0	2	0
Sudan	0	12	21	5	0
Ukraine	0	16	0	0	0
Total	**12,540**	**12,995**	**11,013**	**14,255**	**9,275**

Source: ITC calculations based on UN COMTRADE statistics

Saudi Arabia, Kuwait, and UAE

Saudi Arabia and Kuwait have emerged as the largest and most valuable markets for Lebanese pears, taking 23 percent and 15 percent of Lebanon's pear exports, respectively, in 2011. Lebanon held a 35.8 percent share of the pear import market in Saudi Arabia, and 10.5 percent share of the Kuwait market in 2011. According to USDA FAS, the majority of imports to Saudi Arabia and Kuwait are low-priced Turkish pears, averaging around $0.65 per kg. According to Lebanese exporters, there is a growing demand in the high quality segment in Saudi Arabia and Kuwait, which Lebanon can fulfill if it can increase production of Grade 1 pears.

FIGURE 24: IMPORT STATISTICS FOR SELECTED MENA COUNTRIES

Country	Quantity Imported, mt (2011)	Annual Growth in Quantity Imported (2007 - 2011)	Annual Growth in Value Imported (2007-2011)	Average Unit Price $USD per kg (2007-2011)	Annual Growth Unit Price (2007-2011)	Unit Price 2011	Number of suppliers (2011)
UAE	23,490	8.58%	15.75%	0.88	5.02%	0.99	20
Saudi Arabia	17,120	-0.40%	8.24%	0.86	8.82%	0.90	10
Kuwait	2,930	-1.64%	6.72%	0.58	9.10%	0.69	14

Source: ITC calculations based on UN COMTRADE statistics

The UAE is also a growing high value, high quality market that Lebanon has yet to capitalize on. UAE imports modern varieties of high quality, Grade 1 pears from the world's major producers including South Africa, U.S., Chile, Argentina, and China. UAE imported 23,490 tons of pears in 2011, with Lebanon contributing only 819 tons, down from 1,366 tons in 2007. According to a premium produce exporter, while Lebanese pears are heavily demanded by consumers based on taste, the retail price in the UAE market is anywhere from 50 percent to 100 percent higher than similar quality pears due to high production costs, high transaction costs, and competition for supply of Grade 1 pears in the strong domestic market.

SYRIA AND JORDAN

Syria and Jordan are important export markets for Lebanon that have declined in the past two years. Customs data indicate that Lebanon is the sole exporter of pears to Syria. Historically, Jordanian pear consumption has depended heavily on Lebanese production, with total pear consumption levels fluctuating by about 15 percent – 20 percent on a year to year basis. In 2011, Syria and Jordan were the largest export markets for Lebanese pears, consuming more than 50 percent of Lebanon's pear exports. Since 2011, exports to Syria dropped by 80 percent, and exports to Jordan dropped by 50 percent, as transport to these markets became too risky and the costs prohibitive. In 2011, Lebanon had a 50 percent share in the Jordanian import market with exports of 2,243 tons, which declined to 1,198 tons in 2012. The sharp decline is attributed to the Syrian conflict. However, no producer has filled the shortfall in exports, with Turkey exporting just seven tons in 2012.

FIGURE 25: PEAR IMPORTS BY COUNTRY TO JORDAN 2007 – 2011 (TONS)

Exporters	2007	2008	2009	2010	2011
Total	3,563	3,293	2,768	2,859	4,579
Lebanon	2,058	2,050	1,641	925	2,140
South Africa	27	24	91	810	1,218
Syria	1272	973	742	610	852
USA	27	59	110	265	144
Chile	132	101	154	140	78
Argentina	5	24	4	10	69
Spain	0	5	0	68	50
Greece	0	0	4	2	15
China	43	56	19	9	13
Italy	0	0	2	0	0
Tunisia	0	1	0	0	0
Turkey	0	0	0	20	0

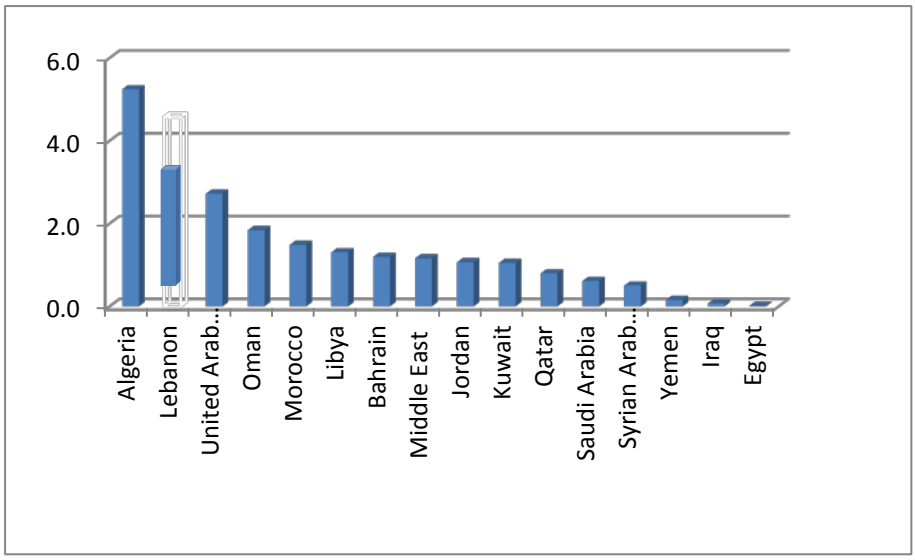
Source: ITC calculations based on UN COMTRADE statistics

The majority of imports to Syria and Jordan from Lebanon are low quality Coscia pears ranging from $0.33 – $0.40 per kg, although exporters also send a small volume of high value Bartlett pears ranging from $1.33 - $2.00 per kg. Lebanon is poised to fill the post-conflict gap in both Syria and Jordan, as long as it can increase production and compete with Turkish pears on price.

DOMESTIC MARKET

Lebanese per capita consumption is among the highest in the region at approximately 2.5 kg in 2012, trailing only Algeria with 5 kg as illustrated in Table 26 below:

FIGURE 26: MENA PER CAPITA PEAR CONSUMPTION (2011)



Source: LVCID Calculations using FAOStat; Trademap; and World Bank data

FIGURE 27: 2012 PRODUCTION AND CONSUMPTION IN LEBANON

	Total Production	22,000 mt [21]
+	Imports	318 mt [22]
-	Exports	9,277 mt [23]
-	Jams, other processing	0
-	Wastage	2,300 mt [24]
=	Domestic fresh consumption	10,741 mt

Source: Interviews, LIVCD estimates

The vast majority of pear consumption in Lebanon is domestically produced pears. Interviews with stakeholders and visits to markets indicate that most of the high quality, large pears produced stay in Lebanon.

Grade 1 Bartlett pears receive a premium of up to 75 percent over similarly graded Coscia pears. This premium is due to:

- A favorable marketing window vis-à-vis apples and other fruit. Bartlett pear season is October – November, when few other domestic fruits are available in the market.
- The Bartlett variety has better storage characteristics than then Coscia variety. Due to its seasonality, there is greater storage capacity for Bartlett pears than other varieties because there is less competition with apples for cold storage.
- The Bartlett pear enjoys a scarcity effect, because this variety is relatively new in Lebanon and not yet available everywhere.

Grade 2 and 3 Bartlett pears receive a 25 percent premium over similarly graded Coscia pears.

