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**CHERRY VALUE CHAIN ASSESSMENT REPORT
DRAFT
APRIL 2013**

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1. OVERVIEW

The fragile nature and short shelf life of sweet cherries creates risk at all levels of the Lebanese cherry value chain and limits the sales window to 3 days, from the time it is harvested to the time it is purchased by the end-consumer. Improved post-harvest including hydro cooling will significantly help increase shelf life (up to 40 days), thereby reducing risk, increasing the producer's negotiating power in domestic markets, as well as opening up opportunities in export markets.

Farmers tend to deliver product individually to the wholesale market, with most deliveries under 250 kg. Aggregation occurs at the wholesale market. Only a handful of damans operate in cherries. Only a few diversified packers handle cherries.

The cherry value chain is dominated by smallholder production, with more than 80% of individual orchards less than 0.2 ha in area. However, these individually owned orchards are typically parcels that were once part of larger orchards that were divided as the land was passed through the generations through inheritance, or sold. Currently, there is little to no cooperation in terms of production or harvesting. Rivalry between producers of different families or even within families means little potential to build a cooperative model between individual growers.

An appropriate incentive scheme is required to organize these smallholder producers so that they can coalesce into a large production base and achieve economies of scale that could potentially improve the Lebanese cherry industry. Opportunities include extending the season and increasing marketing windows by organizing production of early/mid/late season varieties, and making investment into post-harvest and transport infrastructure that would facilitate access to more lucrative export markets in Europe.

Investment in orchard renewal and/or expansion is limited. In fact, newer orchards are being uprooted due to disease in the topsoil. There is very little sophistication among growers in terms of production, harvesting and post-harvest handling practices. Cherry producers are mostly poor, rural farmers, making this an excellent value chain for targeting a small, rural production base.

Aarsal, which at the time of this writing is an open conflict zone, is a concentrated cherry production zone, with World Bank estimates suggesting the existence of two million cherry trees. Aarsal lies in the Ante-Lebanon Mountain chain along the border with Syria. It is home to intermittent violent conflict, both internal and related to Syrian conflict.

Cherries offer great potential for increasing exports to non-traditional regional markets, with exporters suggesting that Lebanese prices are competitive in Europe and Russian Federation. There is also a possible opportunity to capture Syrian market share in the MENA (especially GCC) and Iranian market share in the UAE in the short to medium term.

2. VISION FOR VALUE CHAIN

The LIVCD-supported cherry industry's vision is to reduce the inherent risk in the value chain through better organization and become recognized as a reliable and high quality source of sweet cherries by regional importers. LIVCD will intervene at the producer level by organizing fragmented, rural production clusters and developing extension materials to improve production, harvest and post-harvest practices in order to create a lengthened

marketing season. LIVCD will support investment in hydro cooling and other post-harvest infrastructure required to extend product shelf life; create linkages and develop information channels between LIVCD-supported production clusters and aggregators to reduce transaction costs. LIVCD will support exporters with actionable market intelligence; create linkages and develop information channels between LIVCD-supported production clusters, aggregators, exporters and regionally based importers. Finally, LIVCD will support investment in dehydrating and other processing technologies in order to generate additional domestic demand.

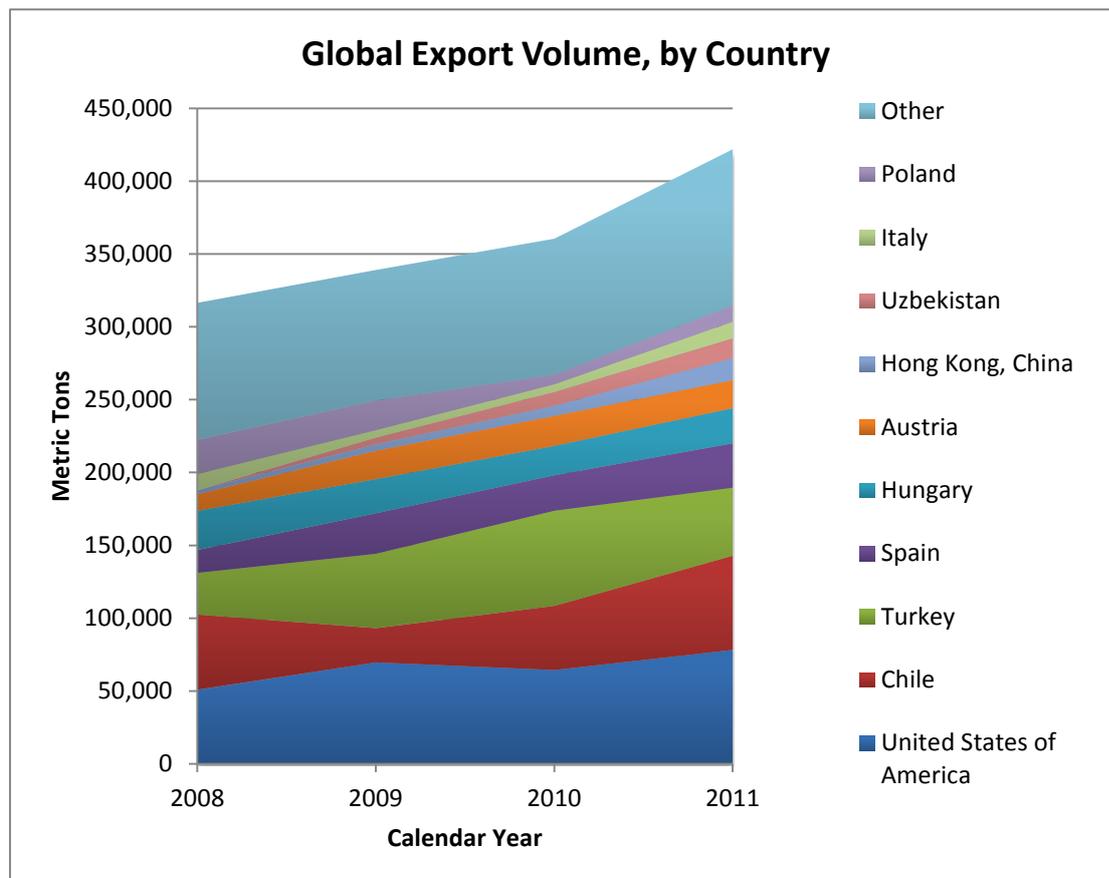
3. END MARKET ANALYSIS

3.1 EXPORT MARKETS

In 2011, the value of internationally traded cherries reached USD 1.6 billion, up 45% from USD 1.1 billion in 2008. Cherry export volumes increased 33% from 316,505 tons in 2008 to 421,908 tons in 2011. As shown in Figure 1, four countries dominate the global cherry trade: USA, Chile, Turkey, and Spain. In 2011, these countries combined for more than 50% of export volume and 65% of export value.

In 2010, the largest cherry producers were Turkey, USA, Iran, China, Italy and Spain¹. That same year, Lebanon’s cherry harvest ranked 16th globally, in terms of total yield.

FIGURE 1: GLOBAL CHERRY EXPORT VOLUME, BY COUNTRY



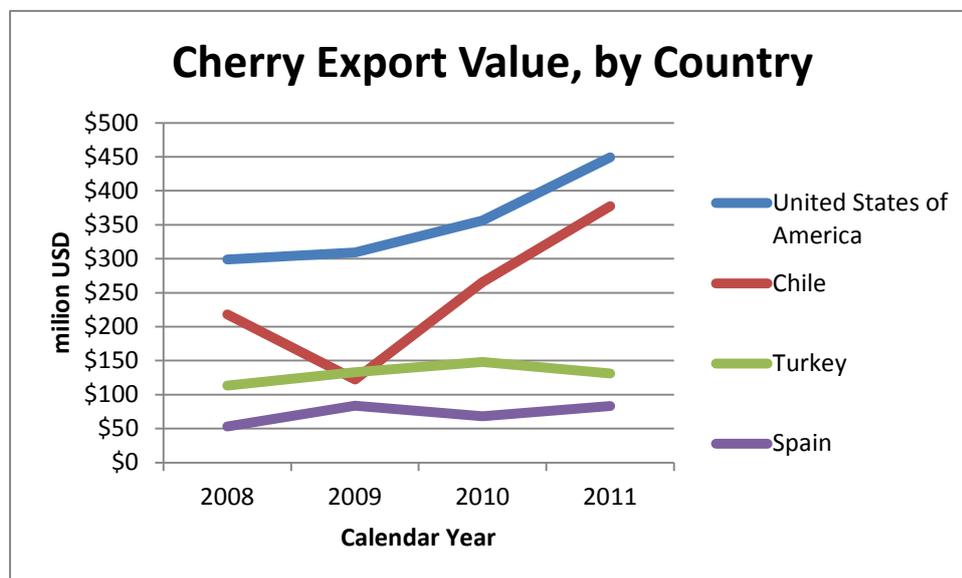
¹ Source: FAO & USDA

Source: Trademap

The U.S., Spain and Turkey dominate the Northern Hemisphere cherry trade and have experienced above average growth in their respective cherry industries since 2008. As shown in Figure 2, the U.S. is the world's largest exporter, mainly supplying the North American and Asian markets. The U.S., Spain and Turkey compete heavily in the high-value U.K. market.

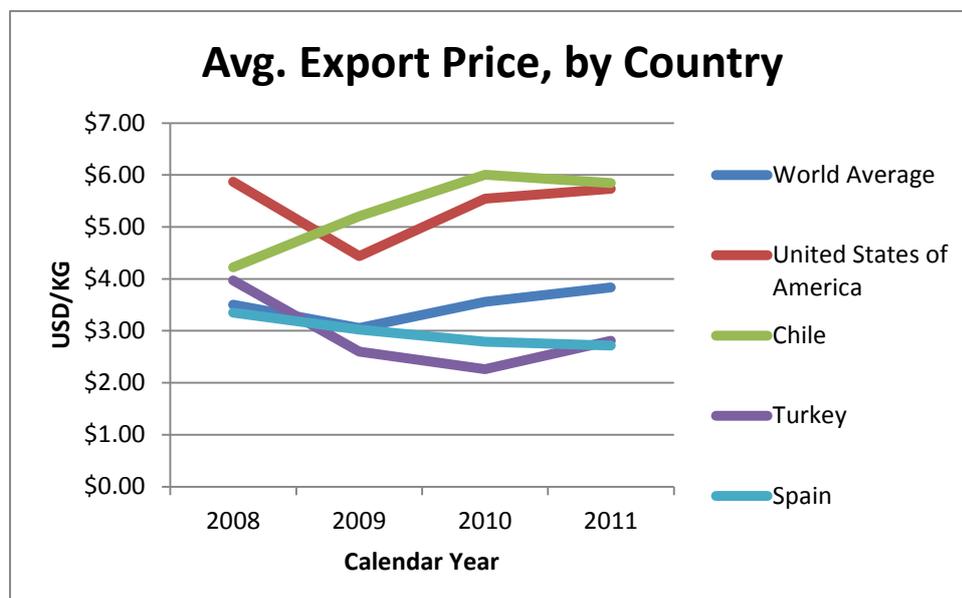
Chile is the largest producer and exporter in the Southern Hemisphere, producing more than six times the amount of cherries, about 85,000 MT per year according to USDA FAS, than its closest Southern Hemisphere competitor, Australia. Chile receives the highest average unit price of all exporters, USD 5.84/kg in 2011, by capitalizing on its off-season production. Although Chile has experienced slightly below average growth in export volumes, Chilean export values have been growing at an impressive 14.62% since 2008.

