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USAID/LEBANON LEBANON INDUSTRY VALUE CHAIN DEVELOPMENT (LIVCD) PROJECT

TABLE GRAPE VALUE CHAIN ASSESSMENT REPORT
DRAFT
FEBRUARY 6, 2013

FEBRUARY 2013

This publication was produced for review by the United States Agency for International Development.

It was prepared by DAI.

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1. OVERVIEW OF THE GRAPE VALUE CHAIN

Grapes are one of Lebanon's most important agricultural products, and Lebanon produces over 117,000 tons of table and processing grapes annually for a total value of USD \$106 million, including \$81,221 value of table grape production. There are 15,758 grape farms, including 4,197 commercial farms that employ 15,812 full time production workers¹; making grape production one of the largest agricultural employers. Lebanese grapes are a high value product that claims premium prices in both domestic, Gulf, and other Arab markets.

The majority of Lebanese grape production, about 60-70 percent, is exported, mostly to GCC and other Arab countries. Grapes for export are from medium and large-scale producers. A small cohort of Lebanese grape producers have achieved high production standards and can export to high value European markets, although total exports to Europe are still very small. These exporters have some degree of vertical integration, can control grape production and can guarantee quality. In general, most grapes grown in Lebanon, whether for local consumption or for export are not produced or packed according to the standards required either by European buyers or high quality produce buyers in the region.

While large scale commercial operations serve export markets, the domestic market is served predominantly by small and medium scale grape farmers. The technical capacity of farmers tends to decline in relation to farm size. Smaller grape farmers do not follow production and post harvest practices that would allow them to produce the quality of grapes for which demand is the strongest in both Europe and the region. The most common problem is that farmers have no access to pre-cooling and modern cold storage facilities, and during the peak season grapes sit out under the hot sun where they rapidly lose quality and storage potential. To access retail and urban wholesale outlets in Lebanon, the majority of grapes for domestic consumption flow through the Ferzol wholesale market, which is a major focal point of the grape value chain.

During the peak production period of August and September, prices are often below production costs. In order to maintain domestic prices that cover production costs for small and medium sized farmers, Lebanon must improve cold storage practices to extend shelf life and increase exports to absorb peak production. In recent years, there has been a growing trend to plant new varieties that are in high demand in local and export markets. Additionally, grape production is expanding into new non-traditional areas such as the extreme north of the Bekaa valley and deep in the South. The expansion into the South is important in lengthening the export window of Lebanese grapes. All these factors help farmers capitalize on higher prices in domestic and international markets.

Major opportunities for the grape value chain include improving market linkages and technical practices that will increase grape exports to high value GCC and EU markets. LIVCD can work with small and medium scale farmers to improve production, harvest, and post-harvest practices including access to modern cold storage facilities, and educate farmers and other value chain actors on new markets, varieties, market windows, and market requirements in terms of consumer expectations of quality, size, and color. As quality improves, LIVCD can link grape cooperatives and other small and medium scale farmers to exporters with established international markets. These interventions will improve the sophistication of

Lebanese grape production and improve competition and prices for Lebanese farmers in both domestic and international markets.

2. VISION FOR THE VALUE CHAIN

The grape value chain will be more tightly integrated with greater volumes of grapes flowing to higher quality export markets. It will include a greater number of small farmers benefiting from improved linkages between lead farmers, small farmer cooperatives, and exporters.

Financing and co-financing packages through Public Private Partnerships will support investments in production in conjunction with exporters or other buyers and microfinance institutions. To accomplish this vision there will be:

- Wide diffusion of new table grape varieties, especially among small and medium scale farmers;
- Greater traceability from input suppliers to exporters and domestic retailers and documented levels of pesticide residues that meet international standards;
- Improved production, harvest and post-harvest practices;
- More investment in packing houses and cold storage facilities;
- Improved packaging to buyers and consumers' expectations.

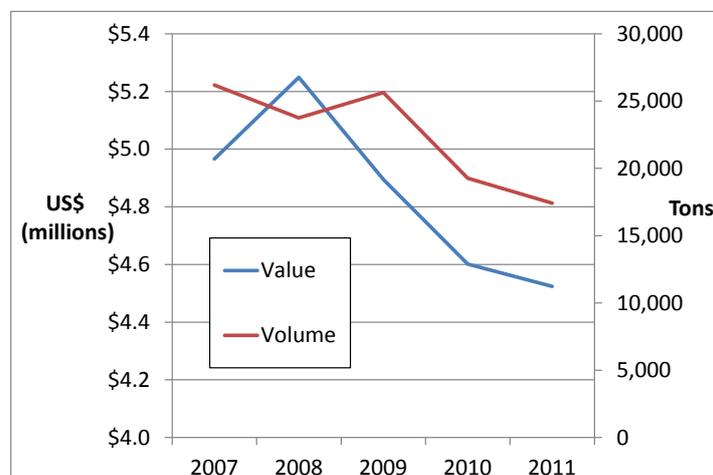
3. GRAPE MARKET OPPORTUNITIES

LEBANESE EXPORT MARKET ANALYSIS

Figures for value and volume of Lebanese grape exports vary widely between sources. For the purpose of this study, we use information from key stakeholders and Chambers of Commerce to calculate export volumes and average sales prices; and information from the UN Comtrade database and Lebanese Customs to assess five year trends and percentages of exports going to key import markets. Because grape exporters and importers frequently under-report quantity and value of grapes moving between countries, Comtrade data show unreasonably low volumes, values and average sales prices. Additional rationale and assumptions for these decisions are found in Annex 1.

Based on interviews with key grape value chains stakeholders, Lebanon exports approximately 55,000 tons of grapes annually, with an average sales price of between US\$0.95 and US\$1.35 per kilogram. As shown in Figure 1, which should be used only to understand trends in exports, volumes of fresh grape exports dropped significantly by 32 percent and the value dropped by 13 percent between 2009 and 2011. Much of this reduction was the consequence of a severe snow storm in 2010 that damaged grape vines followed by a heat wave that occurred in the same year both of which depressed overall grape production in Lebanon. More recently, the conflict in Syria has disrupted transportations routes to the GCC market. Another important factor which reduced exports is the increase in production of Saudi Arabian grapes, causing that country to import less.