In the domestic market, shops that specialize in fresh produce including high quality domestic and imported pears are rapidly expanding, competing with the traditional role of supermarkets as primary sellers of imported fresh produce. These shops typically carry higher quality and thus higher priced produce than supermarkets. Spinney's, Charcuterie Aoun, TSC, and other supermarket chains are also rapidly expanding in Lebanon, and carry a wide range of local and imported produce at varying quality standards. With the entrance of Carrefour in 2013, demand for high quality pears will increase and this segment will be pressed to lock-in producers that produce good quality pears, at competitive prices.

- Large supermarkets are price sensitive and place an emphasis on consistent quality and supply. They have mid-range quality requirements and purchase both directly from farmers, as well as wholesale markets.
- Many supermarkets such as TSC and Charcuterie Aoun are seen by farmers as unreliable payers, with payments taking in excess of six months with some

[21] Unofficial estimate of 2012 production in Lebanon from interviews with traders and producers

[22] GOL 2012 Customs data

[23] GOL 2012 Customs data reports 9,077 mt.

[24] Estimate based on expert opinion and global industry averages

reports of non-payment. Spinney's is trusted by farmers, though payments still take about 60 days.

- Average supermarket retail prices generally hover around $2.33 per kg; however prices have topped $3.00 per kg for good quality pears. Among domestically produced pears, the large Bartlett pears receive the best price, ranging between $3.50- $4.00 per kg in premium fruit markets.
- Pears receive excellent prices in Lebanon and abroad, especially those that are considered top-quality. Farm gate prices start from $0.33 per kg for the lowest quality, Coscia pears, to $2.66 per kg for the high quality Bartlett pears. The highest quality pears can receive up to $3.33 in the off season as shown below in Figure 28.

FIGURE 28: FARMGATE PEAR PRICES - LEBANON USD /KG)

	Bartlett		Coscia	
	In-Season	Off-Season	In-Season	Off-Season
Grade 1	2.66	3.33	1.16	2.00
Grade 2	1.33	2.00	0.66	0.90
Grade 3	0.50	1.33	0.33	0.40

Source: Interviews with traders

Those producers who consistently produce and sort out Grade 1 and 2 pears are sought after by supermarkets, traders, and exporters, and are able to sell their production directly. The growing demand for high quality pears in both the domestic and export markets provides an opportunity for growers to make the necessary investments to modernize their operations by improving production and post-harvest practices to increase the supply of premium pears.

Pear imports into Lebanon have remained steady for the past five years, totaling 318 tons in 2012, just a very small percentage of total consumption. Lebanon applies 70 percent duty on all imported pears. Chile is the largest importer, followed by the U.S. Supermarket prices for imported pears range from $5.00 – $8.00 per kg for varieties not produced in Lebanon such as Beurre Bosc (Chile), D'Anjou (Chile), Anjou (Red and Green) (US) and Starkcrimson (US).

As with export markets, it seems clear that domestic market tastes are evolving to reward new varieties and better quality. According to supermarket purchasing managers in Lebanon, consumer preferences are becoming more sophisticated and demanding, a trend seen throughout developed and emerging economies.

Key Findings of End Market Demand:

- Increasing demand in regional export markets for Grade 1 pears, with a trend of rising unit values and volumes. There is a range of varieties demanded in the high quality segment of regional export markets, including Bartlett and Coscia but also other varieties from U.S. and South American suppliers. No other regional pear suppliers are positioned in this high quality segment; Syria and Turkey produce mainly lower grades.
- There is also a gap in regional export markets for lower priced, lower quality pears created by the sharp decline in Syrian exports since 2010. Lebanon faces competition from low-priced Turkish exports to fill this gap.
- There is high domestic demand for Grade 1 pears. The Bartlett variety commands a premium in the domestic market over the Coscia variety due to the timing of availability in October-December, as well as longer storage life.

4. PRODUCTION AND PROCESSING

Approximately 80 percent of pears grown in Lebanon are Coscia, though the Bartlett pear, also known as Williams and referred to as 'California' in Lebanon, has been steadily gaining popularity since its introduction about 15 years ago. Crassane, Abate Fetel and Conference pears are also grown in limited volumes.

FIGURE 29: COSCIA PEAR

FIGURE 30: BARTLETT PEAR

Coscia pears are a mid-summer pear with harvesting beginning in July and lasting to Early September. Coscia pears are generally harvested unripe and can be stored until November. Bartlett pears are harvested in October and November. Bartlett pears are generally harvested unripe and can be stored until March.

Overall, about 10 percent- 15 percent of total Lebanese production or 3,000 tons is considered Grade 1. Producers who follow modern production and post-harvest practices, including sorting and grading, are highly sought after by supermarkets, traders, and exporters. Producers of Grade 1 are in a strong negotiating position vis-à-vis buyers due to this high demand.

Lebanese pear orchard productivity of 11 tons per ha lags well behind the world's top producers, including Chile at 44 tons per ha and the Netherlands at 36 ton per ha (World Pear Review, 2009).

According to MoA estimates, Lebanon produces about 20,000 tons of pears on about 1,800 Ha. The Coscia variety has the largest share of production (80 percent – 85 percent), followed by Bartlett (10 percent), then Passase, Crassane, Abate Fetel and Conference.

FIGURE 31: ESTIMATES OF PEAR PRODUCTION IN LEBANON, TONS (2005-2011)

	2005	2006	2007	2008	2009	2010	2011
Lebanon	36,800	35,700	33,500	34,000	35,500	22,000*	20,000*

*Revised in 2013[25] Source: FAO Stat,

[25] The sharp drop in production numbers are attributed to revision to data provided by the 2010 Agricultural census, which became available in January 2013. The previous numbers were estimated by FAO.

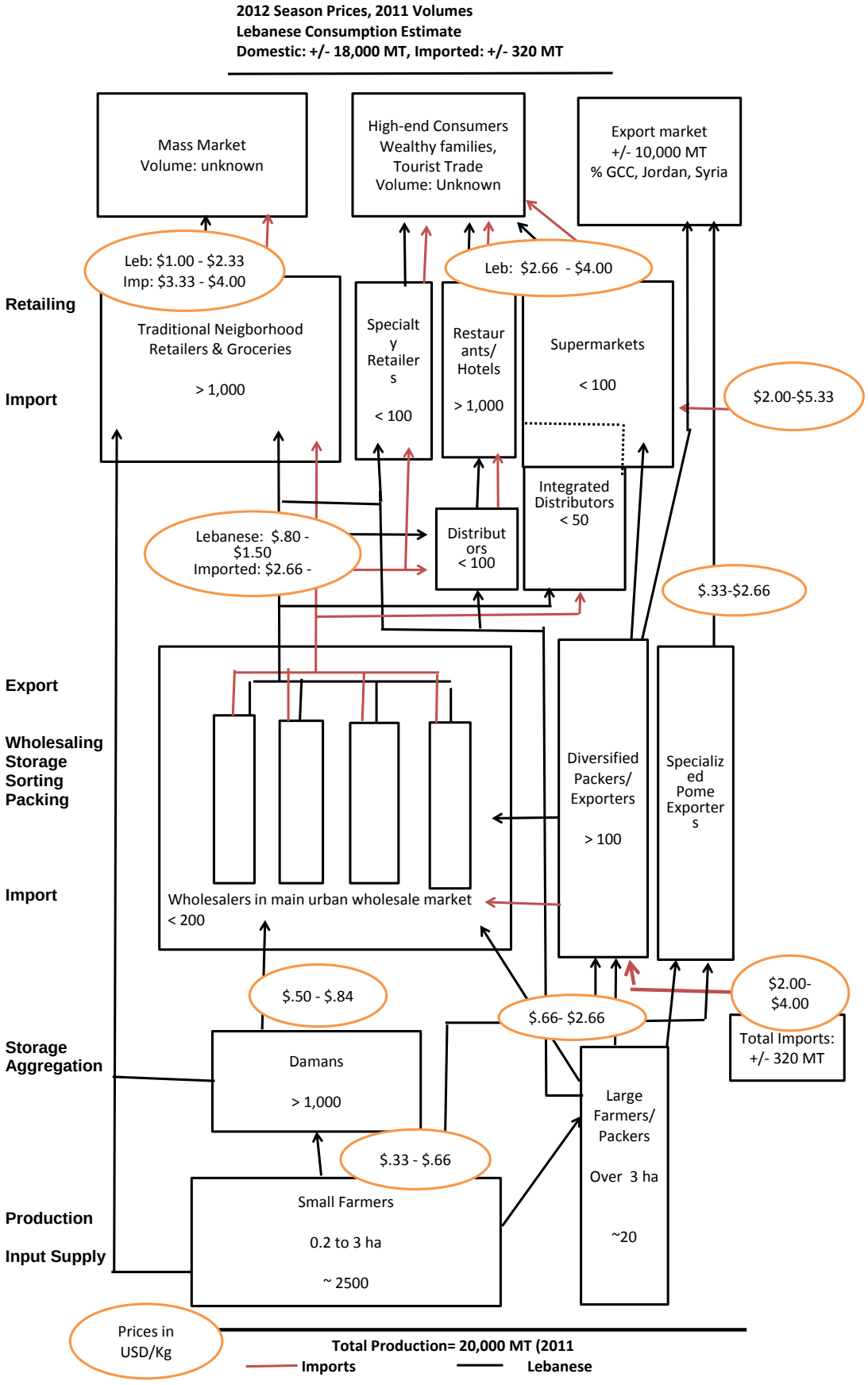
Few pear farmers in Lebanon utilize modern pear production practices required to attain high yields and Grade 1 quality, including the following:

- Written record keeping
- Application of pesticide and fertilizers at recommended intervals
- Harvesting fruits after the recommended waiting time for pesticide application
- Proper pruning of trees
- Thinning fruit
- Harvesting during lower temperatures
- Avoiding direct sunlight to harvested crops
- Using GAP approved storage containers
- Pre-cooling and cooling techniques

With the application of the above modern practices, farmers can obtain yields of at least 24 tons per ha, which is double the customary yields for Lebanese pear orchards.

5. VALUE CHAIN ACTORS

FIGURE 32: PEAR VALUE CHAIN MAP



PRODUCERS

The value chain map shows two main categories of farmers.

SMALL FARMERS: (87 percent of production) There are an estimated 2,500 pear farmers with areas between 0.3 ha and three ha planted with pears. This category of farmer is comprised mostly of landowners, with some small 'wood daman' who lease land, invest in orchard upgrading and take on the risk of production. This type of farmer typically produces mostly Grade 3 and some Grade 2 pears, with a yield of 10 tons per ha. In this category, many farmers have enough land under cultivation for pear revenues to constitute an important part of total family income, while not providing enough to be the only income-generating activity.

These farmers use pesticides and fertilizers and prune their trees. They are unlikely to employ drip irrigation, instead using flood irrigation. They generally farm with mainly unpaid family labor, using paid labor only to prepare land and plant new orchards, and sometimes for harvesting. These actors generally sell to small traders (damans), but they may also send pears directly to the wholesale markets or retailers depending on their volumes, location, and access to transport.

LARGE FARMERS: (13 percent of pear production) There are fewer than 25 large pear farmers, defined as those with 3 ha or more of production. About 20 percent of large farmers are wood damans, who lease land for production and invest in orchard upgrading and take on the risk of production.

This scale of activity, with at least 30 tons of production per year, provides gross income of $50,000. The largest producers have output of at least 1,200 tons.

Large farmers are more likely to invest in agronomic and business education, to use drip irrigation (both in the Bekaa and in mountain locations) and to regularly invest in orchard regeneration. Large farmers are also much more likely to conduct their own harvesting and field packing operations with sales either to the local wholesale market or direct to retailers including supermarkets. These farmers are more likely to achieve Grade 1 production, making them sought after by supermarkets, wholesalers, and exporters.

Model Pear Farmers: Gaby & Seto

- Gabriel and Setrack are fruit growers with 50 hectares of apple and pear production. They utilize Global Gap and Conservation Agriculture practices, and sort, pack and grade their production in their own facility that includes a modern cold storage unit that can hold 10,000 cases.
- Gabriel was one of the first to commercially cultivate the Bartlett variety about 15 years ago. Working as a 'wood daman', he and his son, brother, and father signed leases and set up modern pear orchards with the Bartlett variety, utilizing modern cultivation practices. At least two of the largest pear orchards in Lebanon were set up in this way. However, after several years, the landowners took control of the orchards, and the pair now works exclusively on their own land.
- Marketing under the brand name Gaby & Seto, the majority of their production is in high demand by domestic traders and exporters alike, receiving 50 percent more than the average farm gate price for pears. Gaby & Seto pears are sold in two ways: sorted bulk, and in packages of 10 and 12 pieces. Gaby & Seto sell their best pears (large, Grade 1 quality) for $3.33 per kg to specialized fruit and vegetable markets, which retail the pears for $4.33 per kg.

AGGREGATION

Small farmer production is aggregated by a class of small-scale collectors called "damans." These intermediaries are essentially traders who, at a minimum, have a pick-up truck and a stock of plastic crates that can hold 20 to 22 kg of pears. Damans either organize labor for harvesting or will supply crates on demand and let farmers do the harvesting. They generally contract with small farmers to purchase all their production at a fixed unit price. A premium is paid to farmers who harvest and pack product on behalf of the daman. Larger damans may have cold storage facilities and simple packing facilities, such as packing tables. The business models of damans vary according to their financing arrangements with farmers. In many cases, damans who work in apples also work in pears.

WHOLESALE TRADE, PACKING, AND EXPORT

There are two main loci of wholesale level trade for pears in Lebanon. The most visible of these are the urban wholesale markets, of which the two Beirut markets (Sin el Fil and Sports City) and the markets in Jbeil and Tripoli are the major centers of the pear trade. The second loci are the different categories of packers/exporters with warehouses and cold storage facilities located throughout Lebanon. Both types of actors buy from damans, small and large farmers, and trade volumes at the wholesale level. Each is described below.

URBAN WHOLESALE MARKET OPERATORS Urban wholesale markets are run by associations of traders who occupy the designated spaces, collect rent for the warehouses, and organize cleaning and security. The biggest wholesale market in Lebanon is the Sports City market in South Beirut, with 80 stalls. Less than half of the stalls in urban wholesale markets have cold storage and these are used only to keep inventory from spoiling for several days—not for long-term storage. There is little specialization either by quality or by product among wholesalers. All operators deal in a variety of fresh fruit and vegetables. A portion of wholesalers in the market are owned by independent exporters/importers who own packing facilities and cold storage outside of the urban wholesale markets. Imported products usually arrive in wholesale markets through these actors' affiliated stalls.

The operations of wholesale markets in Lebanon are the source of some discontent among farmers and damans. Dissatisfaction centers around the lack of transparency in the dominant trade practice of consignment sales in which no price is contracted at delivery with prices fixed by the wholesaler according to market conditions, with the wholesaler taking an eight to 15 percent commission on sales. Thus, there is strong incentive for sellers to bypass wholesale markets with direct sales to retailers or even consumers, which is a widespread practice for low transaction volumes. Still, interviews with the wholesale market operators and the distributors and wholesalers who buy from them indicate that the vast majority of neighborhood grocery shops, larger families, and some restaurants get the majority of their produce, including pears, through these operators.