FIGURE 2: CHERRY EXPORT VALUE, BY COUNTRY



Source: Trademap

FIGURE 3: AVERAGE CHERRY EXPORT PRICE, BY COUNTRY



Source: Trademap

As shown in Figure 3, the U.S. and Chile supply the highest priced cherries globally, exporting at an average of USD 5.74/kg and USD 5.84/kg, respectively, in 2011. Spain and Turkey exports averaged USD 2.71/kg and USD 2.81/kg, respectively, in 2011. Turkey, the world's largest producer, supplies both high and low end markets. It supplies Germany and UK with top quality cherries that average USD 4.02/kg as well as Iraq with cherries that average USD 0.73/kg.

Cherry prices are driven by fruit size. In Europe, cherries are graded by diameter in millimeters, and packed in 2 kg and 5 kg containers. Grade 1 cherries range from 24mm – 28mm, with 28mm receiving double the price of 24mm. In North America, cherries are graded by how many pieces of fruit fit in a row, and packed in 7-8 kg containers. The sizes range from 9-row to 13-row, with 9-row cherries being larger than 13-row cherries.

FIGURE 4: CHERRY SIZE COMPARISONS

Fruit Size Diameter - mm	Fruit Weight (grams)	US Sales category
20.6	4.2-5.3	13 row
21.4	5.4-7.0	12 row
24.2	7.1-8.6	11 row
26.6	8.7-10.6	10 row
29.8	10.4+	9 row

Source: Cherry Growers of Australia

IMPORTS²

The top ten cherry importing countries account for 76% of volume and 77% of value of global imports. Seven of the top ten importing countries are members of the OECD. Russia is the single largest importer of cherries and is generally regarded a low price market, with cherry prices averaging USD 1.71/kg, about half of world average. Russia imports most of its cherries from Central Asia, Eastern Europe and the Middle East, with Central Asia providing the highest value cherries among these suppliers.

FIGURE 5: TOP CHERRY IMPORTERS WORLD

Top Importers						
Countries	Qty Imported, MT (2011)	Annual Growth in Qty Imported (2008 -2011)	Annual Growth in Value Imported (2008 -2011)	Average Unit Price (Kgs)(2008-2011)	Unit Price 2011	Annual growth Unit Price (2008 - 2011)
World	413,031	6.85%	10.60%	\$3.51	\$3.90	2.94%

² Belrose World Sweet Cherry Review 2012

Russian Federation	80,255	8.45%	9.53%	\$1.76	\$1.71	0.81%
Germany	58,662	4.67%	7.54%	\$2.35	\$2.76	2.41%
Canada	32,548	7.94%	7.45%	\$4.58	\$4.93	-0.37%
Hong Kong	31,859	45.64%	43.53%	\$5.54	\$5.63	-0.75%
China	23,773	153.64%	177.68%	\$7.02	\$7.50	3.36%
United States of America	20,395	-4.33%	-4.73%	\$4.08	\$4.06	-0.49%
Austria	19,563	8.38%	-0.32%	\$4.19	\$3.77	-6.52%
United Kingdom	18,482	3.19%	-0.28%	\$4.25	\$4.20	-3.07%
Chinese Taipei	15,372	5.02%	7.62%	\$5.05	\$5.23	2.16%
France	10,584	24.89%	4.18%	\$3.11	\$2.48	-10.38%

Source: Trademap

The EU-15 and the UK provide a large market for high-value cherries. In Europe, the season begins in early May. Cherries available in the early season receive the highest price premium. Wholesale prices drop 25%-35% in the peak supply months of June and July and increase again in August. Off-season cherries are sold at lower prices than late-season cherries, suggesting that sweet cherries have little demand in Europe in the off-season.

Spain and Turkey are the main suppliers of European markets, each accounting for nearly 20% of all imports to the EU-15 countries. Austria, Italy, Belgium and the Netherlands serve as important entry and transshipment points for cherries destined to Europe.

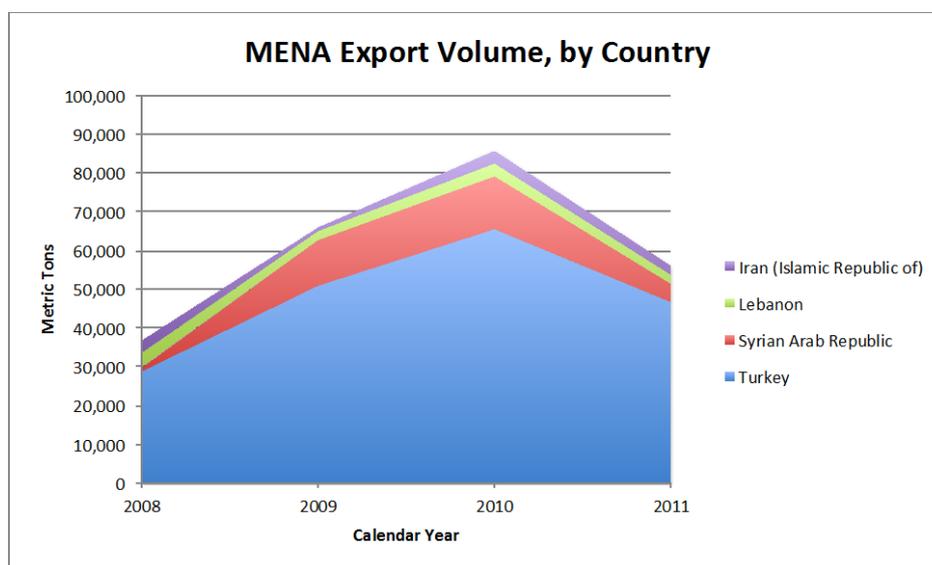
The United States is also a large import market for sweet cherries. Canada supplies nearly 15% of the imports, with the remaining imports sourced from Southern Hemisphere producers during the off-season.

MENA EXPORTS

In 2011, the MENA region accounted for just 13% of the global cherry exports or 56,000 tons, down from a record 86,000 tons or 24% of global market share in 2010. However, despite the downturn in 2011, the quantity of cherry exports from the MENA region have been growing at almost double the rate of the global average, averaging over 16% annual growth from 2008 to 2011, with prices markedly lower than global averages, USD 2.57/kg vs. USD 3.83/kg.

Turkey, Syria, Lebanon and Iran are the main cherry exporting countries in the MENA region. Syria stopped reporting national level statistics in 2011, making it difficult to establish region-wide cherry trade figures. Turkey accounted for approximately 82%, or 46,613 tons, of the cherries exported from the MENA region in 2011; this represented a decrease from 2010 exports, due to adverse weather conditions in Turkey. Syria, the second largest exporter, saw growth in exports until 2010, the last year official statistics were reported. From 2008 to 2011, Lebanese cherry exports were constant, with export volumes of 3,500 metric tons and 2,100 metric tons in alternating years. This fluctuation is attributed to adverse weather; mainly frost, which resulted in significant crop loss in alternating years. There was a sharp rise in Lebanese exports of cherries in 2012; traders and exporters suggest that this sharp rise was actually Syrian product smuggled into Lebanon and re-exported as Lebanese product.

FIGURE 6: MENA CHERRY EXPORT VOLUME, BY COUNTRY



Source: Trademap

Turkey exports both high and low quality cherries in nearly equal quantities. In 2011, Turkish cherries received the highest price in Belgium, selling at an average price of USD 7.27/kg, while those sold to the U.K. sold at an average price of USD 4.18/kg. Cherries destined to Iraq sold at an average price of USD 0.73/kg. The following table lists average export prices of fresh cherries originating from Turkey, and is a useful reference for potential prices Lebanese cherries can achieve in these markets.

FIGURE 7: AVERAGE EXPORT PRICES OF FRESH TURKISH SWEET CHERRIES, 2006-2011. PRICES ARE USD/KG.

Destination	2006	2007	2008	2009	2010	2011
Belgium	\$3.43	\$4.11	\$6.80	\$5.73	\$5.96	\$7.27
United Kingdom	\$3.54	\$3.90	\$5.94	\$4.17	\$4.15	\$4.18
Germany	\$2.49	\$2.85	\$4.48	\$3.11	\$3.04	\$4.02
Italy	\$4.11	\$3.63	\$5.30	\$3.37	\$3.00	\$4.00

Netherlands	\$2.88	\$3.30	\$4.86	\$3.90	\$3.38	\$3.95
Denmark	\$3.23	\$3.30	\$4.94	\$2.55	\$3.42	\$3.78
Sweden	\$3.43	\$3.77	\$5.05	\$3.70	\$2.95	\$3.55
Bulgaria	\$0.83	\$1.70	\$2.79	\$1.89	\$1.65	\$1.80
Russian Fed.	\$1.09	\$1.42	\$2.07	\$1.41	\$1.40	\$1.45
Iraq	\$0.71	\$1.64	\$0.62	\$0.69	\$0.65	\$0.73

Source: Belrose Inc. World Sweet Cherry Review 2012

Syria is a low priced exporter, exporting its cherries to low price markets such as Iraq and Russia at prices ranging from USD 0.72/kg to USD 1.50/kg. Despite the lack of official Syrian statistics in 2011, the study team can attribute approximately 4,660 metric tons of Syrian exports through mirror data, representing a 66% decrease from the 2010 official Syrian export figure of 13,839 metric tons.

According to 2011 customs data, export prices for Lebanese cherries averaged USD 0.84/kg. According to exporters, producers and traders interviewed by the assessment team, export prices reached USD 2.00/kg – USD 3.33/kg for high quality cherries.