FIGURE 1: LEBANESE EXPORTS OF FRESH GRAPES FROM 2007-2012

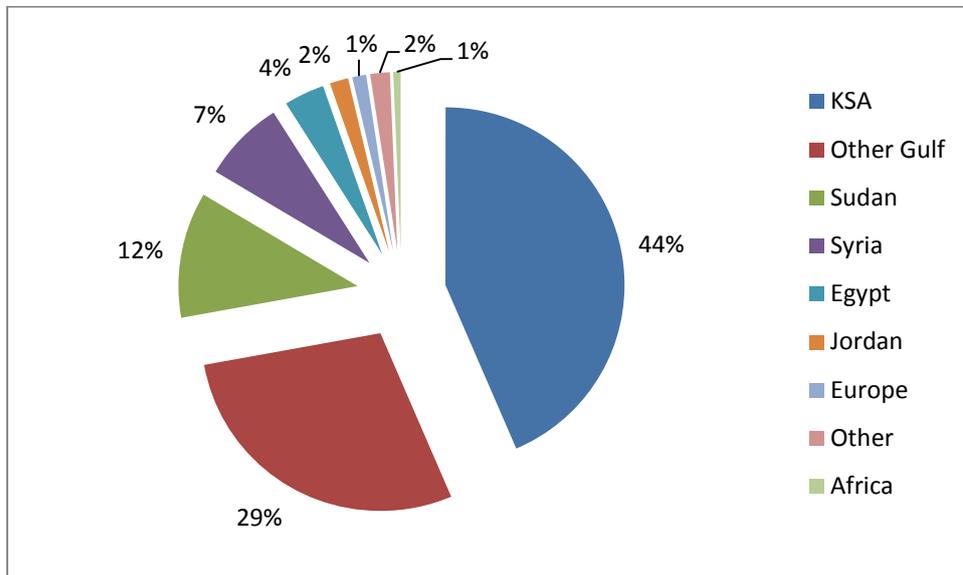


Source: Comtrade

Lebanon has traditionally focused its fresh fruits and vegetables exports, including grapes, to Arab markets. As shown in Figure 2 below, in 2010 Lebanon exported over 80 percent of grape exports by volume to Arab countries, including 73 percent to GCC countries. Saudi Arabia is the largest destination market, importing 44 percent of Lebanese grape exports, followed by Sudan, which imports about 12 percent. Even though Lebanese exports to Europe accounted for only 1.3 percent in 2010, exports to the EU have increased in value in every year since 2009, and this is likely to continue. Increasing investments in new grape varieties and pack houses including cold storage facilities, along with improved control over pesticide usage and

Lebanon's bilateral trade agreement with the EU should foster tighter links with European importers.

FIGURE 2: DESTINATION MARKETS FOR LEBANESE GRAPE EXPORTS AS PERCENT OF VOLUME IN 2010

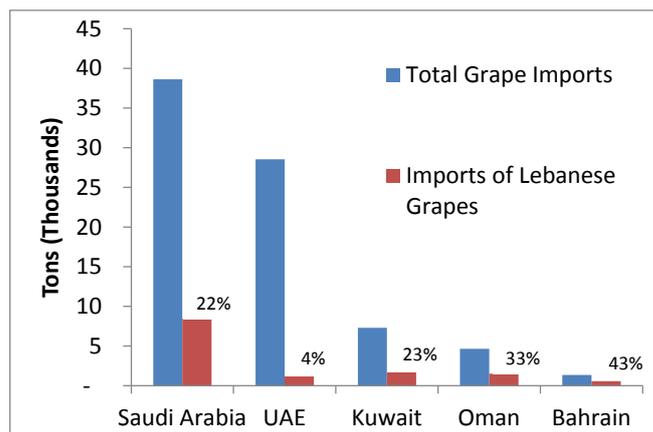


Source: Lebanese Customs

THE GCC MARKET.

The GCC has the largest and most dynamic markets for Lebanese grapes due to its relative proximity, ease of access, and a large, growing, and wealthy population. Demand for fresh grapes in GCC countries is high, with over 80 thousand tons of grapes consumed per year. Based on interviews with Lebanese exporters and Lebanese expatriates living in the GCC, Arab expatriates, who constitute a high proportion of GCC residents have a preference to Lebanese grapes varieties. As highlighted above, GCC markets accounted for over 70 percent of Lebanese grape exports in 2010. During the same year, Lebanese grape exporters captured 17 percent of the overall GCC market. Lebanon's market share in each of the GCC countries exceeded 20 percent except in the UAE market where Lebanese grapes only claim a 4 percent market share. Figures for the Lebanese market share in individual markets are found below in Figure 3, below.

FIGURE 3: LEBANESE MARKET SHARE IN GCC GRAPE IMPORT MARKETS-2010



Source: Comtrade

Sales to the GCC market and other Arab countries are for the most part made through wholesale markets where each Lebanese exporter deals with individual with whom they have built a relationship of trust. Over 90% of the sales are made on consignment. Lebanese grape exports to the GCC are not typically branded, except for the highest quality grape exports from the most advanced integrated exporters. Over the past five years, an increasing percentage of Lebanese grape exports to the GCC are being channeled through particular wholesale market importers who work for major supermarket chains and who will purchase with firm fixed price orders from exporters who have an established quality track record. Most of these volumes have been supplied by a few integrated Lebanese grower/exporter.¹

The main varieties of Lebanese grapes in the GCC are traditional varieties including: Vitamouni and Halawani (these are also known as Baytamouni and Tfeifihi) in addition to a growing volume of a relatively new variety called Red Globe. High quality exporters also sell new varieties such as Black Pear and Thompson Seedless.² In GCC markets, these grapes are sold at a price premium compared to grapes from Italy, Brazil and other countries. An example of this is shown in Figure 4.

In general, GCC markets exhibit significant demand from Lebanese grape exporters for the following reasons:

FIGURE 4: PRICES FOR LEBANESE AND ITALIAN GRAPES IN DUBAI CARREFOUR, DEC 15, 2012

1: LEBANESE GRAPES



2: ITALIAN GRAPES



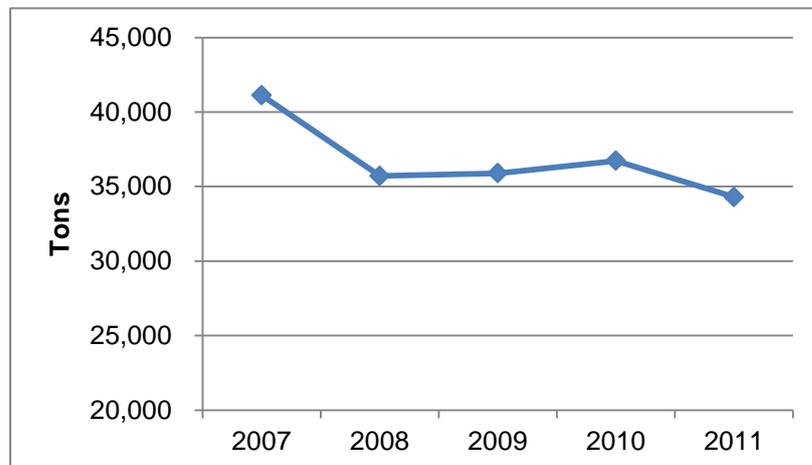
¹ This group includes Medigardens and 3-4 other exporters.

² These varieties are established in international markets, but new to Lebanon.

- *Relative ease of access.* Especially compared to Europe, GCC countries have fewer restrictions and enforcement of pesticide residue levels, although in recent years these countries have begun to tighten their requirements and enforcement.
- *Lower quality requirements.* The GCC market has lower quality requirements related to freshness, color, size of berries and clusters, and type of packaging.
- Historical presence of a large Lebanese community living and working in the GCC. Some Lebanese exporters have wholesale and retail outlets in GCC countries.
- *Greater name recognition.* Lebanese varieties have greater name recognition and higher demand in GCC countries than in European markets.
- *Lack of domestic substitutes.* In the European market, Lebanese grapes exporters have to compete with local growers while this is not the case in the GCC market except for Saudi Arabia during the months of July to mid-September. During these months, Lebanon's wholesale prices reach their lowest levels.
- *Lower cost of shipping.* The geographical proximity to the GCC makes shipping from Lebanon cheaper than from most other grape exporters.