DIVERSIFIED PACKERS/EXPORTERS There are around 40 professional, full-time, fresh fruit and vegetable exporters in Lebanon and most belong to the Fresh Fruit and Vegetable Export Syndicate. Though, according to traders, the number of ad-hoc packers has increased enormously over the past 10 years, as even small-scale traders have entered the export market and set up packing operations. The range of capacity

among packers in this category is quite broad. Smaller packers generally ship mixed containers of different types of product. Larger packers will specialize to some degree in a narrower range of products and try to avoid mixed containers.

Distribution and Retail

Lebanon is characterized by a wide variety of retailers and distributors, as follows:

Distributors: These stakeholders assemble a variety of fresh produce from the wholesale markets and directly from farmers and deliver them on a regular schedule to retailers or hotels/restaurants who do not want the hassle of buying directly from the urban wholesale markets on a daily basis. There are two main types of distributors*: independent distributors* who market to mainly upper-class restaurants and hotels under contractual agreements and "*integrated distributors*" who generally lease space or pay a commission fee to run the produce department of supermarkets. Most independent supermarkets in Lebanon operate with these types of embedded integrated distributors.

Neighborhood retailers: In a country without a strong tradition of open air markets or farmers' markets, pears and other produce are sold by small neighborhood shops. In most cases these retailers make daily trips to the urban wholesale markets to procure produce. They have arrangements with local restaurants or juice bars to take unsold stock.

Specialized produce retailers: A small but growing trend in Beirut is the emergence of retailers that seek to differentiate themselves in terms of product quality and the physical layout of the store with mark-ups over neighborhood groceries that vary from next to nothing to 20 percent to 30 percent. These are often jokingly referred to as "pharmacy" stores- emphasizing that they are clean with almost medical hygienic standards in comparison to the normal down-trodden image of the neighborhood shop. Such retailers make a more concerted effort to source the best produce from the wholesale markets or directly from a regular circle of farmers or damans. This category of retail shop has only emerged in the last 10 years and is a small but growing percentage of the retail outlets.

Restaurants and hotels: Urban up-market restaurants and hotels provide another important market for high quality pears. Most are supplied by specialized distributors, although some will send their own trucks to the wholesale markets.

Supermarkets: The supermarket segment of the market is rapidly expanding- following a familiar path of other middle income countries. The major chain supermarkets, TSC, Charcuterie Aoun, and Spinney's all have centralized purchasing of produce either out of the urban wholesale markets or in the case of TSC from its wholly owned packing subsidiary in the Bekaa Valley that is promoted as a house brand. Independent supermarkets tend to work with integrated distributors as produce department contractors. The chain supermarkets also import pears directly.

Processors

Currently, there is little to no pear processing in Lebanon. The study did not find any pear processing operations in Lebanon, at either the industrial or artisanal scale.

BUSINESS DEVELOPMENT SERVICE PROVIDERS

Actors in the apple value chain are supported by a number of critical service providers who play a large part in the value chain's growth potential and efficiency. These include:

NURSERIES Farmers obtain pear tree planting materials from a wide range of sources, including individual farmers who propagate trees from seed and give or sell them to neighbors, and commercial nurseries that also propagate from seed and sell three year old seedlings to farmers. Certified disease-free rootstock propagated from cuttings or tissue culture, are not available in Lebanon.[26]

INPUT SUPPLIERS Lebanon has a competitive market for agricultural inputs. Dealers in most major towns are able to provide a range of fertilizers and pesticide products and drip irrigation equipment. Several of the larger dealers maintain trained agronomists on staff in field locations and produce a full range of crop-specific extension materials. These staff and extension materials provide virtually the only guidelines on fertilization and pest treatments that actually reach small pear farmers. In some cases, these recommendations are not congruent with best agricultural practices or with farm-level profit maximization.

COLD STORAGE PROVIDERS The Lebanese countryside is dotted with small warehouses equipped with refrigeration, owned by damans or by large farmers who use them for their own production, and also rent space to anyone wishing to store pears as noted above. These cold store service providers enable farmers to benefit from expected off-peak seasonal price increases, but there are many opportunities to bring the cold stores up to a better standard by introducing pre-cooling, temperature regulation, ventilation, and humidity control, and avoiding mixing of different products. Many pear farmers are unable to store their product in the peak Cosica season (July harvest through October) as the cold store operators leave the space empty to accommodate the coming apple harvest. Bartlett pears do not face this problem as these pears are generally harvested after the apple season.

[26] The availability of certified rootstock and budwood for pear trees is substantially lower than for apples. A contributing factor to the lack of such certified planting materials is that Lebanon lacks a tissue culture laboratory that could more rapidly multiply high quality planting material.

6. BUSINESS ENVIRONMENT FACTORS AFFECTING THE VALUE CHAIN

Key elements of the environment surrounding the pear value chain are described below.

ACCESS TO FINANCE

Lebanon's commercial banking sector is one of the most advanced in the region, with 54 commercial and 10 specialized banks (including four Islamic banks), 23 MFIs, multiple finance companies, and leasing offered through retailers and manufacturers. Government and donor support for lending to small and medium-sized enterprises (SMEs) is strong, including: the Kafalat loan guarantee; BDL interest rate subsidies and reserve requirement exemptions for SME loans; the Economic and Social Fund for Development provides capital, BDS services, de facto guarantees for commercial SME loans; and IFC support for SME lending and trade finance. Specific to agriculture, a recent partnership between the Ministry of Agriculture and Fransabank aims to increase agricultural lending. Two of the largest MFIs (Al Majmoua and ADR) have a developed agricultural loan products, and the Lebanon Investment in Microfinance (LIM) program supports increasing microfinance for agriculture.

Despite the potential of this large and sophisticated sector, with an impressive array of incentives, credit to small and medium enterprises and the agricultural sector remains limited. The banking sector invests primarily in treasury bills, with loans to the private sector representing only 24 percent of total assets. The largest share of this credit is disbursed within the greater Beirut area. A high concentration of this credit goes to the trade and services sectors, and to a very small number of larger businesses – about one percent of borrowers benefit from about 50 percent of private sector loans. Loans to the agricultural sector account for only one percent of all lending. Access to finance is also hindered by the mismatch between terms and conditions of available loan products and the needs and capacities of SMEs, including high interest rates, high collateral requirements, and a lack of seasonal loans structured for agriculture. Incentives intended to mitigate the "crowding out" influence of public borrowing have so far failed to catalyze macro-economically significant lending.

The chief program for promoting SME lending is the Central Bank's Kafalat loan guarantee program that has been operating since 2007. Under this program, a private finance company, Kafalat, has been set up with central bank support to offer guarantees to qualifying SME loans made by participating commercial banks. In January 2013 the European Union announced a grant of $4.5 million to finance new Kafalat loans for agriculture and rural development. Two new financial products will be introduced, including a long-term loan designed to meet the needs of tree crop producers.

Kafalat issues guarantees on examination of loan dossiers that originate in the commercial banks that are responsible for the loan. The Ministry of Agriculture has been an active proponent of this scheme and has publicly supported the use of Kafalat guarantees as a way of supporting investment in agriculture. As of the end of 2012, $51.6 million in loans, about 37.4 percent of all Kafalat loans, had been approved for agriculture sector uses. Banks such as Byblos, Fransabank, and Credit Libanais have been the most aggressive originators of Kafalat loans to agriculture. There is little doubt that the Kafalat program can, if correctly accessed, provide an attractive source of commercial financing for pear farmers and packers. The main hurdle for such smaller

actors will be fulfilling the loan application documentary requirements imposed by the participating banks—most notably the potential borrower must have a business plan.