Stakeholders also report that Syrian traders purchase low quality cherries from the Aarsal region for USD 1.00/kg – USD 1.33/kg; these exports are not recorded in official statistics. These cherries are destined to Syrian packers/aggregators and re-exported to Iraqi and other low quality markets.

MENA IMPORTS

The MENA region has a small share of global cherry imports. In 2010³, the MENA region accounted for just over 5.5% of total global imports, with prices averaging USD 1.38/kg, about half of the global price average of USD 3.54/kg. The Middle East's leading importers are Iraq, Saudi Arabia, Egypt and UAE. Iraq imports more cherries than the next top three importers combined, but is an extremely low quality and price market, buying cherries at an average price of USD 1.01/kg since 2008. Turkey dominates the Iraqi market. Lebanon dominates the Egyptian market.

GCC countries, with the exception of UAE, mainly import Syrian and Lebanese cherries. The UAE's major supplier is Iran. While the UAE and Saudi Arabia are generally considered to be high value markets for fresh agricultural produce, this does not hold true for cherries. The UAE and Saudi Arabia respectively imported 1,955 MT and 4,277 MT of mostly lower quality cherries in 2010. National cherry consumption in these countries is quite low relative to European markets. Cherry season coinciding with the hot summer months and low tourist season in the GCC may contribute to this low demand.

Lebanon has an opportunity to increase its market share in the GCC. The conflict in Syria, which will affect production for some years after the cessation of hostilities, and Iran's

³2010 figures are used due to the lack of official Syrian and GCC statistics in 2011.

increasing isolation provide Lebanon with an opportunity to supply the MENA market with low priced product in the short to medium term. However, because the MENA market is small and it can be assumed that Syria's production will eventually come back online, Lebanon needs to enter the higher priced European and/or Russian markets if it hopes to sustain its cherry industry over the long term.

FIGURE 8: TOP CHERRY IMPORTERS- MENA

Countries	Qty Imported, MT (2010)	Qty Imported, MT (2011) ⁴	Annual Growth in Qty Imported (2008 -2011)	Annual Growth in Value Imported (2008 - 2011)	Average Unit Price (Kgs)(2008-2011)	Unit Price 2011	Annual growth Unit Price(2008 - 2011)
World	362,915	413,031	6.85%	10.60%	\$3.51	\$3.90	2.94%
Middle East total	20,332	5,334	-2.15%	5.59%	\$1.54	\$1.85	8.47%
Iraq	8,654	823	1057.89% ⁵	6050.00%	\$1.01	\$0.89	115.25%
United Arab Emirates	1,955	741	-1.96%	27.94%	\$2.45	\$3.67	32.44%
Jordan	121	728	66.00%	89.71%	\$2.44	\$1.61	6.51%
Egypt	2,733	1,216	22.80%	82.25%	\$1.40	\$2.41	31.09%
Kuwait	1,030	525	-11.59%	-21.43%	\$0.97	\$0.32	-18.34%
Saudi Arabia	4,277	447	-18.97%	-17.53%	\$1.82	\$2.11	5.93%
Algeria	191	233	50.65%	55.85%	\$0.64	\$0.65	1.72%
Bahrain	69	197	-6.62%	-6.48%	\$1.39	\$1.86	0.20%
Oman	92	147	-12.63%	56.19%	\$1.17	\$2.14	139.03%
Qatar	371	144	-9.28%	3.39%	\$1.41	\$1.51	20.14%
Syrian Arab Republic	751	58	-15.07%	3.33%	\$0.15	\$0.29	46.32%
Lebanon	52	31	104.17%	106.25%	\$1.60	\$2.03	0.40%
Morocco	19	23	16.07%	68.75%	\$1.19	\$1.30	32.07%
Yemen	7	11	-23.82%	-23.55%	\$0.84	\$0.82	5.88%

⁴ Syria data is based on mirror data obtained through Trademap

⁵ Official statistics show 2008 imports were 19 MT at USD 0.20/kg

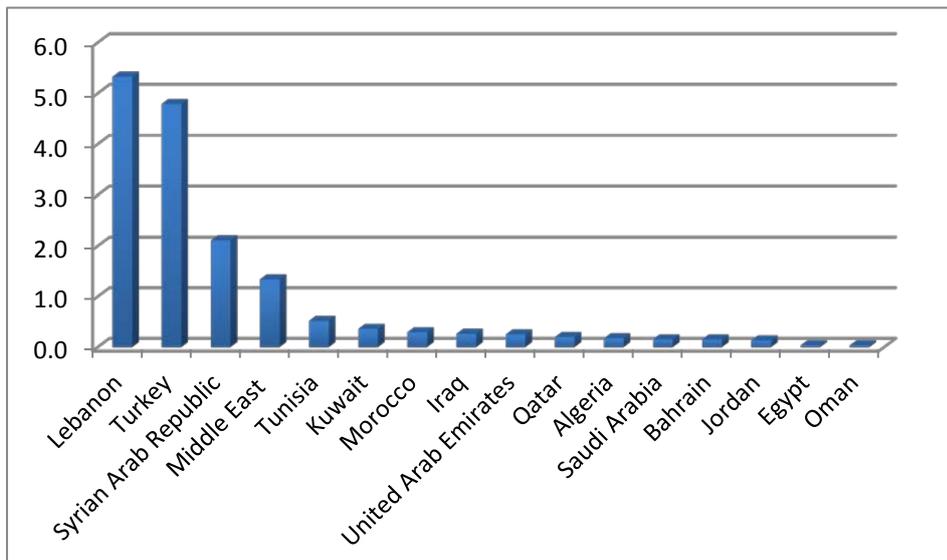
Turkey	4	6	-22.97%	-24.18%	\$6.00	\$2.67	-14.89%
Tunisia	6	4	75.00%	575.00%	\$3.23	\$6.00	125.00%

Source: Trademap

MENA CHERRY CONSUMPTION

Lebanon has the highest consumption rate for fresh cherries globally, averaging over 5 kg per capita in 2010, triple the average EU per capita consumption rate. Besides Syria, Turkey and Lebanon the MENA region has very low consumption rates for fresh cherries, at less than 400 grams per person.

FIGURE 9: 2010 PER CAPITA MENA CHERRY CONSUMPTION IN KG



GLOBAL CURRENT EVENTS AFFECTING THE CHERRY VALUE CHAIN

Conflict in Syria

Syria is a major producer/exporter in the region, with UN/FAO estimating 2010 production at 70,000 metric tons, more than double that of Lebanon's estimated production in 2010. The conflict in Syria will affect its production in the short to medium term, as the violence will prevent growers from tending to their orchards. Once the conflict ends, it will take 3-7 years for neglected Syrian orchards to regain their productive capacity. There is a potential opportunity for low-quality Lebanese producers to capture markets normally served by Syria in the short to medium term, assuming the conflict ends and transport through Syria resumes to normal.

Variability of Weather Patterns due to Climate Change

According to the World Sweet Cherry Review 2012, the marketing season for many individual producers of sweet cherries may last only one to two weeks, and the prices they receive may vary greatly day to day. The same holds true for Lebanese producers. The global trend to stabilize prices is to lengthen the marketing season by introducing early and/or late varieties into existing orchards, or establishing new orchards in different climactic zones. However, weather continuously proves to be the biggest constraint to planning and expansion of the marketing season, as variability between seasons, and the high susceptibility of the cherry fruit to weather related damage, in flowering and fruiting stages, makes predicting the harvest size and timing a near impossibility and planning very difficult, for growers and buyers alike.

LEBANESE PRODUCTION & TRADE

Lebanon produces both high and low quality cherries, but the majority is high quality product. The majority of Lebanese cherries are consumed domestically, despite the fact that wholesale prices in nearby European markets are significantly higher than domestic wholesale prices, as evidenced by the data in Figure 10 below. Approximately 33% of Lebanon’s total production was exported in 2012, a near tripling of the total volume exported in 2011.

Egypt is the largest export market for Lebanese cherries, accounting for nearly 30% of total exports, followed by Saudi Arabia and Kuwait. Lebanese exports to Russia quadrupled between 2011 and 2012, either as Syrian cherries were re-exported from Lebanon, or Lebanon was able to fulfill some of the Syrian production shortfalls. Traders in Ferzol wholesale market did report an increase in the appearance of Russian buyers in 2012.

Although 2012 was a bumper year and 2011 an adverse year for cherries in Lebanon, exporters and traders suggest the increase in 2012 is due to re-exportation of Syrian cherries. Others suggest that Lebanese cherries from Aarsal, which are typically traded unofficially to Syria and re-exported, were attributed to Lebanon in 2012. With hostilities affecting the authors’ ability to determine what is going on Syria, it is difficult to ascertain the truth.

Lebanese and Syrian cherries compete across the entire MENA region, with Syrian cherries being more competitive due to lower production and transportation costs. Production costs may equalize as Syrian government subsidies and interventions gradually decrease in the coming years. However, ground transport costs for Lebanese cherries will always be higher due to Syria’s geographic position. Furthermore Syrian authorities can close its border crossings with Lebanon at any given time, as it has in the past, and cutoff the only land route Lebanese producers have to the rest of MENA.