SAUDI ARABIAN MARKET. The Saudi Arabian market for grapes is the largest of all GCC countries, but total tons of imports from Lebanon have declined by around 7,000 tons since 2007. Grape imports have declined in Saudi Arabia in large part due to increased domestic grape production. Saudi Arabian domestic production of grapes grew by 17 percent between 2006 and 2010.

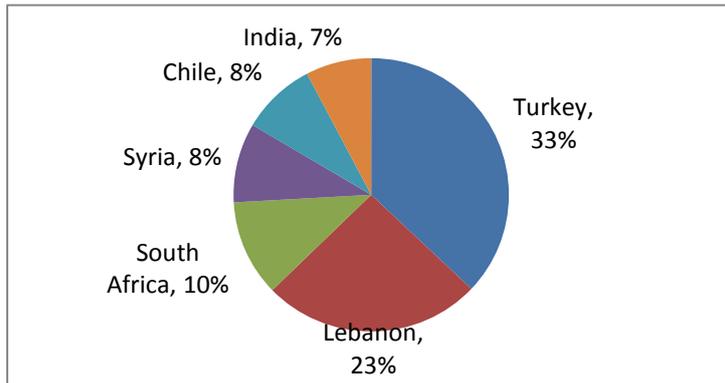
FIGURE 5: SAUDI ARABIAN GRAPE IMPORTS



Source: Comtrade

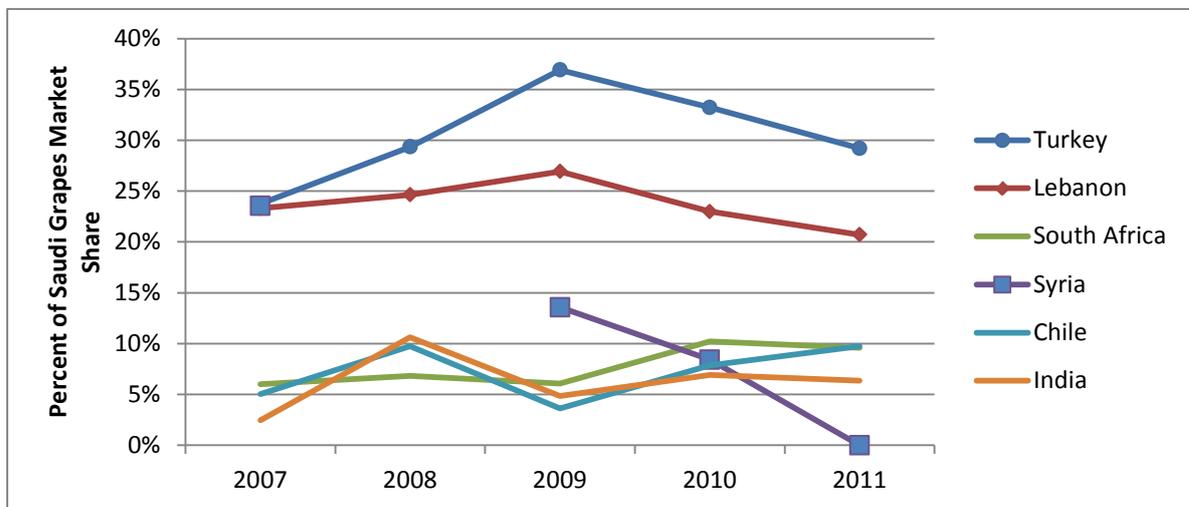
Lebanese grape exporters have maintained a relatively stable market share, averaging 24% by volume with minor declines in 2010 and 2011, which were caused by the decline in production due to the snow storm and heat wave, and transportation constraints arising from the Syrian conflict.

FIGURE 6: MARKET SHARE BY VOLUME- SAUDI GRAPES MARKET 2010



Source: Comtrade

FIGURE 7: TREND BY EXPORT COUNTRY OF SAUDI GRAPES MARKET SHARE BY VOLUME



Source: Trademap. Please note that there was no data reported for Syrian grape exports in 2008.

As can be seen in the Figure 7, above, Lebanon and its close competitor, Turkey, experienced a significant increase in their market share of the Saudi grapes market at the expense of Syrian grapes from 2009 to 2011. The figure also shows a consistent decline in market share of the three top suppliers of grapes to Saudi Arabia; namely Turkey, Lebanon and Syria in 2010 and 2011. In addition to the lower import demand due to increased local production, all three countries were affected at different levels by the Syrian crisis. Saudi Arabia and other GCC countries banned imports of Syrian products. Turkey was affected by the constrained transport through Syria. Lebanon’s transport through Syria was similarly affected but to a lesser extent than that of Turkey.

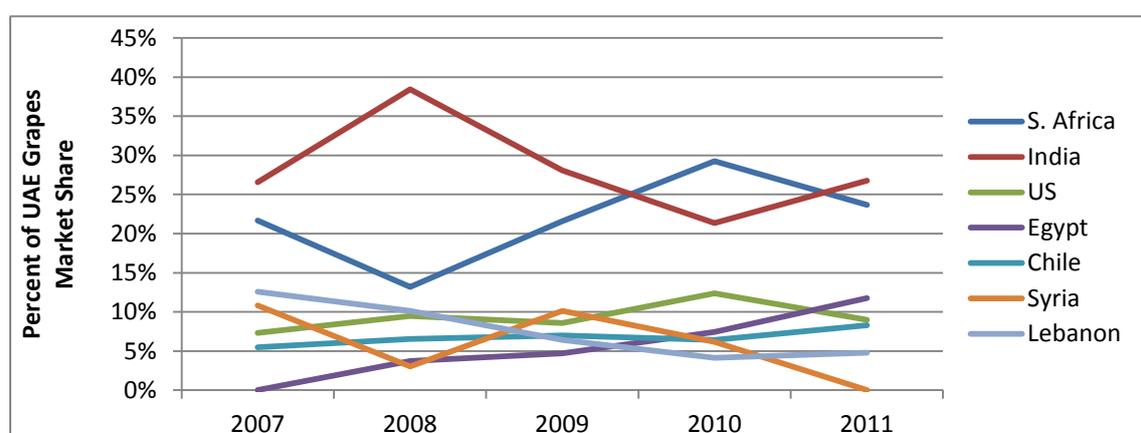
Even though Lebanon is the second largest supplier of grapes to the Saudi Arabian market, it faces a few significant risks. First, as Saudi Arabia continues to increase grape production, domestic grapes could reduce the demand for imported grapes, thus reducing imports from Lebanon. Second, Lebanon’s quality control and traceability systems are not completely reliable, and if grapes with high pesticide residues are discovered at Saudi Arabian customs, it could lead to increased scrutiny by Saudi Arabian officials and a possible ban on Lebanese grape exports. This occurred in UAE in 2009 (see below). Saudi Arabia has strict regulations on maximum residue

levels but thus far enforcement has been lax. It is worth noting that Lebanon has considerably improved enforcement of maximum residual levels especially after the 2009 incident.

UAE MARKET. The UAE is the second largest importer of grapes in the GCC, sourcing grapes from all major grape producers in the world, with the largest quantities coming from South Africa, India, and the US.

In 2009 the UAE found high levels of pesticide residue after the UAE quarantine service tightened its inspection of fruits and vegetables from Lebanon and other countries.³. This led the UAE government to ban the import of grapes from Lebanon until the problem was addressed. The ban caused Lebanese market share of the UAE grapes market to drop from 12.6% in 2007 to 4.1% in 2010.