Product Traceability Regulations

In 2010, the Ministry of Agriculture launched a voluntary policy requiring farmers to register and, for wholesale market sellers, to record the origin of produce moving through the wholesale markets. In 2011, these regulations were to become mandatory, but have since been delayed. While implementation of this program has been difficult, the motivation for these regulations—to bring a level of traceability that will give the consumer confidence in the product being sold and to hold farmers accountable for pesticide residues—are valid. It has yet to be determined how these regulations will be enforced, but many damans, wholesalers, and larger farmers in the pear sector are aware of them and state their readiness to comply.

Extension Services and NGO Support Programs

Pear farmers receive little to no extension support. Some larger farmers may hire specialists for advice. Others self-finance study tours to Europe or North America. Smaller farmers have virtually no source of advice on improved techniques and will often rely on neighbors or the local nursery for guidance or in some cases input suppliers.

The MOA is in the process of reorganizing and recruiting extension staff that will be mandated to visit fields in 2013. The existing budget is for 50 agents to cover all of Lebanon. These agents, if well-trained and managed, are a potentially valuable source of production advice for Lebanese farmers, the benefit of which could be extended with the integration of crop-specific experts, on whom the agents could call to get advice on specific problems.

Business Culture

The Lebanese business culture has elements that offer important levers to the development of the pear value chain. The first of these is a wealth of entrepreneurial individuals, coupled with a cultural ethos that emphasizes ties to “the family land” or to the home region. These two factors combine to provide a fertile pool of wealthy individuals who are interested in investing in agricultural activities in ancestral mountainous lands—often as part of a network of land holdings within an extended family. In many cases, these family networks may include members with resources or commercial inclinations to engage in packing and export. Many of the large farmers in the Value Chain Map in Figure 32 are family plots of several hectares that belong to individuals who have significant other sources of revenue that take great pride in developing lands located in their region of origin. These individuals form an important potential anchor for regional fruit tree development activities. They can also be an important vector for socially-oriented investment from Diaspora Lebanese looking to contribute to their home communities. Another, less positive, aspect to the presence of strong family links in Lebanese business culture is the strong tendency of businesses to want to integrate vertically through alliances with related family businesses. This often interferes with or slows the development of inter-firm cooperation.

7. DYNAMIC TRENDS

1. *PEAR PRODUCTION HAS ATTRACTED NEW INVESTMENT IN CONVERSION OF ORCHARDS TO MODERN VARIETIES GEARED TOWARD THE EXPORT MARKETS WITH A FOCUS ON HIGHLY PROFITABLE GRADE 1 PRODUCT.*

The pear production sector has seen entrance of larger, professional farms using modern methods and focusing on quality over quantity. In some cases, this includes a branded product that receives an additional premium. These producers consistently produce and sort out Grade 1 and 2 fruit. Their pears are sought after by supermarkets, traders, and exporters. They benefit from high demand, and sell to the highest bidder.

Gabriel and Setrack, producers described in Section 5 above, exemplify this type of producer in their use of modern production and post-harvest practices and investment in cold store infrastructure.

2. *THE DISAPPEARANCE OF SYRIA AS AN EXPORTER OF PEARS HAS CREATED VERY FAVORABLE DEMAND CONDITIONS IN TRADITIONAL MARKETS FOR GRADE 2 AND GRADE 3 PEARS*.

85 percent- 90 percent of Lebanon's pear output is Grade 2 and 3 product, for which there are strong regional markets. There are also new opportunities to fill the gap left by the sharp decline in Syrian exports to regional markets demanding lower quality pears.

8. CONSTRAINTS IN THE PEAR VALUE CHAIN

The main constraints faced by value chain actors in the context of these two dynamic trends include:

PRODUCTION

LACK OF PUBLIC SECTOR EXTENSION SERVICE: Pear farmers have few options for extension support, with access especially limited for small farmers who are unable or unwilling to invest in technical advice. Larger farmers invest in education and practical training through universities, and have access to private extension through the large-scale input suppliers to achieve a high standard of production and higher yields of Grade 1.

SMALL FARM SIZES & LACK OF ORGANIZATION/COOPERATION MAKE PRODUCTION COSTLY: Lebanese pear orchards average less than one hectare in size. A lack of coordination between growers means economies of scale are not achieved and production costs are high. Small farmers do not invest as much in training and extension, nor modernization of production. Thus production is more inefficient than larger growers, with costly over-application of pesticides and fertilizers and higher input costs. This results in a fragmented and inconsistent supply of quality produce, expensive input supplies, and lack of bargaining power when selling. There is collaboration in the sector in the sense that farmers will look to each other for production information, which may be incorrect or out of date, and information about market prices. However, there is little cooperation, either informally or formally through a cooperative or company structure, in bulking demand for inputs and technical assistance, or aggregating output for sale.

LACK OF AVAILABILITY OF IMPROVED, VIRUS-FREE AND ADAPTED PEAR ROOTSTOCKS AND BUDWOOD: Pear farmers, many of whom are also apple farmers, reported that pear production is more risky and expensive than apple production. The main factor contributing to this situation is that the variety of planting material available for pear trees is more limited than it is for apples, reflecting the fact that pears are not as commercially important as apples. In addition, pear trees in Lebanon are propagated from seed or cuttings of existing trees, and not from modern rootstocks bred to be virus free and adapted to specific agro-ecological conditions. Nurseries- or in some cases individual farmers- propagate new pear tree seedlings from seeds, and sell three year old plants to farmers for planting.

Trees grown from this seed-propagated rootstock have a longer time horizon until becoming fully productive, taking 10-12 years compared to 5-7 years for vegetative propagated trees, though the former do live longer. The propagation of trees from seed lengthens the amount of time before a producer realizes returns on investment. In addition, trees propagated from seeds are much more variable in their size and productivity, because they take on characteristics from both parent trees. It is not possible to know final tree size or output until the tree reaches maturity. Finally, trees propagated from seed are larger, more susceptible to disease, and require more pesticide and other input application.

SUSCEPTIBILITY TO CLIMATE EVENTS: Adverse weather events can reduce pear production drastically. Spring freezes during the flowering phase prevents fruiting, high temperatures during the summer can damage fruit on the tree and cause post-harvest

degradation in quality. After the long wait for pear trees to become productive, there is risk to productivity every season.

Packing and Storage

Poor harvest and post-harvest handling. With a large number of small orchards and small-scale daman traders responsible for collection and aggregation, poor handling during and after harvest contributes to losses in the marketing chain and diminishes product quality.

Pears are delicate and require good post-harvest handling practices to maintain fruit quality. There are a number of simple logistical measures and investments that can be implemented to improve shelf-life and reduce damage to fruit. These include: harvesting only in the early morning and storing harvested product in shade to avoid sunburn. Use of simple field shelters or storage facilities to provide shaded storage and loading spaces for harvested production; improving loading zones in packing plants/cold storage facilities with plastic sheeting to reduce air exchange during loading of refrigerated trucks; and using pre-cooling chambers with forced-air to speed heat-loss in pears entering into storage.

Harvesting decisions are also often poorly timed with farmers responding to damans' buying schedules rather than actual fruit maturity. Small-scale farmers and damans seldom test for fruit maturity, sweetness, starch content, or firmness. As a result, fruits are often harvested too early-particularly at the start of the season when prices are generally higher. The simple use of a refractometer to measure sugar levels before harvest could make a significant difference to harvested quality. Slicing the pear open to ensure the seed is black is another effective traditional technique used by some Lebanese farmers.