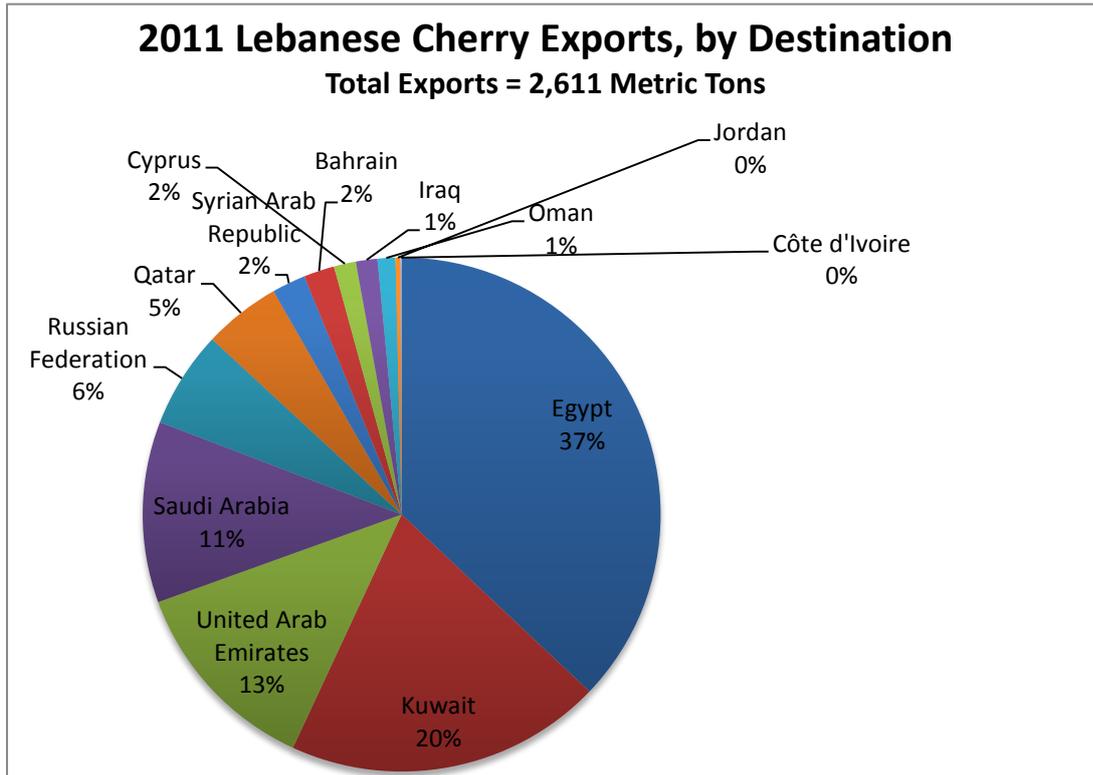
FIGURE 10: COMPARISON OF WHOLESALE PRICES IN JUNE, LONDON AND FERZOL

Size	24 mm	26 mm	28 mm	30 mm
London Wholesale (USD/KG)	\$1.00	\$1.50	\$3.00	\$5.00
Ferzol Wholesale (USD/KG)	\$0.33	\$0.66	\$1.66	\$3.33

Source: Dr. Adel Tini

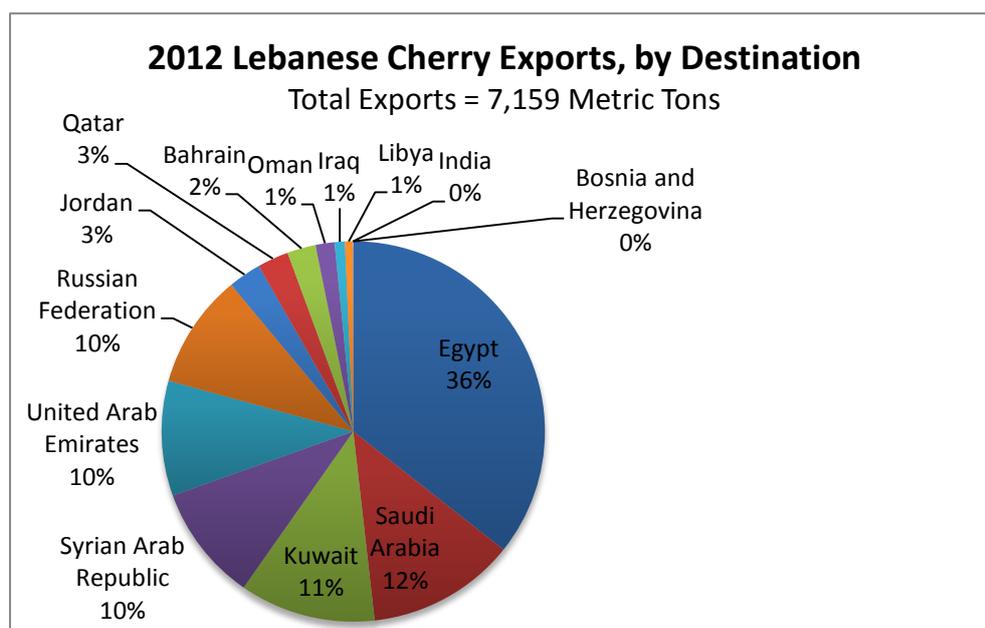
The market for cherries in nearby Europe and Russia is steadily growing. According to Lebanese traders, Lebanese cherries are very competitive in UK and Russian markets. In the peak production month of June, London wholesale market prices are typically USD 1.40/kg more than Ferzol wholesale market prices for comparable quality cherries (>28mm). According to an interviewed exporter, Dr. Adel al Tini, this margin is more than sufficient to cover cooling, packing and transport costs to New Covent Garden Wholesale Market in London. He intends to export cherries to the UK in 2013. He began exporting cherries to Russian markets in 2011.

FIGURE 11: 2011 LEBANESE CHERRY EXPORTS, BY DESTINATION



Source: Lebanese Customs Website

FIGURE 12: 2012 LEBANESE CHERRY EXPORTS, BY DESTINATION



Source: Lebanese Customs Website

Figures 11 and 12 above compare Lebanese cherry export destinations between 2011 and 2012. It is clear from these charts that Lebanon’s traditional markets (Egypt, GCC and Jordan) absorbed the tripling of export volumes witnessed between 2011 and 2012, suggesting that there is an appetite for cherries in these markets. The sudden surge in exports destined to the Russian Federation (159 MT in 2011 to 696 MT in 2012) is also an important indicator of Lebanon’s cherry industry to compete internationally. 2012 also saw first time exports to India and Bosnia Herzegovina.

SUMMARY OF CHERRY EXPORT MARKET OPPORTUNITIES/CHALLENGES FOR LEBANON

Egypt has traditionally served as the largest market for Lebanese agriculture produce, including cherries. However, the political crisis there has caused significant currency devaluations in recent years. The increased currency exchange risk is making Lebanese traders more wary of trade with Egypt. Cash outflow controls imposed by the Egyptian government further exacerbate the situation. This trend, if not reversed, will have significant impact on all agricultural value chains that rely on exports to Egypt.

The crisis in Syria poses a challenge and an opportunity. The challenge is related to increased transportation costs, with exporters reporting a 250% increase in the cost of ground transport to the GCC. Even more constraining is the frequent border closures⁶ and inability to send a convoy of trucks, thereby limiting supplier ability to meet larger orders. Lebanon will need to develop its maritime and air shipment routes to the GCC and North Africa in order to bypass Syrian territory. The opportunity is related to the almost certain degradation of Syrian cherry orchards, resulting from farmers inability to tend to their orchards. After the cessation of hostilities, these orchards will require multiple seasons to return to peak production levels. Lebanon has and must continue to fill the market gap left by Syrian shortfalls, especially in Saudi Arabia and GCC countries. Iraq offers a big opportunity for low quality producers, but

⁶ The Syrian government recently closed the border after a spate of bombings targeting fuel trucks transiting Lebanon and destined to the Regime in Syria.

is currently dominated by Turkish suppliers. It will be difficult to capture market share in this low price market.

New markets for Lebanese cherries in the high priced EU-15, and lower priced Russian Federation offer the best opportunity for increasing exports. Market channels are opening to the lucrative UK market, and channels to the Russian Federation are showing significant growth (quadrupling between 2011 and 2012). Reports of Russian buyers coming to buy directly from Ferzol market are a positive development.

3.2. DOMESTIC MARKET

2012 domestic cherry consumption in Lebanon is estimated at 12,804 tons. Assuming an average wholesale price of USD 1.33/kg, this equates to approximately USD 17 million in sales at the wholesale level. This represents approximately 60% of national production. The remaining 40% are exported. Imports to Lebanon are limited to off-season imports and accounted for 31 tons in 2012.

FIGURE 13: 2012 CHERRY PRODUCTION AID CONSUMPTION IN LEBANON

	Total Production	21,000 MT ⁷
+	Imports	31 MT ⁸
-	Exports	7,177 MT ⁹
-	Jams, other processing	50
-	Wastage	1,000 MT ¹⁰
=	Domestic fresh consumption	12,804 MT

Considering a population of 4.2 million people, consumption per capita is 3 kg in 2012, down from 5 kg per capita in 2010. The decrease from 2010 to 2012 is attributed to the reduced volume of product available for consumption and does not reflect a trend in consumer preference. This puts Lebanon among the top per capita consumers of cherries in the region, along with Turkey (4.50 kg/capita) and Syria (2.00 kg/capita).

Traders in the Ferzol wholesale market trade approximately 250 tons/day during the peak production month between June and July. This represents approximately 70% of total trade in Lebanon. Farmers sell the remaining 30% directly to retailers, distributors and/or exporters.

The domestic market consumes all grades of cherries. Cherries can be found throughout the mass consumer market both in the lower and high-income markets and neighborhoods, on street vendor carts and in high-end specialty shops, restaurants, and hotels. Product quality and price differ greatly across these consumer segments. There is little demand from processors.

On average, wholesale cherry prices average USD 1.33/kg. Prices range from USD 0.33/kg to USD 6.7/kg depending on several factors including quality and seasonality. The primary

⁷ FAO estimate of 2012 production in Lebanon and from interviews with traders and producers

⁸ GOL 2012 Customs data.

⁹ GOL 2012 Customs data.

¹⁰ Estimate based on expert opinion and global industry averages

quality considerations when negotiating wholesale prices are size; freshness, which is assessed based on the color of the stem (the greener the fresher); and ripeness, which is assessed by skin color (the darker the riper).

Seasonality and associated supply and demand forces also play an important role in setting price. During the peak production months of June and early July, high quality cherries are available for as low as USD 1.33/kg, as opposed to USD 3.33/kg for comparable quality cherries in early or late season. When supplies are scarce, in May and after mid-July, low quality cherries are available for as high as USD 1.33/kg, as opposed to USD 0.33/kg. Early season cherries, from low altitude orchards, get the highest price relative to their quality. Late season cherries come from the Aarsal region, and while they are very small, and sometimes discolored they sell for USD 0.66/kg – USD 1.33/kg, which is considered very good considering the quality of these cherries. In addition to seasonality, Aarsal is reputed to grow pesticide free cherries, which also helps increase the price.

Cherry buyers at the wholesale market include small to large neighborhood grocers, supermarkets, traders in other Lebanese wholesale markets, and exporters. Importers from Russia and Egypt also come to purchase cherries directly from Ferzol. When foreign importers purchase directly from the wholesale market, the wholesale operator typically serves the role of exporter. In other cases, the foreign importer utilizes the credentials of a known and trusted Lebanese exporter.