FIGURE 8: MARKET SHARE OF THE UAE GRAPES MARKET



Data source: Trademap

Key Trends and Drivers of Market Change in the GCC Grapes Market

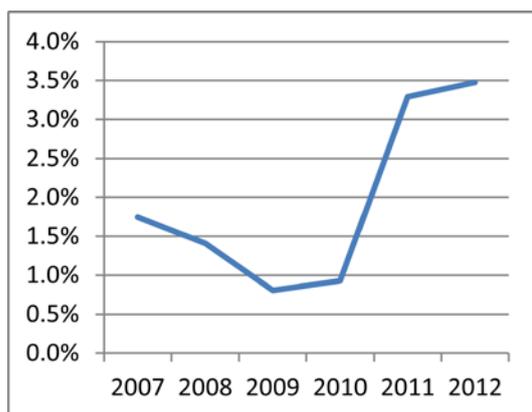
- Tighter inspection of pesticide residue levels, especially in UAE following the discovery of high level of pesticide residues on Lebanese grapes and apples in 2009. This is leading to higher interest in Global Gap compliance.
- Steady growth in population driven by expatriates and the recovery of the economy in UAE.
- Per capita expenditure on fruits in UAE has increased by 89% since 1995.
- Shift in retail market sales of grapes from bulk to pre-packed in plastic bags or plastic boxes.
- Consolidation among the specialized wholesalers in the Gulf that supply the leading supermarket chains will leave a decreasing number of larger firms in the business. In the UAE, currently the market is dominated by no more than 10 sizeable wholesaler-importers. Wholesale markets continue to supply part of the lead food retailers, but their role is diminishing.
- Specialized wholesalers are increasingly procuring directly from producers, and have buyers in supplying countries.

EUROPEAN MARKET. The EU is the largest importer of grapes worldwide, importing 558,939 tons in 2010 for a total value of nearly USD 1.4 billion. While EU grape imports declined in 2009 and 2010, likely as a result of the global financial crisis and

³ Report: "Monitoring of Pesticide residues in Fruits and Vegetables on UAE markets 2005-2009", <http://www.eprw2010.com/download/Poster%20Monitoring/PM%20012%20Mutwakil/PM%20012%20Mutwakil.pdf>

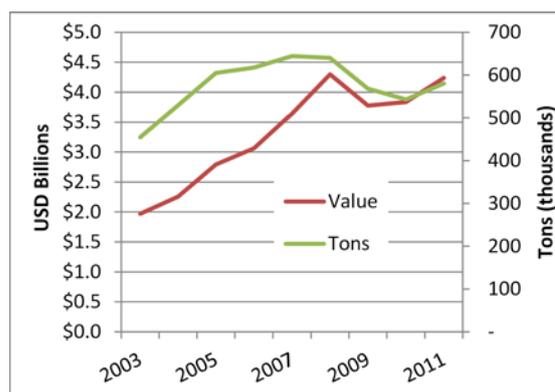
the European recession, imports again began to grow in 2011, as shown in Figure 8. Europe is an important market for Lebanese grape farmers due to its size and relative proximity to Lebanon. Since 2009, the share of Lebanese exports destined to the EU has risen from under 1.0% to 3.5% (see Figure 9). However, due to the complexity of the market and relatively high requirements, few Lebanese grape exporters have successfully entered that market and only one has been able to sustain a growing presence.⁴

FIGURE 10: LEBANESE EXPORTS TO EUROPE AS % OF TOTAL LEBANESE GRAPE EXPORTS



Data Source: Trademap and Lebanese Customs.

FIGURE 9: VALUE AND VOLUME OF EU GRAPE IMPORTS



Source: Comtrade

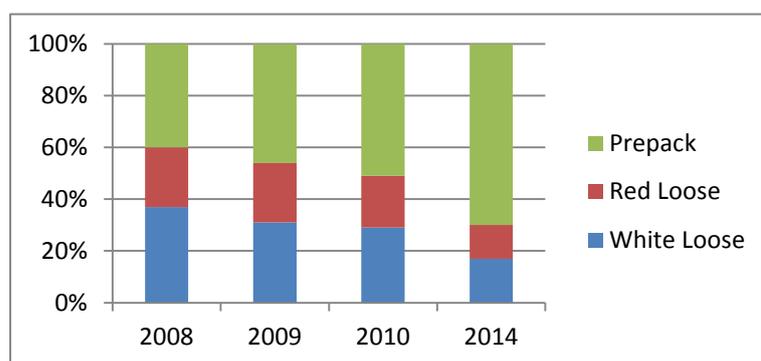
European buyers expect very fresh grapes and green unbroken stems that most Lebanese exporters cannot supply due to poor harvest practices. Inadequate cold storage conditions negatively impact shelf life which is critical due to the relatively long transport time to Europe. In addition, the European market has requirements that are not found in the traditional Lebanese export markets in the region. Buyers expect exporters to sort the content of boxes based on size and color. For example, for the Red Globe variety, which is successfully grown in Lebanon, each box, pallet window, and packing list should indicate if the color is dark red or light red. Spain and Portugal markets prefer the dark red, while France, Germany and Central Europe accept both colors. Additionally, as illustrated in Figure 11, the European market has seen a trend in recent years from loose grapes to pre-packed grapes. See Annex 3 for additional information on EU grape purchasing requirements.

The pan-EU data mask national-level variation; the EU is a complex market with different countries having varying preferences and requirements. For example, Spain consumes 80% seeded grapes and 20% seedless, while Germany and UK purchase 50% for each. There are also variations on the desirable color of grapes. For example in the case of white grapes; the Dutch market prefers a green color, while the German and South EU markets prefer amber-yellow.⁵

⁴ Again this is Dr. Adel al Tini

⁵ Oscar Salgado- Market Trends and Challenges.

FIGURE 11: TREND TOWARDS PRE-PACKED GRAPES VS. LOOSE GRAPES IN THE UK.



Source: Oscar Salgado from D. Crook 2010.