Distribution and Marketing

The lack of market analysis capacity and tendency to make business decisions based on insufficient analysis: Neither individual exporters, nor the Fruit and Vegetable Exporters Syndicate, nor any local consulting firms or public export promotion bodies provide any type of market analysis of opportunities in the region or elsewhere for pear exporters. This is a problem that goes beyond the pear value chain—as it is common to all fresh produce sectors. This lack of market analysis capacity hinders exporters' ability to react to changing conditions in their focus markets and to take advantage of emerging opportunities elsewhere.

9. OPPORTUNITIES FOR THE PEAR VALUE CHAIN

OPPORTUNITY 1: INCREASE PRODUCTION OF GRADE 1 PEARS AND CAPITALIZE ON HEALTHY DOMESTIC AND REGIONAL DEMAND IN THE HIGH QUALITY SEGMENT: Strong domestic and Gulf markets for high quality pears provide an opportunity for farmers to capture more value by improving production to produce higher volumes of Grade 1 pears. The domestic market demands high quality pears, and there is an opportunity to displace the approximately 318 tons of imports (which retail at more than double the price of Lebanese pears). The potential returns to actors able to produce and sell into this part of the market are favorable for the foreseeable future. Farmers have already taken the initiative in planting new varieties including the popular Bartlett. Traders compete for Grade 1 product, putting producers in a strong negotiating position. Traders are willing to work with smaller farmers who can supply Grade 1 pears.

Constraints to increasing production of Grade 1 pears include:

- High production costs due to fragmented and inefficient production and post-harvest handling practices.
- Lack of genetic material. At present, most pear planting material in Lebanon is from seed propagation, which compared to modern bred rootstock has a longer time frame to full maturity, and thus return on investment.
- Low yields. On average Lebanese orchard yields are two-thirds less than top producing countries such as Netherlands, US, and South Africa. This constrains investment into new orchards, and harms the grower's ability to consistently produce the highest levels of quality needed to capture market premiums in both local and export markets. Cost of production is increased by overuse of pesticides and fertilizers and inadequate or inappropriate irrigation and orchard maintenance activities.

OPPORTUNITY 2: IMPROVE QUALITY OF GRADE 2 AND 3 PEARS, AND CAPITALIZE ON OPPORTUNITIES IN DOMESTIC AND REGIONAL MARKETS IN LOWER QUALITY SEGMENTS: There are strong regional markets for Grade 2 and 3 pears. Despite competition from Turkey in this segment, the sharp decline of Syrian pear exports provides an opportunity for Lebanese producers of Grade 2 and 3 pears, which account for 85 percent- 90 percent of pear output in Lebanon, mostly from small farmers. Improvement of output with more standard sized fruit and appropriate post-harvest handling will make Lebanese pears more attractive in terms of taste in the lower quality markets, where Lebanon competes with Turkey on price.

Like the Grade 1 producing farmers, these farmers also face high production costs due to fragmented and inefficient production and post-harvest handling. An additional constraint is a lack of accessible extension. Because these tend to be smaller farmers, they are least likely to invest in extension and modern technologies to make production more efficient. There is an opportunity to improve production for the majority of Lebanese pear farmers, who are unable to reach Grade 1 production but could improve efficiency of production of Grade 2 and 3 to reduce production costs and increase margins.

10. VALUE CHAIN UPGRADING STRATEGY

The LIVCD project's upgrading strategy will increase revenue in the pear value chain in the long-term, by increasing the overall competitiveness of the value chain measured by the percent change in share of domestic and targeted international markets for goods and services provided by LIVCD-assisted enterprises.

The upgrading strategy exploits opportunities related to the two dynamic trends identified above: 1) Pear production can be profitable especially with Grade 1 quality, and has attracted investment in conversion of orchards to modern varieties geared toward the export markets; and 2) There are strong regional markets for Grade 2 and 3 product, with additional demand in traditional markets created by a decline in Syrian exports**.**

The LIVCD project Upgrading Strategy includes provision of technical assistance, some targeted financial support and, most importantly, helping actors at different parts of the value chain to come together and collaborate over some simple concrete projects in which they have common interests. LIVCD will use Public-Private Partnerships with qualified lead partners as a tool to leverage private investments to meet development objectives.

The Upgrading Strategy rests on three main axes of intervention:

AXIS 1: INCREASE AVAILABILITY OF HIGH QUALITY GENETIC MATERIAL FOR CLONAL PROPAGATION OF ROOTSTOCK AND BUDWOOD

LIVCD will work to establish a supply of high quality, locally propagated pear rootstock and budwood that is certified virus-free and in the case of rootstock bred for disease resistance and early production.

1. *IMPORT ROOTSTOCK* LIVCD will import high quality, certified disease free pear rootstock, such as the OHxf (Old Hand x Farmingdale) range of rootstocks (see text box).
2. *CONDUCT PRODUCTION TRIALS* LIVCD will support testing of the imported rootstock in a controlled environment to ensure suitability, in collaboration with private and public sector actors including nurseries and researchers from universities and agricultural research institutions. LIVCD will work with nurseries to graft budwood of local varieties onto the rootstock, and then grow them under supervised conditions for three to four years to ensure suitability for Lebanon's agro-ecological conditions. This testing will lead to identification of

OHxf rootstock

This rootstock produces trees approximately 50 percent to 90 percent of the size of a standard pear tree in a shorter amount of time, allowing the grower to reduce pesticide, fertilizer, and water application Depending on the rootstock, fruiting begins in two to four years, with full productivity after five years. A tree produced from these rootstocks has consistent production and are compatible with most pear varieties, allowing a grower to vary the crop. OHxf roots well and produces good quality trees resistant to crown gall, pear decline, nematodes and root aphids. They allow the pear grower to control the size of trees, and achieve earlier fruiting- about five to seven years for the trees to reach full productivity. These rootstocks are not yet used in Lebanon so performance is not known.

appropriate pear rootstocks/budwood pairings, reducing risk to nurseries and farmers wishing to use improved rootstocks. This will bring the situation for pears closer to that of apples, for which appropriate rootstocks have been tested and are widely available for immediate use by farmers.

3. *ESTABLISH TISSUE CULTURE* infrastructure in order to support local propagation of the successfully tested variety of pear rootstock.

AXIS 2: WORK WITH "LEAD PARTNERS" TO LEAD FOCUSED REGIONALLY SPECIFIC PROGRAMS TO INCREASE PRODUCTION AND IMPROVE POST-HARVEST HANDLING

LIVCD will incentivize investment by demonstrating improved production practices to existing pear farmers. Lead partners are existing actors in the value chain who are interested in and willing to coordinate in pilot programs demonstrate improved production and post-harvest practices.

These partners will work with smaller farmers throughout the West Bekaa for example, to troubleshoot production issues, implement best practices, and provide a marketing channel for the resulting product. The coordination between large and small farmers may lead to long-term 'wood' daman contractual arrangements that can potentially create the necessary economies of scale to reduce production and transaction costs and increase production of Grade 1 pears. Lead partners may also host production trials to assess the most promising rootstock for specific regional climates.

Large pear orchards are concentrated in the West Bekaa. Some large farmers, such as Gaby & Seto, have extensive experience in producing high quality products while managing large orchard areas. Having already invested in modern cold stores and packing facilities, and a product brand, these farmers could take the lead of informal or formal cooperation with smaller farmers capable of Grade 1 production. The large farmer would take on the role of communicating and enforcing quality standards, and would manage aggregation and post-harvest handling of product, bulking their own supply for their brand. LIVCD can also help these large farmers establish links to additional regional markets such as Morocco and Algeria.