Imports to Lebanon are limited (31 tons) and typically include off-season imports from Australia. During the course of researching this paper, the study team saw imported Australian cherries at a specialty retailer (Beit Mussalem near Sassine Square) in Beirut for USD 46.66/kg. The vendor suggests that consumers willing to pay this price point are few and far between. However, this particular retailer imports product in order to maintain his reputation as the premiere FFV retailer in Lebanon. The vendor said consumers may buy (and he's willing to sell) only a handful of off-season cherries at a time.

DOMESTIC MARKET OPPORTUNITIES

The domestic market is a significant end market for the cherry value chain. Per capita consumption of cherries in Lebanon is among the highest in the world. The domestic consumer base spans the entirety of the socio-economic spectrum, and creates demand for all grades of cherries. There is very little wastage reported at the farm-gate or wholesale level, though sometimes farmers may be disappointed with the sale price. There is an opportunity to create additional domestic demand by introducing basic processing, such as dehydration and jams/composites. This may alleviate mid-season price drops, by creating additional demand in the peak supply period.

DOMESTIC MARKET CHALLENGES

Existing post-harvest and marketing practices require cherries to reach the end consumer within 72 hours of harvest in order to be saleable. Failure to meet this sales window will drastically reduce product value sometimes turning USD 5.00/kg cherries to USD 0.50/kg cherries. Post harvest infrastructure is required to extend the sales window. In some cases, proper cooling, storage and transport may extend the sales window from 3 days to 40 days.

Summary of Market Opportunities

- + There is an opportunity for high quality Lebanese cherries in European markets. Lebanon's geographical and climactic situation makes it one of the few suppliers of early season cherries (May) at very high prices; and even during peak season in June and July, Lebanese cherries can be competitive on price.
- + Other non-traditional export markets, especially Russia, provide an opportunity for lower quality Lebanese cherries. The decline of Syrian exports provides an opportunity for Lebanon to establish itself in these markets over the next few years.
- + The decline of Syrian exports also provides an opportunity to expand Lebanese exports to established GCC markets, which also demand lower quality product.
- + In the domestic market, there is an opportunity to increase demand for processed cherry products, particularly dried cherries. This could reduce pressure on mid-season prices by providing an alternative sales channel and increasing demand.

4. PRODUCTION AND PROCESSING

4.1: PRODUCTION

According to MoA statistics, cherries currently rank sixth among all crops in Lebanon in terms of production value, which is estimated at USD 27 million. According to FAO statistics, total cherry production quantities for the years 2011 and 2012 were around 21,000 tons, down from 25,000 tons in 2010. In 2012, the total cherry production area was around 6,000 ha, down from 8,100 ha in 2008. During this period, witches broom and verticillium wilt diseases affected newly established orchards, causing farmers to uproot trees and resulting in a sharp decline in area planted as farmers replaced cherries with other tree crops. Lebanese yields, estimated at 3.5 tons/ha by FAO, are low by international and regional standards.

FIGURE 14: CHERRY PRODUCTION STATISTICS IN MENA PRODUCERS 2007 - 2011

Country	element	2007	2008	2009	2010	2011	Tons/HA	Farm Gate 2009
Lebanon	Area Harvested (Ha)	8,100	8,500	7,510	6,173	6,000	3.5	USD 1.66/kg
	Production (tonnes)	30,000	31,000	30,800	25,000	21,000		
Syrian Arab Republic	Area Harvested (Ha)	14,000	12,700	13,100	13,000	12,699	4.9	n/a
	Production (tonnes)	75,034	48,300	56,886	58,084	62,195		

Tunisia	Area Harvested (Ha)	800	850	980	894	913	6.5	USD 2.67/kg
	Production (tonnes)	4,500	4,200	4,900	5,500	5,919		
Turkey	Area Harvested (Ha)	34,400	35,800	37,900	42,054	45,246	9.7	USD 1.45/kg
	Production (tonnes)	398,141	338,361	417,694	417,905	438,550		

Source: FAOSTAT

Cherries are planted throughout the mountains, with five main production areas that account for the bulk of the production:

FIGURE 15: LEBANESE PRODUCTION AREAS AND AVAILABILITY

Area	Availability	% of Total Production
Qaa Rim	June/July	~ 38%
Arsal	July/August	~ 36%
Baskinta/Sannine	July	~ 9%
Ouyoun Orgosh	June/July	~ 9%
Kfar Zbad	June/July	~ 5%
Other	May or August	~ 3%

Source: Stakeholder Interviews

FIGURE 16: CHERRY PRODUCTION AREAS (SOURCE: MOA SURVEY 2006)



Arsal, on the Syrian border, accounts for nearly 36% of the total area planted with cherries in Lebanon. According to a 2005 World Bank report¹¹, there are approximately 2 million cherry trees in Aarsal. The latest agriculture census revealed 562 cherry farmers in Aarsal, with individual orchards ranging from 0.8 to 1.6 hectares. Cherries coming from Aarsal are smaller in size and are considered to be of lesser quality compared to cherries from other high-altitude regions. According to stakeholders, this is due to the lack of irrigation and fertilization that result in lower yields, as well as misshapen and/or small fruit. However, Aarsal cherries are considered to be “natural” by many consumers, as area farmers typically cannot afford required pesticides, and may receive a premium in retail stores that are aware of and take advantage of consumer trends.

There are five commercially grown cherry varieties in Lebanon. Generally, consumers do not ask for cherries by the name, rather they choose cherries based on color, size and price.

¹¹ Due to insecurity in the Aarsal region, the study team could not verify production in Aarsal. Information is from Lebanese industry stakeholders including farmers, traders, and exporters.

FIGURE 17: LEBANESE CHERRIES - VARIETAL DESCRIPTION

Local Name	Variety	Color	% of Total Area Planted
Pharaone	Ferrovia and Turkish Napoleon	Dark Red	69
Nouari	Burlat	Red	13
Mkahal or Alb el Teir	Napoleon/Royal Anne	Light Red with Stripe	6
Benni, Irani, Itali	Van and Lapin	Red	12

Source: Stakeholder Interviews

FIGURE 18: NAPOLEON / ROYAL ANNE VARIETIES



FIGURE 19: PHARAONE VARIETY



According to FAO statistics, Lebanon yields about 3.5 tons of cherries per hectare, with 84% of cherry farmers producing less than 3.5 tons/annum/farmer. This represents a maximum income of approximately \$10,000/hectare for skilled farmers (3.5 tons X USD 3,000/ton) at this level. In fact the great majority of these farmers, with orchards around 0.1 ha, earn less than \$500 (350 kg X USD 1.33/kg) in revenues during the cherry season. On average, high-quality cherries will sell for USD 3,000/ton and low quality cherries for USD 1,333/ton. The revenue estimates provided here represent extreme scenarios and are used to highlight the disparity small cherry farmers might face in any given year.

PRODUCTION PRACTICES IN LEBANON

Planting Material

The Mahleb and Mazzard rootstocks are most commonly used in Lebanon. Mahleb rootstock is hardier but shorter-lived than Mazzard and produces a slightly smaller tree. Farmers tend to select rootstock based on the recommendation of the nursery owner or neighbor. These recommendations are typically based on soil type and water availability in the orchard.

Mahleb is considered one of the best rootstocks for sweet or tart cherries. It is cold hardy, drought tolerant, and highly productive with a deep root system. However, it is susceptible to

oak root fungus, root knot, and especially phytophthora. It is somewhat resistant to crown gall and resistant to bacterial canker and root lesion. This rootstock prefers light sandy soils and will not survive on wet or heavy soils. It is most commonly found in drier areas in Lebanon such as Aarsal.

The Mazzard rootstock produces a larger, higher yielding tree than Mahleb and is most compatible with sweet cherries. Fruit production takes longer with this rootstock, about 6 years. It tends to resist common cherry diseases better than Mahleb. It has some tolerance to phytophthora and is moderately resistant to oak root fungus. It grows best in sandy loam soil, but is also tolerant of heavy soils. It is susceptible to crown gall and bacterial canker, but it is resistant to water stress and root knot nematodes. Unlike the Mahleb, the Mazzard rootstock is better adapted to overwatering.

Planting

Cherries are generally planted at the standard 5 meters x 4 meters spacing, or about 500 - 600 trees/ha. Lebanese cherry farmers do not typically use drip irrigation for cherry production, relying on flood irrigation instead. In most cases this is due to the cost of drip irrigation. In Aarsal, cherry orchards rely on rainfall for irrigation.

Flowering and Fruiting

Flowering season in the Bekaa is in March, while most cherry trees in Aarsal flower between 10 April and 10 May depending on the climate, the area and the variety planted. Fruit formation is between 20 April and 20 May with maturity in June. The period between flowering and fruit maturity is of 40-50 days and the fruit can stay on the tree for up to 10 days after maturity. In-season management practices are minimal, including an annual application of compound fertilizers (typically 17s), with little regard to soil types and the tree's actual nutrition needs, as needed application of pesticides and irrigation.

Harvesting

Cherries are harvested in Lebanon from mid-May through late-July, depending on region and variety. Cherries at lower altitudes, from the Lebanon mountain range along the Bekaa and the coast, are harvested first, in mid-May. Of these cherries the Noueiri/Burlat variety is the first to be harvested. From Early June to Mid-July, cherries of all varieties are harvested in every major region, except Aarsal, which harvests its cherries in July and August.

Cherries are handpicked from the tree, and grading and packing is done on-site. Typically, female harvesters hand pick cherries and place them in a bucket. As each bucket is filled, a runner collects it from the base of the tree and delivers to the sorting/grading facility. The sorting/grading facility consists of basic worktables where fruit is manually sorted by size into smaller plastic crates. Little to no instrumentation is used in the sorting process. There is limited to no product waste at the farm level using this technique, as each fruit is hand picked off the tree. Only cherries destined for the export market are chilled or refrigerated.

Lebanese cherry farmers primarily rely on family labor for harvesting. This may be attributed to the small orchard size and socio-economic situation of cherry farmers in Lebanon. A large cherry farmer/daman in Qaa Rim who uses hired labor said that his laborers are predominantly Lebanese from a neighboring village with a mix of Syrian labor.

Cherries are graded by size, freshness and ripeness. Size is determined by measuring the fruit's diameter. The result is presented in millimeters ranging from 24 to 30 mm in diameter, comparable to international standards. Freshness is determined by the color of the stem, with greener stems signifying fresher fruit. According to wholesalers, once the stem begins to

blacken the product becomes unsalable. Ripeness is determined by the fruit's color intensity, with riper fruit attaining a darker color. However, if the fruit is too dark, and therefore too ripe, it will fetch a lower price.