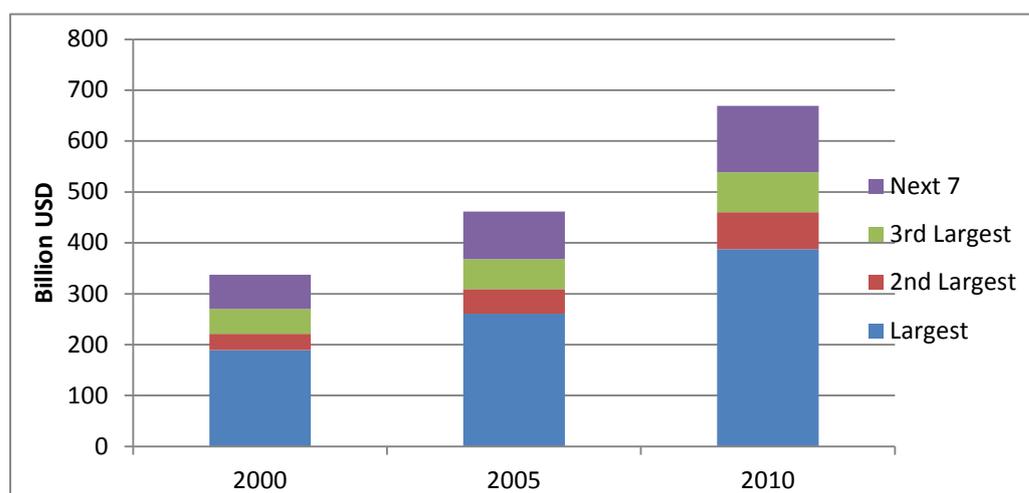
Beyond stricter import requirements and market complexity, high retail concentration in Europe has acted as a barrier to entry for Lebanese grape exports. The European supply chain is funnel shaped, with purchasing power concentrated in a limited number of buying desks that purchase food products on behalf of large retailers. 110 buying desks account for 85 percent of total retail food purchases in Western Europe⁶. Europe's retailers are highly concentrated, and the 10 largest retailers doubled their size between 2000 and 2010. In the UK, hypermarkets and supermarkets (over 3,000 square feet) account for 71 percent of total grocery sales, valued at \$252 billion⁷. This increasing concentration has led to large importers/wholesalers working closely with retailers, a process that is most advanced in northern and western EU countries, but also is present in the eastern EU. Supermarkets have strict purchase requirements and specifications, and also maintain lists of approved countries. For example Sainsbury's which is the third largest chain of supermarkets in the United Kingdom with a 16.5 percent share of the UK supermarket sector, does not include Lebanon on its list of countries approved for grape procurement because Lebanon has not shown a large and consistent presence in the UK grapes market, however this is expected to change. After consistently exporting to the UK high and safe product for four years, Medigarden is no longer required to be tested for pesticide residue upon entry to the UK. See Annex 3 for more detail on Sainsbury grape requirements.

To enter the European markets; Lebanese exporters need to select the appropriate varieties that have a production calendar that coincides with a period of low supply. In addition both initial quality and shelf life need to be considerably improved. For new entrants, exporters would need to brand their product and sell it in the wholesale market. After becoming a recognized brand name by supplying safe and consistent quality and volume for 2-3 years to the wholesale market, exporters can enter through high value channels. Small and medium exporters can collaborate together and sell using one brand name, or they could enter the market through an established exporter. It is important to note that if an exporter has 3 incidents of high residue levels, it will get blacklisted. If on the other hand one country has 5 incidents, all exporters from that country will be black listed. As such, the biggest challenge for Lebanese exporters is to grow good quality grapes with the proper MRL (Maximum Residue Levels)

⁶ Humphrey, J. and O. Memedovic (2006) "Global Value Chains in the Agrifood Sector".

⁷ IGD. http://www.igd.com/UK_Grocery_Retailing

FIGURE 12: GROWING SIZE OF LARGE RETAILERS IN UK:



Source: IGD Research, 2001; *European Grocery Retailing... now and in the future...*, Feb 26th 2001

Key European Trends and Drivers of Market Change in the European Grapes Market

- Food safety is a top issue; especially after the 2011 e-coli outbreak in Germany. MRL levels are closely monitored. While there are EU standard MRLs, some countries such as Germany require lower levels. GLOBALG.A.P. is not a requirement but it is important, especially for new entrants from developing countries.
- Interest groups are demanding more organic produce, safe food, FAIRTRADE, and a smaller carbon footprint. Water footprint is gaining interest.
- Packaging material moving from recyclable to compostable.
- Trend toward pre-packed vs. loose grapes
- Supermarkets dominate the retail market.
- Trend for supermarkets to buy directly from exporters without going through importers and wholesalers.
- Trend toward seedless grapes vs. seeded.
- A growing global trend of direct relationships between integrated exporters and retailers is eliminating the role of importers and wholesalers

DOMESTIC MARKET.

The domestic Lebanese market consumes around 21,000 tons of grapes per year, which is about 4.7 kg per person annually and equivalent to around one fifth of domestic grape production. High quantities of grapes flow into Lebanese wholesale markets from Syria, but these are often not captured by official trade data, and small volumes are imported from other high value grape producers. Figure 13 provides details of domestic grape production, trade flows, and consumption.

FIGURE 13: COMPOSITION OF LEBANESE DOMESTIC GRAPE MARKET

Type of Production	Volume
Total table grape production	110,354 tons
Losses reported by wholesalers and retail markets	11,035 tons
Grapes used for processing other than wine	15,000 tons

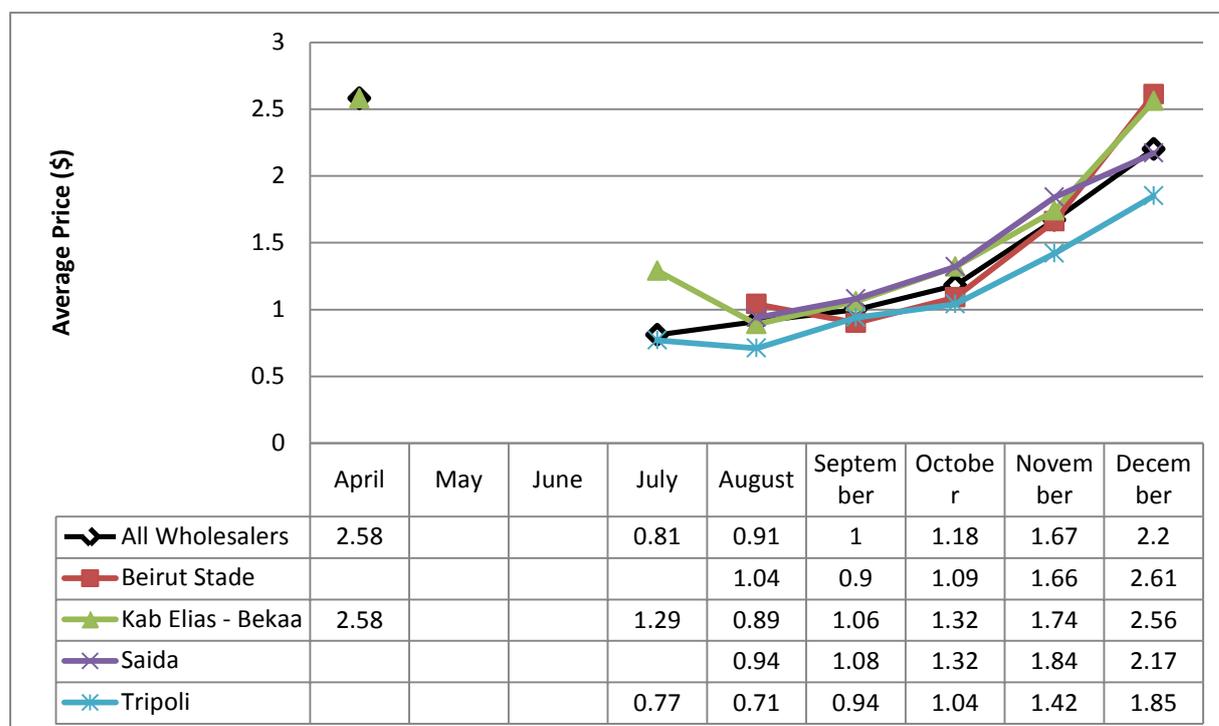
Exports as reported by key stakeholders	75,000 tons
Net non-Commercial table grape production	10,000 tons
Imports as reported by Customs	973 tons
Total domestic table grape consumption	20,989 tons
Per capita consumption	4.66 kg/person
US per capita consumption	3.41 kg/person

Source: Comtrade, FAO, Exporters and wholesalers

Because of Lebanese consumers' willingness to pay premium prices for local varieties, retail prices of grapes can reach values that are comparable to those in the US and other countries. As seen in Figure 14, prices at Lebanese wholesale markets vary by season, with the lowest prices in July, August, and September during peak harvesting season when grapes cannot be exported to Lebanon's largest grapes market, Saudi Arabia due to its own harvest season that starts in July. During July and August, the prevalent varieties are local varieties such as Maghdouchi and Cardinal that have poor shelf life and as such cannot be exported.