Activities will respond directly to the constraints experienced by the participating actors, including:

ESTABLISHMENT OF DEMONSTRATION ORCHARDS LIVCD will provide demonstration farmers with technical guidance and sourcing of needed inputs including drip irrigation and trellises where appropriate. Demonstration farms will show proper orchard planting on new or regenerated plots, while also showing proper pruning, thinning, fertilization, and spraying of existing trees- which should begin to yield improvements in quality for existing production. The demonstration orchards will also include hail netting to reduce fruit damage, and promote dormancy breaking compounds to combat the effects of insufficient chilling hours. While the Global GAP standard is not yet demanded in the domestic or regional Gulf market, it provides a standard set of practices covering production, harvest and post-harvest activities including pruning, fertilization, pesticide application, record keeping, and harvest timing. Use of these correct practices will yield more efficient production, reduce costs, help product homogeneity and color, and reduce pesticide residues- all of which are important elements of overall quality.

LIVCD will keep subsidization to a minimum, as lead partners and farmers will be encouraged to share in training costs.

NEGOTIATION OF CLEAR POST-HARVEST HANDLING PROTOCOLS LIVCD will also work with lead partners to establish clear harvesting and post-harvest handling protocols for farmers- specifying harvesting schedules based on maturity, making sure that spraying protocols are respected, and detailing field packing and sorting procedures to preserve fruit quality and respond to the buying firm's requirements.

HELP WITH INVESTMENT FINANCING FROM OUTSIDE SOURCES. With Kafalat and other publicly supported bank financing plans for agriculture,[27] prospects are good for financing a portion of program participants' investments in new orchards through medium to long term loans. LIVCD can contribute to this by putting into place business planning services for small farmers, orchard financing models and larger grouped credit packages that will help small farmers fulfill loan application requirements and qualify for loan packages from commercial banks.

Develop the capacity to identify new market opportunities; understand and convey market requirements upstream to growers, harvesters, and packers. Once traders understand the quality requirements these must be communicated down the value chain. This element is linked to the activities in Axis 1, such that production and post-harvest handling improvements are responsive to actual market demands.

AXIS 3: DEVELOP NEEDED BUSINESS DEVELOPMENT SERVICE PROVIDERS TO ADDRESS CRITICAL NEEDS IN THE VALUE CHAIN

1. *SUPPORT FARMERS WITH BUSINESS PLANNING AND LOAN APPLICATIONS* The document requirements for accessing commercial bank credits, namely simple business plans and cash flow models, are beyond the capacities of most small and even many larger farmers. LIVCD will work with local actors and business schools such as AUB Oyalan School of Business, the University of Balamand, the Lebanese American University and USEK to hold certifying training sessions for business planning consultants, focusing on the major elements of the pear production models being financed, the key risk parameters for farmers and the modeling of orchard operations, and link potential apple value chain clients to these consultants.
2. *SUPPORT INPUT SUPPLIERS IN PEAR PRODUCTION AREAS TO IMPROVE THEIR EXTENSION CAPACITIES* With the new MOA emphasis on traceability and reducing pesticide overuse, input suppliers are coming under increasing scrutiny regarding the advice they give to farmers. LIVCD can work with input suppliers who are targeting fruit trees and train their sales and extension staff in the appropriate orchard models, as well as make sure that these firms supply matches the input needs of the farmers. Where suppliers are not meeting input needs, LIVCD will help farmers find new sources of inputs.
3. *HELPING TO IMPROVE OPERATIONS OF COLD STORAGE OPERATORS* Given the poor state of many cold storage facilities in pear producing zones, efficiency in this sector could be greatly improved with some simple energy use audits of these units

[27] In addition to Kafalat loans, the MOA has recently signed agreements for subsidized loans for agriculture with Fransabank and with the Lebanese Bankers Association. These loans will provide lending for up to four years at rates at rates of around 5 percent. The Ministry's objective is to increase the number of farmers with access to private credit from 3–4 percent to 30–40 percent.

operations. The geographic concentration of pear production, especially in the West Bekaa offers opportunities for shared infrastructure.

4. *DEVELOP MARKET ANALYSIS CAPACITY FOCUSING ON DOMESTIC FOOD MARKETS AND EXPORT MARKETS.* Few firms in Lebanon are able to offer market analyses looking at traditional or new export markets to fresh produce exporters. LIVCD will work with firms interested in entering this sector by conducting a number of market analyses in the first year for key product/market pairs with senior international consultants/firm and selecting one or more Lebanese firms to twin with the expatriates during these assignments.

5. *CREATE LINKAGES BETWEEN SMALLER FARMERS AND EXPORTERS TO IMPROVE CONSISTENCY OF SUPPLY* of appropriate grades of pears for the different export segments. Especially in the case of Grade 1 pears, where demand outstrips supply, linkages between exporters and farmers to maximize quantity and consistency of supply to exploit opportunities in export markets. The small number of pear farmers, concentrated regionally (mostly in West Bekaa) and a high value product provides incentive to work together. The pear industry is small, and it is still possible to build momentum and work towards vision of industry together.

ANNEX: SUPPLEMENTARY TABLES: FINANCIAL MODELING OF APPLE ORCHARDS

FIGURE 1: 2 HECTARE ORCHARD PLANTED WITH DWARF VARIETIES

Item	Description			Unit	Quantity	Price/Unit	Total
Gross Receipts	**% of Total Yield**						
	Grade 1 apples.	70%	Farm gate price	Ton	84	$1,233	$103,600
	Grade 2 apples.	25%	Farm gate price	Ton	30	$667	$20,000
	Grade 3 apples.	5%	Farm gate price	Ton	6	$267	$1,600
	raw material conversion ratio						
	Processed (jam, butter)	0%	Farm gate price	KG	0	$7	$0
Total gross receipts							**$125,200**
Capital Investment							
	Land prep: Orchard levelling & all civil works			Hectare	2	$800	$1,600
	Land prep: Trellising			Hectare	2	$6,250	$12,500
	Land prep: Artesian well 20 meter.			Lump Sum	1	$7,500	$7,500
	Land prep: Water reservoir			Cubic Meter	64	$63	$4,000
	Land prep: Storage (75sqm shaded facility)			Square Meter	75	$13	$938
	Procurement: Seedling			per root	5,000	$9	$43,750
	Planting: Seedling			per root	5,000	$0.41	$2,050
	Equipment: Drip system, pumps, fittings & installation			Set	1	$4,375	$4,375
	Equipment: Production implements			Set	1	$3,125	$3,125
	Equipment: Small tractor & trailer			Set	1	$7,500	$7,500
	Equipment: Sorting/Packing line			Set	1	$1,500	$1,500
	Equipment: Pre-cooling line			Set	0	$0	$0
	Equipment: Processing oven & tools			Set	0	$0	$0
	Equipment: Generator & Power Distribution System			Set	0	$0	$0
	Services: Logo Development, Package & Label design			Set	1	$3,500	$3,500
Total Capital Investment							**$92,338**
Operating Expense							
	Land Rental			Hectare	2	$1,500	$3,000
	Tree Replacement			Per tree	0	$9	$0
	Labor						
	Labor: Management/Technical			USD/annum	0	$15,000	$0
	Labor: Semi-skilled F/T			USD/annum	1	$9,000	$9,000
	Labor: Skilled Seasonal			USD/day	12	$67	$800
	Labor: Unskilled Seasonal			USD/day	416	$13	$5,547
	Inputs						
	Fertilizer			USD/KG	7,500	$2.50	$18,750
	Pesticide			USD/liter	7,500	$0.63	$4,725
	Water						
	Water			USD/liter	250,000	$0.00	$0
	Fuel for pumps			USD/liter	730	$0.88	$642
	Transport						
	Fuel for tractor			USD/liter	730	$0.88	$642
	Utilities						
	Government			KW/h	0	$0.00	$0
	Fuel for generator			USD/liter	0	$0.88	$0
	Packing/Marketing Material						
	Crates for Grade 2 & 3 apples			USD/container	1,800	$3.75	$6,750
	Corrugated boxes for grade 1 apples			USD/container	18,480	$0.50	$9,240
	Tissue Paper			USD/sheet	36,960	$0.004	$148
	Sticker/Label			USD/sticker	336,000	$0.007	$2,352
	Waxing			USD/apple	336,000	$0.007	$2,352
	Indirect						
	Government mandated fringe on full time labor				22.50%	$9,000	$2,025
	Government mandated fringe on part time labor				7.50%	$6,347	$476
	Crop Insurance			Crop value		$125,200	$0
	Debt Servicing			Loan Amount		$92,338	$0
Total Variable Costs (TVC)				**USD**			**$66,449**