Cherries destined to the wholesale market are packed in plastic crates with capacity of up to 8 kg. 70% of Lebanon's cherry harvest is traded through the Ferzol wholesale market. Cherries destined for exports may be packed in larger crates; one Bekaa-based specialized cherry exporter provides farmers with 10 kilo crates; these cherries are then brought to the pack house, sorted according to size and repackaged in smaller 2 kg – 4 kg packs for export to Russia, Europe and Asia. Traders in the wholesale market suggest larger boxes are not suitable for export as they may crush fruit during transport. Traders that export use the 8kg crate.

Diseases

Generally, cherries are more fragile than other fruit trees. They do not tolerate overwatering, though the Mazzard rootstock can tolerate overwatering, and are very susceptible to brown rot, bacterial canker, cytospora canker, root and crown rots and several viruses. Cherry leaf spot, witches broom, mostly in Northern Lebanon, and verticillium wilt which occurs in areas with past tomato, potato, pepper and eggplant cultivation, are the most serious diseases.



FIGURE 20: CHERRY LEAF SPOT SYMPTOMS

Cherry leaf spot, caused by the fungus *Blumeriella jaapii*, is characterized by tiny spots on the upper leaf surface that enlarge and become necrotic. Affected leaves often yellow and fall early in the season. The organism spends the winter on fallen cherry leaves and in the spring produces large numbers of spores from last year's infected leaves.

Control of cherry leaf spot is enhanced by raking and destroying infected leaves in the fall or early spring. Preventive fungicides may also be used. Later in the year, an after harvest fungicide could be applied. A combination of Benomyl (50% WP) and Captan (50%WP) at rates of 1/4 Tablespoon and 2 Tablespoons are mixed together per gallon of water.

Witches-broom is a fungal disease where infected branches develop large, dense, broom like tufts of foliage. These branches do not produce flowers or fruit, making them particularly visible during bloom. The leaves are discolored (red to brown), thickened, and curled or puckered. Whitish fungal growth may be present on the underside of curled leaves. Diseased branches do not recover. The cultural practice to treat Witches Broom is to cut out infected branches at least 12" below lowest infected point.



FIGURE 21: WITCHES BROOM

Verticillium wilt is a common disease found in Lebanon. It is a soil-borne disease which attacks the vascular system but seldom kills plants, and there is no effective fungicidal treatment. Verticillium wilt is more common in young orchards. Pre-plant soil fumigation

will reduce the amount of Verticillium in the soil in known-infested sites. Usually areas that once produced tomatoes, potatoes, peppers, and eggplant should be avoided.

Pests

The major pests infesting cherries in Lebanon, and the control methods are listed in the table below.

FIGURE 22: COMMON PESTS AFFECTING CHERRY ORCHARDS IN LEBANON

Pest Name	Borer (Asian longhorn beetle)	Rhynchites auratus (cherry weevil)	Diptera (rhagoletis Cerasi)
Picture			
Pest Control	Presently control measures include destroying infested trees and limited use of insecticides targeted at the adult beetles.	In Lebanon, the trees are sprayed with deltamethrin at fruit set.	Until recently, one application of Dimethoate is the standard for controlling R. cerasi. cherry fly, Rhagoletis cerasi, in organic orchards may be solved successfully by usage of yellow traps

BUSINESS VARIABLES: COSTS OF PRODUCTION, GROSS MARGINS, PROFITABILITY

Figure 23 lists the average annual costs for cherry production per dunum (0.1 ha). The cost estimates are according to Lebanese production practices and market prices for associated inputs, based on the industry standard of 60 trees/dunum. Cherry farmers in Lebanon achieve yields of 350 to 400 kg per dunum, according to FAO statistics. Assuming 350 kg production and an average sales price of USD 1.33/KG, this results in revenues of USD 465/dunum. The net operating profit for a below average farmer is thus USD 95/dunum. This represents a 5-year payback period for the initial investment once the orchard becomes productive, in addition to the 6 years it takes for the orchard to become productive. An above average farmer may achieve significantly higher net operating profit, up to USD 830/dunum, assuming a yield of 400KG/dunum and an average sales price of USD 3 /kg. This represents a 1-year payback period on the initial investment, in addition to the 6 years it takes for the orchard to become productive. The numbers of farmers in the latter category are limited. They are able to consistently produce large, high quality cherries. This may be due to excellent management practices or dumb luck attributed to planting material and climate.

FIGURE 23: PRODUCTION COSTS FOR ONE DUNUM OF CHERRIES (SOURCE: AIDSAP, 2006)

Activity	Cost \$	Percentage %
Land preparation	20	5.41

Pruning	15	4.05
Basic Fertilization	25	6.76
Pest Control	10	2.70
Labor: 18-20 days for harvest	300	81.08
Total	370	100

Figure 24 lists the orchard establishment cost, excluding land acquisition. The cost estimates are according to Lebanese market prices for implements, and stakeholder interviews for tree seedlings and planting.

FIGURE 24: ORCHARD ESTABLISHMENT COSTS FOR ONE DUNUM OF CHERRIES (SOURCE: STAKEHOLDER INTERVIEWS)

Activity	Cost \$	Percentage %
Seedling /Tree Cost (50 seedlings)	150	33.72
Land preparation	100	22.22
Implements	200	44.44
Total	450	100

4.2 PROCESSING

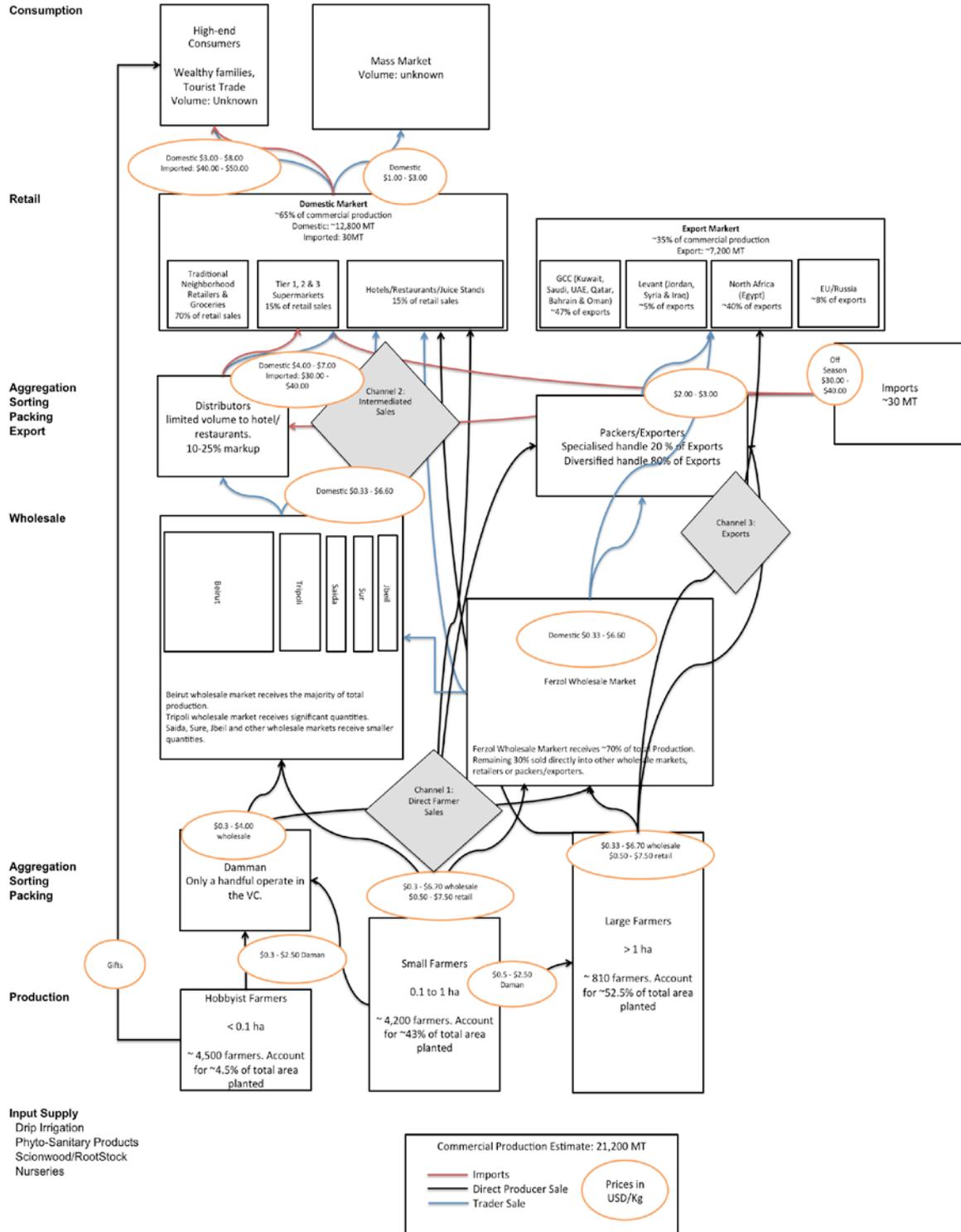
There is limited to no processing of cherries in Lebanon. There is potential to develop a dehydration industry in Lebanon, using lower quality cherries. The process of dehydrating cherries requires a pitting using a machine similar to an olive pitter, then dehydration to about 17% - 20% moisture content using a dehydrator machine. Cherries are then packed in bulk or retail packaging. Dried cherries can be stored for about 1 year, in cool, dry conditions.

5. VALUE CHAIN ACTORS

5.1. VALUE CHAIN MAP AND ACTORS

Cherry Value Chain Map
 2012 Season Prices; 2012 Volumes
 Prices in USD/Kg

Lebanese Consumption Estimate:
 Domestic: +/- 12,800 MT
 Imported: +/- 30 MT



VALUE CHAIN CHARACTERISTICS, CHANNELS AND GOVERNANCE

The defining characteristic of the cherry value chain is the fruit's short shelf life, which poses challenges in marketing and has limited the number of stakeholders who operate in the value chain. Stakeholders in the VC consistently speak of cherries as a crop that "takes over your life during the harvest season." Trees must be harvested and product delivered to market on a daily basis. Many stakeholders in the other stone and pome fruit value chains reported leaving the cherry business as it was too time consuming and risky. One grower recalls missing village weddings and funerals due to the fruit's short shelf life and marketing window. The relatively low number of 'damans' in the cherry value chain, as compared to the pome fruit value chain can be explained at least in part by the difficulty and risk of working with cherries.