The small size of the domestic grape market makes it vulnerable to flooding from both domestic production and from Syrian imports. In addition, local and regional security conditions, especially in Syria can greatly constrain exports leading to increased supply to the local market. Flooding can depress prices to levels equal to or less than the costs of production. The domestic market plays an especially important role for small and medium scale producers, as the requirements for domestic markets are not as stringent as export markets in terms of quality tests, packaging, and relationship management. In addition, due to the short time to market, shelf life is not an issue and as such, maintaining the cold chain is not as critical as it is for exports.

FIGURE 14: AVERAGE PRICE (\$) FOR BAYTAMONI GRAPES IN SELECT WHOLESALE MARKETS- 2010



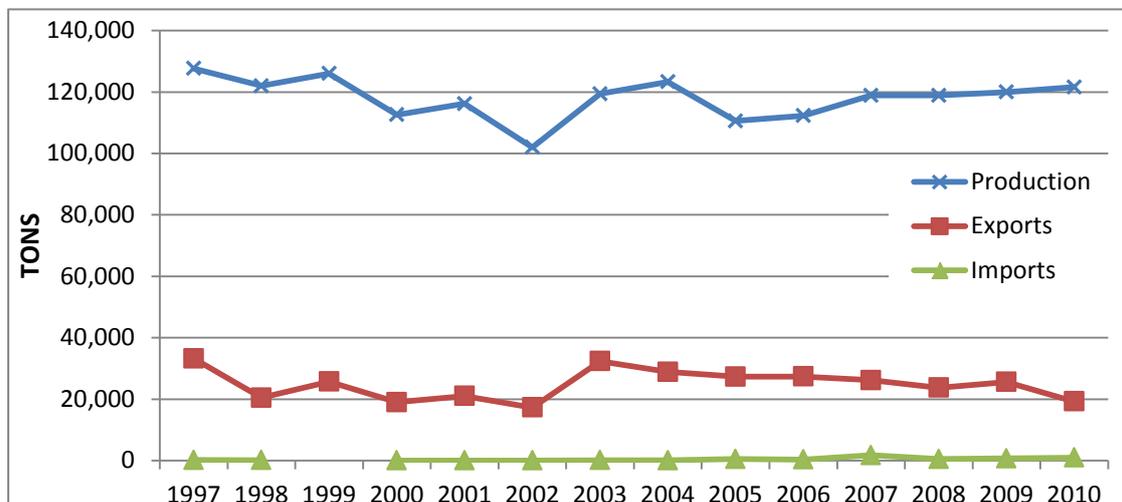
Data Source: Chambers of Commerce, Industry and Agriculture

4. PRODUCTION AND HARVESTING

PRODUCTION

Grape production in Lebanon has averaged around 120,000 tons since 1997. As seen in Figure 15, production has been fairly consistent, except for a dip in 2002.

FIGURE 15: TRENDS OF GRAPE PRODUCTION, EXPORTS, AND IMPORTS- IN TONS



Source: FAO

Grape production occurs in all regions of Lebanon, covering 15 percent of the total fruit production area, equivalent to 12,149 hectares.⁸ Total production includes approximately 97,827 tons of table grapes and 19,690 tons of processing grapes including grapes for production of wine and arak. As illustrated in Figure 16, the total area planted with grapes has remained relatively stable. About 53 percent of vineyard land is planted with table grapes, and 47 percent is planted with wine and processing grapes. The MoA survey of 2010 provided a breakdown of land planted for commercial versus household use and reported that commercial table grapes are planted on 5,640 Ha and commercial processing grapes are planted on 2,495 Ha. The remainder was produced at the household level, intended for household consumption and processing. The 2010 survey was the first time that the household versus commercial use breakdown was provided.

FIGURE 16: TABLE AND PROCESSING GRAPE PRODUCTION AREA AND OUTPUT

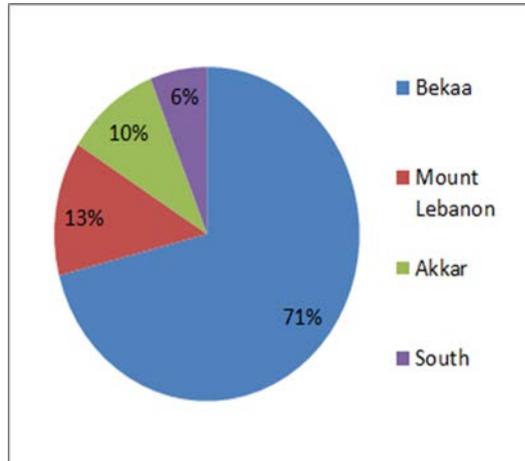
	2008		2009		2010	
	Area [Ha]	Output [Tons]	Area [Ha]	Output [Tons]	Area [Ha]	Output [Tons]
Table Grapes	8,800	89,800	8,750	91,000	6,484	97,827
Processing Grapes	3,276	16,100	3,274	17,000	5,665	19,690
Total	12,076	106,000	12,024	108,000	12,149	117,517

Source MoA (2010 data on area are more reliable than 2008 and 2009 since the 2010 numbers are based on the MOA census.)

⁸ According to Lebanese MoA survey of 2010, there are 6,484 hectares of table grapes and 5,665 hectares of grapes planted for processing which includes 2,000 Hectares of wine grapes according to the "Union Vinicole Du Liban"