FIGURE 2: 2 HECTARE ORCHARD PLANTED WITH THE SPUR VARIETY

Item	Description	Unit	Quantity	Price/Unit	Total
Gross Receipts	% of Total Yield				
Grade 1 apples.	70% Farm gate price	Ton	84	$1,233	$103,186
Grade 2 apples.	25% Farm gate price	Ton	30	$667	$19,920
Grade 3 apples.	5% Farm gate price	Ton	6	$267	$1,594
	raw material conversion ratio				
Processed (jam, butter)	0% Farm gate price	KG	0	$7	$0
Total gross receipts					**$124,699**
Capital Investment					
Land prep: Orchard levelling & all civil works		Hectare	2	$1,000	$2,000
Land prep: Trellising		Hectare	2	$0	$0
Land prep: Artesian well 20 meter.		Lump Sum	1	$7,500	$7,500
Land prep: Water reservoir		Cubic Meter	64	$63	$4,000
Land prep: Storage (100sqm shaded facility)		Square Meter	200	$13	$2,500
Procurement: Seedling		per root	1,660	$5	$8,300
Planting: Seedling		per root	1,660	$0.41	$681
Equipment: Drip system, pumps, fittings & installation		Set	1	$3,125	$3,125
Equipment: Production implements		Set	1	$3,125	$3,125
Equipment: Small tractor & trailer		Set	1	$7,500	$7,500
Equipment: Sorting/Packing line		Set	1	$1,500	$1,500
Equipment: Pre-cooling line		Set	0	$0	$0
Equipment: Processing oven & tools		Set	0	$0	$0
Equipment: Generator & Power Distribution System		Set	0	$0	$0
Services: Logo Development, Package & Label design		Set	1	$3,500	$3,500
Total Capital Investment					**$43,731**
Operating Expense					
Land Rental		Hectare	2	$1,500	$3,000
Tree Replacement		Per tree	0	$5	$0
Labor					
Labor: Management/Technical		USD/annum	0	$15,000	$0
Labor: Semi-skilled F/T		USD/annum	1	$9,000	$9,000
Labor: Skilled Seasonal		USD/day	12	$67	$800
Labor: Unskilled Seasonal		USD/day	416	$10	$4,160
Inputs					
Fertilizer		USD/KG	3,320	$2.50	$8,300
Pesticide		USD/liter	3,320	$0.63	$2,092
Water					
Water		USD/liter	99,600	$0.00	$0
Fuel for pumps		USD/liter	730	$0.88	$642
Transport					
Fuel for tractor		USD/liter	730	$0.88	$642
Utilities					
Government		KW/h	0	$0.00	$0
Fuel for generator		USD/liter	0	$0.88	$0
Packing/Marketing Material					
Corrugated boxes for grade 1 apples		USD/container	18,406	$0.50	$9,203
Tissue Paper		USD/sheet	36,812	$0.003	$110
Sticker/Label		USD/sticker	334,656	$0.007	$2,343
Waxing		USD/apple	334,656	$0.007	$2,343
Plastic crates for Grade 2 & 3 apples		USD/container	1,793	$3.75	$6,723
Indirect					
Government mandated fringe on full time labor			22.50%	$9,000	$2,025
Government mandated fringe on part time labor			7.50%	$4,960	$372
Crop Insurance		Crop value		$124,699	$0
Debt Servicing		Loan Amount		$43,731	$0
Total Variable Costs (TVC)		**USD**			**$51,755**

FIGURE 3: 2 HECTARE ORCHARD PLANTED WITH NON SPUR VARIETIES

Item	Description			Unit	Quantity	Price/Unit	Total
Gross Receipts	% of Total Yield						
Grade 1 apples.	5%	Farm gate price		Ton	6	$1,233	$7,893
Grade 2 apples.	70%	Farm gate price		Ton	90	$500	$44,800
Grade 3 apples.	25%	Farm gate price		Ton	32	$267	$8,533
raw material conversion ratio							
Processed (jam, butter)	0%	Farm gate price		KG	0	$7	$0
Total gross receipts							**$61,227**
Capital Investment							
Land prep: Orchard levelling & all civil works				Hectare	2	$1,000	$2,000
Land prep: Trellising				Hectare	2	$0	$0
Land prep: Artesian well 20 meter.				Lump Sum	1	$7,500	$7,500
Land prep: Water reservoir				Cubic Meter	64	$63	$4,000
Land prep: Storage (100sqm shaded facility)				Square Meter	0	$13	$0
Procurement: Seedling				per root	640	$2	$960
Planting: Seedling				per root	640	$0.41	$262
Equipment: Drip system, pumps, fittings & installation				Set	0	$3,125	$0
Equipment: Production implements				Set	1	$3,125	$3,125
Equipment: Small tractor & trailer				Set	0	$7,500	$0
Equipment: Sorting/Packing line				Set	0	$1,500	$0
Equipment: Pre-cooling line				Set	0	$0	$0
Equipment: Processing oven & tools				Set	0	$0	$0
Equipment: Generator & Power Distribution System				Set	0	$0	$0
Services: Logo Development, Package & Label design				Set	0	$0	$0
Total Capital Investment							**$17,847**
Operating Expense							
Land Rental				Hectare	2	$1,200	$2,400
Tree Replacement				Per tree	0	$2	$0
Labor							
Labor: Management/Technical				USD/annum	0	$0	$0
Labor: Semi-skilled F/T				USD/annum	0	$9,000	$0
Labor: Skilled Seasonal				USD/day	0	$67	$0
Labor: Unskilled Seasonal				USD/day	60	$10	$600
Inputs							
Fertilizer				USD/KG	2,560	$2.50	$6,400
Pesticide				USD/liter	2,560	$0.63	$1,613
Water							
Water				USD/liter	76,800	$0.00	$0
Fuel for pumps				USD/liter	730	$0.88	$642
Transport							
Fuel for tractor				USD/liter	0	$0.88	$0
Utilities							
Government				KW/h	0	$0.00	$0
Fuel for generator				USD/liter	0	$0.88	$0
Packing/Marketing Material							
Corrugated boxes for grade 1 apples				USD/container	1,408	$0.00	$0
Tissue Paper				USD/sheet	2,816	$0.000	$0
Sticker/Label				USD/sticker	25,600	$0.000	$0
Waxing				USD/apple	25,600	$0.000	$0
Plastic crates for Grade 2 & 3 apples				USD/container	6,080	$0.00	$0
Indirect							
Government mandated fringe on full time labor					22.50%	$0	$0
Government mandated fringe on part time labor					7.50%	$0	$0
Crop Insurance				Crop value		$61,227	$0
Debt Servicing				Loan Amount		$17,847	$0
Total Variable Costs (TVC)				**USD**			**$11,655**