The lack of processing and hydro-cooling infrastructure in Lebanon means that product must be sold to end consumers within 72 hours of harvest. This places an immense risk on the stakeholder who retains ownership of the product as it flows through the value chain. Approximately 70% of national production flows through the Ferzol wholesale market; growers and damans deliver product to the wholesale market on a consignment basis; wholesalers sell it and collect a 10% commission. The remaining 30% of production is sold to independent damans, distributors, exporters or direct to retailers on either a consignment or cash basis.

The relationship between the cherry producer and wholesale trader is typically very strong. Supply and demand price fluctuations combined with the fruit's short shelf life require shrewd decision making on the part of the wholesaler. If the wholesaler sells too soon (in a high-volume part of the day) then he may not get the producer's desired price. If the wholesaler waits too long, then he risks not selling the product at all. Accordingly, growers will typically only place their product with those traders that they have long and established relationships with and who they trust to sell at the right time for the highest price.

Channel 1: Farmer direct sales. Transactions in this channel are limited to direct sales transactions between grower and retailer, exporter or end consumer. This sub-segment represents a small portion of cherry consumption (approximately 10%). Hobbyist farmers use this channel to target friends, family and business associates with gifts. Small and large farmers use this channel to bypass the middleman and retain the additional margins for themselves.

Channel 2: Intermediated sales. This sub-segment represents the largest portion of cherry consumption (approximately 70%). Small and large farmers use this channel to reach desired markets. Sales through this channel may require as few as two or as many as five transactions, however it is usually somewhere in between. In the shortest route, a grower sells directly to a wholesaler in Ferzol who in turn sells to the retailer. Using the longest route, a small grower sells to a larger grower or daman; the daman in turn sells into the Ferzol wholesale market; the Ferzol wholesaler in turn sells to a wholesaler in Beirut; The wholesaler in Beirut then sells to a distributor; the distributor sells to the retailer. The longest route may be shortened by circumstance, e.g., a retailer in Zahleh purchases directly from the Ferzol wholesaler thereby bypassing wholesalers in Beirut and/or distributors.

Channel 3: Exports. This sub-segment represents a significant portion of cherry consumption (approximately 20%). Transactions in this channel may be as few as two or as many as three. In the shortest route, a grower sells product directly to the wholesaler in Ferzol who in turn sells it to an exporter. In the longest route, a grower sells product to the Ferzol wholesaler; the Ferzol wholesaler sells product to a wholesaler in another market (e.g.,

Beirut); and the wholesaler in Beirut sells the product to the exporter. There are also reports of foreign importers purchasing directly from the Ferzol wholesale market. In these cases, the wholesale trader typically is considered the exporter.

5.2: VALUE CHAIN ACTORS:

The Ministry of Agriculture census of 2010 identified nearly 9,500 cherry farmers in Lebanon; however, nearly half of these are hobbyists with less than 0.1 ha land planted with cherries. Commercial cherry producers, regardless of size, are generally rural, lack sophistication in production, harvesting and post-harvest handling practices, and don't appear to be any more well off as other similarly sized tree fruit producers. Cherry farmers tend to be generational farmers who inherited their orchards from parents, and grandparents. Areas such as Qaa Rim, have thousands of trees on a contiguous piece of terraced land. Individual farmers may own anywhere between 50 to 1,000 trees and most of the farmers own 50 to 100 trees. Growers claim that they know which trees are theirs; therefore fencing or a border is not needed. Despite the presence of large contiguous orchards, there seems to be little willingness for cooperation beyond immediate family members.

In interviews, these producers seem content with their orchards, and are not making investments into improvement or expansion of cherry production. In fact, most farmers seem to prefer to plant apples, rather than cherries, as apples are easier to maintain, harvest and store.

HOBBYIST FARMERS Around 4,500 of the cherry farmers listed in the MoA census cultivate less than 0.1 hectares, and produce less than 350 kg per annum. Though some of these farmers may bring product to market or sell to a daman, they are considered hobbyists by the study team.

SMALL FARMERS with cherry production areas of between 0.1 ha and 1 ha. Of the 5,000 non-hobbyist farmers, approximately 57% cultivate less than 0.3 hectare and 27% cultivate between 0.3 and 1 hectare. This category of farmer includes families with enough land under cultivation for cherry revenues to constitute an important piece of total family income, while not providing enough to be the only income-generating activity. In the best case, a farmer will yield 3.5 tons per hectare and may earn up to \$10,000 USD/hectare (3.5 tons X USD 3,000/ton) in gross revenues depending on seasonality. In fact, most of these growers cultivate less than 0.5 hectares and earn less than \$2,400 in gross revenues per annum (1.7 tons X USD 1,333/ton). The revenue estimates provided here represent extreme scenarios and are used to highlight the disparity any farmer might face in any given year. In most cases, these farmers are not diversified orchardists, having only cherry trees and relying on non-agriculture jobs for additional income.

These families are professional cherry farmers who use pesticides and fertilizer and prune their trees, and specialize in cherry production. Since most orchards are in water-rich areas, they are unlikely to invest in drip irrigation, using flood irrigation instead. The exception is the Aarsal region, where farmers can't afford inputs and rely solely on rain-fed irrigation. While this lowers their production costs, improved profit margins are offset by poorer yields and post harvest controls.

Growers generally use unpaid family labor, using paid labor only to harvest. While this does lower production costs for farmers, harvesting requires significant labor. The vast majority of cherries (approximately 90%) that arrive at the Ferzol wholesale market come from such farmers. According to the MoA, there are approximately 4,200 of this type of farmer in

Lebanon. These actors generally sell to direct to wholesalers, but some also sell to a daman, as described in the section “Aggregation” below, or to distributors, exporters and retailers.

LARGE FARMERS have 1 or more ha. Of the 5,000 non-hobbyist cherry farmers in Lebanon, 15% cultivate between 1 and 5 hectares. There are a dozen or so farmers with between 5 and 10 hectares of cherries, and only 7 with more than 10 hectares. The largest orchard, according to the MoA census of 2010, is 40 hectares in the village of Massa in the Qaa Rim area.

Generally, growers with at least 1 ha produce a minimum 3.5 tons per year, providing a minimum gross income of around USD \$4,650 (3.5 tons X USD 1,333/ton) per hectare per year. Some farmers in this category of farmer also serve as cherry daman to supplement this income.

The number of large farms is around 800. However, only 20 of these are larger than 5 hectares and earn gross revenues of at least \$23,000 USD (17.5 tons X USD 1,333/ton) per five hectare per year. Some farmers in this category of farmer also serve as cherry daman to supplement this income.

The revenue estimates provided here are based on average scenarios and are used to represent typical earnings in any given year. This category of farmer consists of families who live mainly from cherry income. Large farmers are more likely to have expanded or regenerated their orchards. This type of farmer may use drip irrigation, but more likely uses flood irrigation. This type of farmer sells either to the local wholesale market, direct to retailers/exporters including supermarkets, and a few export product directly.

AGGREGATION

A handful of small-scale collectors called damans operate in the cherry VC. These intermediaries are essentially traders who, at a minimum, have a pick-up truck, a stock of plastic crates that can hold 8 kg of cherries, and can organize labor for harvesting. In some cases, they also have their own cherry orchards. They generally contract with small farmers to purchase all their production at a fixed price. The cherry VC includes only a handful (less than 50) damans. This stakeholder has limited financial resources and carries significant commercial risks linked with serving the urban wholesale markets with sales on a consignment basis.

The fruit’s limited shelf life places great pressure on whoever retains ownership of the product, thus limiting the number of intermediaries and aggregators. Due to the lack of damans or other intermediaries in the cherry value chain, the Ferzol wholesale market serves as the main aggregation point for cherries. It is close to the main production areas (1 hour drive from Qaa Rim, Baskinta, Sanine), so it is convenient for farmers to deliver their product directly.

Cherry exporters will either purchase direct from Ferzol, or set up independent aggregation points very close to the Ferzol market. This way they can cherry pick the best product before it reaches Ferzol. They often provide farmers with better prices and payment terms than are available at Ferzol, making it worthwhile for the farmer to stop and try to offload the harvest prior to reaching Ferzol.

WHOLESALE TRADE, PACKING, AND EXPORT

The focus of wholesale level trade for cherries in Lebanon is the Ferzol wholesale market in the Bekaa. Traders there estimate that 70% of total production is traded through the Ferzol market. Outside of Ferzol, only limited amounts of product go directly to a handful of packers/exporters with warehouses and cold storage facilities located near the production areas. Both of these types of buyers purchase from damans, small and large farmers, and trade volumes at the wholesale level. Each is described below. The study team identified one exporter that utilizes hydro cooling technology for cherries. The use of this technology has allowed him access, though in limited quantities, to the UK and Russian markets. He sees potential to expand market share in both Russia and the UK. This exporter has significant contacts in the UK and Russian markets that he developed through exporting grapes.

URBAN WHOLESALE MARKET OPERATORS. Urban wholesale markets are run by associations of traders who occupy designated spaces, collect rent for the warehouses, and organize cleaning and security. All traders deal in a variety of fresh fruit and vegetables. Some of the traders in the market are also independent exporters/importers of fresh produce who own packing facilities and cold storage outside of the urban wholesale markets. Interviews with the wholesale market traders and the distributors and exporters who buy from them indicate that the vast majority of cherries reach their end market through traders in the Ferzol wholesale market, with nearly 70% - 80% of all production traded through Ferzol. The Ferzol market serves as the point of purchase for other wholesale markets in Beirut, Tripoli and Saida.

There are 45 stands at the Ferzol market, however a handful account for the majority of cherry sales. Prices at the Ferzol market vary based not only on supply and demand, but also quality and freshness of cherries. Farmers bring their cherries to the wholesale market using trucks, minivans, or other types of vehicles - typically in quantities under 250 kg at a time. Deliveries to the wholesale market are mainly between 4AM and 10AM. Farmers bring product in 8KG plastic crates. Some re-packing happens at the wholesale market, but the farmers typically perform sorting/grading activities on farm.

Farmers typically get paid 30 days after delivery of product. Traders typically get paid 60-90 days after delivery of product. The traders have limited options for financing the 30-60 day payment deficit. Many traders have been 'broken' by this risk exposure – with instances of non-payment from buyers in export markets. Bank financing is available, but interest rates are 12% and higher APR and the banks require burdensome collateral requirements. The traders cannot access Kafalat or other subsidized credit programs, because those are meant to offset capital investment costs, not operating costs.