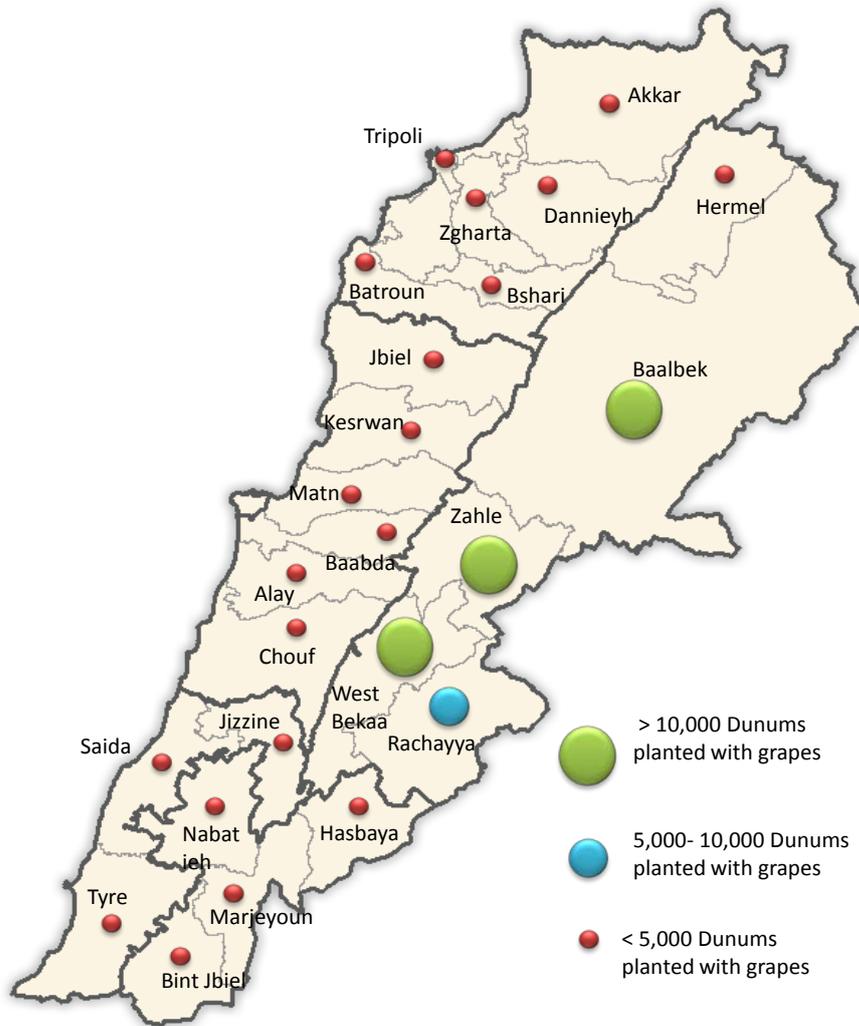
As shown in Figure 17, grapes are grown in all regions of Lebanon, with larger grape farms concentrated in the Bekaa. The main areas of commercial grape production in the Bekaa are Qaa, Zahle, Ferzol, Baalbak, Niha, and Kfarmishki. For the purposes of this study, the designation of “commercial” is used for farms that are at least 3 dunum in size, and where grapes are at least the 3rd largest crop produced by the farmer in terms of revenue. Average commercial yields are 16 tons per Ha for table grapes and 6.8 tons per Ha for processing grapes.

FIGURE 17: DISTRIBUTION OF GRAPE PRODUCTION BY AREA PLANTED IN LEBANON



Although the South has the smallest amount of land planted in grapes, production in the area has been expanding in recent years. This is in large part driven by traders who are looking to secure early-ripening grapes. Improved security and stability also factor into the expansion of grape production in the south. Growers in the south utilize new techniques to overcome some climatic challenges in the south namely higher temperatures, lower differential temperature between day and night, and higher humidity.

FIGURE 18: MAP OF GRAPE PRODUCTION IN LEBANON



Data Source: MoA Survey-2010

VARIETIES AND PRODUCTIVITY

Grape yields vary by variety, density of trees in the farm, and production practices. Figure 19 shows the most common varieties planted in Lebanon, the percentage of area cultivated with each variety, and average yield.

As shown in Figure 19, 53 percent of land is planted with table grapes were planted with Tfeifihi and Baytamuni grapes, both traditional Lebanese varieties. These varieties have average yields of around 21 tons per hectare under commercial production.

Maghdoushi is more commonly planted by household grape producers, and covers only 7 percent of grape vineyards that are considered commercial.

More recently, commercial farmers have begun to diversify into popular international grape varieties such as Red Globe, Crimson, Thompson Seedless, Diamante, Early,

FIGURE 19: GRAPE VARIETIES AND CHARACTERISTICS IN LEBANON 2010

Variety	% of land planted	Yield-Tons/Ha
Tfeifihe	39%	21
Baytamoune	24%	21
Maghdoushi	7%	40
Red Globe	10%	44
Crimson	1%	22
Black Pearl	1%	40
Thompson Seedless	< 1%	25

Source: MoA Survey of 2010 and farmers.

Flame and Big Muscatt seedless. Some of these varieties have higher yields than local varieties, as high as 44 tons per hectare for Red Globe, and are being planted to target high value local and export markets. Red Globe was the first new variety to be introduced to Lebanese producers, and is estimated to be planted on 10 percent of grape producing land. Interviews with key value chain stakeholders indicated to the LIVCD team that farmers are upgrading and planting new vines of new varieties continuously. In 2012, approximately 300,000 new vines were sold; 80 percent were planted in new fields and 20 percent replaced existing ones. This expansion of new varieties has been facilitated by loan facilities provided by banks, which have recognized a market opportunity in grape production. Despite this trend, if the quality of the final product is not acceptable for exports, which is a definite possibility without adequate cold storage facilities, expanded production of new varieties could over flood the local market and depress prices with major negative consequences, especially on small farmers.

The grapes varieties planted in Lebanon ripen between July and November, and the peak harvest period in September and October. The ripening schedule varies by region in which it is grown and by variety as seen in Figure 20. The harvest season starts in the South and Qaa and ends in central parts of Bekaa. The volume of grapes available in the local market which is driven by harvest supply and availability of export markets, affect the price of grapes. As seen in Figure 20, prices are lowest in July, August and September and highest in December when harvesting has stopped and export demand is high. Prices are also high in June due to lack of supply of local grapes. Data are not available between January and May since the Chamber of Commerce that collects data on wholesale prices does not record information on grapes during periods when grape sales are insignificant.

FIGURE 20: RIPENING CALENDAR FOR GRAPES GROWN IN LEBANON

Variety	June	July	August	September	October	November	December
Halawani							
Vitamoni							
Maghdoushi							
Red Globe							
Black Pearl							
Crimson							
Thompson Seedless							

COST OF PRODUCTION AND PROFITABILITY

Irrigated production of table grapes is highly profitable for farmers. Figure 21 below shows the average profitability per hectare for the two most common traditional grape varieties (Halawani and Baytamouni) and the two most commonly grown new varieties (Red Globe and Crimson). As shown in the figure, traditional varieties have similar planting densities, yields per vine, and yield per hectare, however Baytamoune claims a significantly higher market price than Halawani. New varieties of grapes are planted at a significantly higher density, and Red Globe is twice as productive as Crimson. Although Red Globe claims a similar market price to Baytamoune, its higher plant density and productivity makes Red Globe significantly more profitable. Although Crimson grapes have lower yields per tree, a high market price supports net

revenues that are also higher than traditional varieties, although not as high as Red Globe.

FIGURE 21: GRAPE PRODUCTION COSTS AND PROFITABILITY

	# of trees per Ha	Yield in Kg per Tree	Kgs Per Ha	Average Farmgate Price USD\$	Cost of Production USD\$/ Ha	Net Revenue USD\$
Halawani (Tfeifihe)	700	30	21,000	0.60	5,190	7,410
Baytamoune	700	30	21,000	0.83	5,190	12,310
Red Globe	1,100	40	44,000	0.80	5,190	30,010
Crimson	1,100	20	22,000	1.17	5,190	20,476

The costs in Figure 21 are based on the assumption that farmers are applying improved production techniques of the sort that are needed to produce grapes for the quality markets in the GCC and for export to the EU. Modern production is differentiated from traditional practices because it requires a few additional activities and chemical treatments. In traditional production, farmers will engage in pruning of vines, shoot positioning along trellises, shoot thinning, and harvesting, as well as spraying 12 different insecticides and fungicides. Modern production requires additional activities of spreading organic fertilizers and weeding, shoot trimming, bunch cutting, trunk girdling, and spraying of 9 additional nutrients. Bunch cutting, which entails cutting off a certain percentage of bunches to create fewer, larger and sweeter grapes, is one of the most important modern practices that enable grapes to access high value international markets. See Annex 4 for additional detail on costs of traditional and modern production, and Annex 5 for additional detail on yields and revenue by farm size and grape variety.