Cherry buyers at the wholesale market vary widely from small to large neighborhood grocers, supermarkets, traders in other Lebanese wholesale markets and exporters. Importers from Russia and Egypt also come to purchase cherries directly from Ferzol. Early trading typically involves exporters, as those wishing to benefit from the IDAL subsidy must clear the border by 12PM – before IDAL offices close.

DIVERSIFIED PACKERS/EXPORTERS

In contrast to other tree fruits, cherry importers usually visit the Ferzol wholesale market to personally select the appropriate cherries and negotiate the buying price. Therefore, foreign-based importers who purchase direct from traders in Ferzol account for a large proportion of cherry exports. In some cases the wholesale trader serves as the exporter. In others, the

importer will utilize the credentials of a Lebanese exporter that it has an established relationship with to export.

Outside of the Ferzol market, there are a handful of exporters with hydro cooling technology that take large orders (container-load) and export without the client visually inspecting the shipment. These exporters are also involved in trade of other agricultural products, grapes for example, and have cultivated a relationship with their overseas clients.

There are also 40-50 full-time diversified exporters reacting to one-off market opportunities. These full-time traders deal with limited amounts of cherries. They typically have long-term arrangements with buyers in export markets. These buyers may require limited amounts of cherries that are then packed as part of a mixed shipment that is airfreighted to the customer.

DISTRIBUTION AND RETAIL

Lebanon is characterized by a wide variety of retailers and distributors of fresh produce, 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 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, versus the chain supermarkets such as Spinney’s TSC and Charcuterie Aoun who buy directly and manage their own produce departments.

NEIGHBORHOOD RETAILERS: In a country without a strong tradition of open air markets or farmers’ markets, cherries 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.

SPECIALIZED PRODUCE RETAILERS: A small but growing trend in Beirut is the emergence of fresh produce 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. 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: Restaurants and hotels provide another important market for high quality cherries. Most are supplied mainly by specialized distributors, although some will send their own trucks to the wholesale markets. During the busy summer season, nearly every Lebanese ‘meza’ restaurant offers a wide selection of fresh fruits and vegetables to every diner. Though no official estimates are available, these restaurants consume large amounts of cherries.

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.

BUSINESS DEVELOPMENT SERVICE PROVIDERS

Stakeholders in the cherry 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 cherry seedlings is not an obstacle, but the quality offered by most nurseries in terms of genetic purity and disease free certifications is questionable. In addition, there are no commercial tissue culture facilities that propagate improved rootstocks. Since improved rootstocks are imported, seedlings are double to triple the price of the local varieties constraining demand by growers. The two largest nurseries dealing with cherry seedlings are Hanna Nurseries, which only sells certified seedlings, and Tarchiche Nurseries, that deals in both non-certified and certified seedlings.

Generally, non-certified cherry seedlings sell between USD 2 and USD 3 per seedling using local varieties like Pharaone, Mkahal or Alb el Teyr, and Benni. Certified seedlings using local rootstocks sell for USD 4 to USD 6 per seedling, depending on variety. The scions are certified by the MoA. In 2012, the MoA bought 370,000 fruit trees, including 10,000 cherry trees, for USD 3.33 each.

The two major rootstocks adopted in Lebanon are Mahlab and Mazzard. The imported rootstock is planted for one year. If it survives, a scion is grafted and it is left in the ground for another year. The current price of this improved seedling is USD 12 to USD 15 per seedling. By propagating improved rootstocks in Lebanon, nurseries estimate that this price can be reduced by over 50%

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 for water poor areas. Several of the larger dealers maintain trained agronomists on staff in field locations and produce a full range of crop-specific extension materials.

6. BUSINESS ENVIRONMENT FACTORS AFFECTING THE VALUE CHAIN

6.1. ACCESS TO FINANCE

Most cherry producers are self financed or work on credit obtained from input suppliers and/or wholesale traders. These loans cover the costs of production and harvesting. In most cases the loan includes a mutual agreement for the farmer to sell his product to the wholesaler at market prices.

6.2. EXTENSION SERVICES

Cherry farmers receive little to no extension support. Some larger farmers hire agriculture engineers for production and management advice. Smaller farmers have virtually no source

of advice on improved techniques and will often rely on neighbors or the local nursery for advice, or in some cases input suppliers. Most small cherry farmers are generational farmers, having grown up on the orchard. They do not feel they have a need for extension, with many saying that previous extension training sessions they attended in the past were a waste of time.

The MOA is in the process of reorganizing and recruiting extension staff who 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.

6.3. BUSINESS CULTURE

The Lebanese business culture has elements that offer important levers to the development of the cherry 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 cherry value chain map 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

This section captures major trends in value chain development that may have potential impacts on the possible upgrading strategies

TREND 1: DECLINE IN SYRIAN EXPORTS

The decline in Syrian production and exports due to the conflict is expected to continue for the medium-term (10 years). Lebanon is should continue to fill this market gap.

TREND 2: DIVESTMENT IN THE SECTOR

Small farmers are divesting from the sector, with a tendency to switch to apples. There is limited to no investment in post harvest infrastructure. However, some larger traders are showing inclination to invest, but have not taken the actual steps to do so, citing other more pressing interest in the grape trade.

TREND 3: NEW MARKETS COME ONLINE

New markets, with huge growth potential, are being penetrated in London and Russia. There is increasing demand globally. The MENA region, currently a small market, will see a surge

in demand over the next six years as Ramadan will coincide with the peak production period in Lebanon.

8. VALUE CHAIN OPPORTUNITIES

The potential for increasing demand in both domestic and export markets exists. Lucrative export markets exist in the UK and Russia. A surge in demand is expected in the MENA region. Domestically, there is an opportunity to develop small-scale processing to spur demand.

OPPORTUNITY 1: INCREASE MARKET SHARE IN EXPORT MARKETS

The UK is a lucrative market that offers huge potential for Lebanese producers, aggregators and exporters that can meet its demand for high quality product and stringent import requirements. A Lebanese trader with hydro cooling equipment and established market links in the UK has begun exporting small amounts of cherries to the UK. He sees significant growth potential for high-quality Lebanese cherries in this market.

The Russian Federation is a high-volume market that demands product of varying quality levels. Traders at the Ferzol Wholesale Market report the increased presence of Russian importers demanding cherries in 2012, and expect this trend to continue in the coming years. Lebanese exports to Russia quadrupled between 2011 and 2012.

Lebanese exports to MENA nearly tripled between 2011 and 2012. Lebanese have a short to medium term opportunity to continue this trend as the conflict in Syria and Ramadan occurring in Summer will increase demand over the next six years.

The limited number of aggregators and exporters willing to work in the cherry value chain pose the greatest constraint to expanding market share in these markets. It will be necessary to both increase the volume and consistency of supplies in order to take advantage of the large markets in the UK and Russia. Linkages to importers in the UK and Russia will need to be strengthened in order to improve access to these markets.

The lack of infrastructure for aggregation, cold storage and transport is another constraint to accessing these markets. LIVCD can promote investment in hydro cooling and cold storage technology to extend the shelf life of cherries. It will be necessary to develop air and maritime transport terminals to bypass Syria.

OPPORTUNITY 2: INCREASE QUANTITY AND QUALITY OF CHERRY PRODUCTION IN LEBANON

Lebanese cherry production practices are rudimentary and application of modern practices will increase yields and product quality, as well as extend the harvest season. If production is better-organized cherry growers will have the opportunity to sell more cherries at higher prices for a longer time.

The highly fragmented production base poses a significant constraint to organizing production at a large scale. It will be necessary to identify production clusters and develop appropriate incentive schemes for them to work together. Production can be organized by variety within an agro-climactic zone or by the agro-climactic zones themselves.

Improving yields and consistency requires significant lead time may not be realized within the project's life. It will be necessary to organize production clusters by agro-climactic zone

and link them with exporters in order to realize gains within LIVCD's period of performance. LIVCD can also promote investment in drip irrigation in existing orchards and realize increase yields and qualities within the project's period of performance.

Open conflict in one of the main production zones of Aarsal will pose significant constraint to organize production.

9. VALUE CHAIN UPGRADING STRATEGY

AXIS 1: INCREASE MARKET SHARE IN EXPORT MARKETS

Support exporters with actionable market intelligence. Create linkages and develop information channels between LIVCD-supported production clusters, aggregators and exporters.

Determine appropriate target markets

- Study potential markets which include all European countries, GCC markets, and Asian markets, especially those that have already been successfully accessed by pioneering exporters/packers.
- Identify existing market channels and trends.
- Identify regulatory requirements and market barriers.
- Identify individual consumer preferences and trends in selected markets.
- Develop market entry strategy.

Determine appropriate varieties for the selected target markets

- In the identified target markets, study consumer demands for different varieties of grapes, wholesale and retail prices, market trends, competing countries and their export windows.
- Ascertain the potential of these varieties to adapt to the various micro climates of Lebanon and the harvest calendar of grapes.

Develop vertical linkages to connect growers with exporters

- Match and introduce growers with exporters.
- Identify efficient and effective means of communication between linked entities.

Promote investment in hydro cooling and cold storage infrastructure

- Study international best practices to determine most suitable technology for Lebanon.
- Spur investment through targeted grants and co-investments.

Promote investment in small processing equipment

- Support investment in dehydrating and other processing technologies to create additional domestic demand.

AXIS 2: INCREASE QUANTITY AND QUALITY OF CHERRY PRODUCTION IN LEBANON

Promote improved production practices

- Study international best practices to determine most suitable practices for Lebanon.
- Develop extension materials and disseminate them to growers.
- Organize fragmented, rural production clusters to create lengthened marketing season.
- Support invest in drip irrigation and improved planting material for existing and new orchards.

ANNEX 1: SWOT ANALYSIS

Strengths <ul style="list-style-type: none">+ High quality reputation.+ Concentrated pockets of production.+ Proximity to lucrative markets.+ Agro-climactic zones well suited for expanded production season.	Weaknesses <ul style="list-style-type: none">+ Fragmented production base.+ Inefficient production practices.+ Lack of appropriate post harvest infrastructure.+ Limited number of aggregators and exporters.+ Divestment in sect
Opportunities <ul style="list-style-type: none">+ New markets opening in UK and Russia.+ Syrian conflict resulting in unmet demand in traditional markets MENA markets.	Threats <ul style="list-style-type: none">+ Internal conflict in primary production zones.+ Syria conflict obstructing transport.