HARVESTING AND PACKAGING

Harvesting and packaging of table grapes is labor intensive and is the subject of a special type of arrangement based on temporary migrating laborers. Harvesting is done in the field using crews that provide their services to multiple farmers in an area under the direction of team leaders or managers. Harvesting and packaging 10 tons of grapes requires a crew of 25 women and 4 men, a manager, and a foreman. The women pick the grapes from the vine while the men transport the containers to the trucks. A typical workday is from 7:00 AM to 3:00 PM- although in peak season, harvesting can start much earlier in the morning. The manager of the crew charges USD\$8.67-12/day for women who are typically young and unmarried and USD\$12 to 14.67/day for men depending on experience, for a 6-hour work day. Overtime is charged at USD\$1-1.5 per hour, or at a rate of half a day for two additional hours of work above 6 hours.

The manager pays the parents of the younger women 60 percent of their total pay and keeps a commission of 40 percent. Men with experience work independently and get paid directly. It is customary for the manager to lease land for the families of the young women to use as space where they can erect a tent that they live in during the harvest season.

All packaging for the local market is done in the field, and 90% of exported grapes are packaged in the field. The produce is placed in a plastic bag inside a plastic container with an absorption pad on the bottom and sulfur paper on top. These grapes are transported directly to wholesale markets or exporters without going through any pre-cooling.

A different procedure is used for the 10% of export grapes destined for high quality markets. Grapes export to high quality markets are placed in 8-kg plastic containers, sent to pre-cooling at zero degrees centigrade (the freezing point for grapes is -2.1°C), then packed and sent either to cold storage at 0°C to 1°C or directly to the exporter in refrigerated trucks.

Packaging in the field reduces handling costs and damage related to handling, but if it is not done correctly, can lead to higher losses. Field packing exposes grapes to high heat since it takes longer to pack the grapes and because farmers work into the later hours of the afternoon during peak season. Ideally to insure a healthy stem, grapes should be sent to pre-cooling within two hours of harvest. Another problem related to packing in the field is degradation of sulfur papers and sulfur pads and the damage they cause to grapes when exposed to temperature above 28 centigrade. At high temperatures, grapes in contact with the sulfur papers get permanent discoloration. Without pre-cooling the shelf life of the product is greatly reduced. Grapes intended for same day sale in the local market are packed directly in plastic crates without absorption pads or sulfur paper.

Plastic containers used for field packing are used only once and come in three different sizes holding 2.75 kg, 3.25 kg or 3.5 kg with the cost varying from \$0.45 for the smallest and \$0.55 for the largest. The supplier of the crates is located close to the main wholesale market in Ferzol where he supplies clean crates and then collects the used ones for recycling at local plastic manufacturers. The plastic bags cost \$0.05, the absorption pad and the sulfur pad that are used for cold storage or export cost \$0.10 each.

5. GRAPE VALUE CHAIN ACTORS

FIGURE 22: TABLE GRAPE VALUE CHAIN MAP

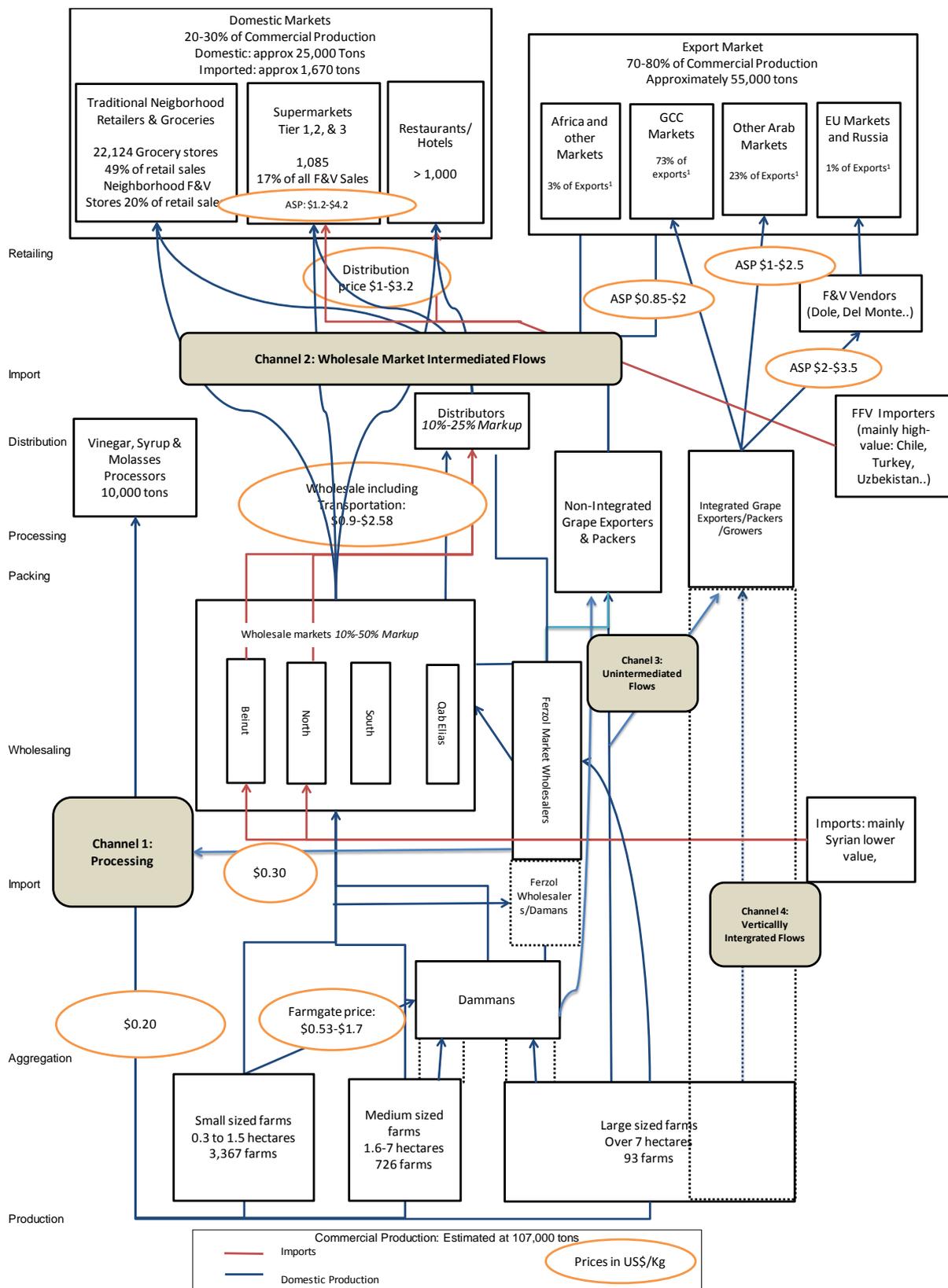


Figure 22 is the Grape Value Chain Map. This map shows the main functions, volumes of product flow and prices per Kg at different points in the value chain. Descriptions of the main actors are given below by functional level including production, aggregation, wholesale, distribution, retail, export, and import.

PRODUCERS

According to the 2010 MoA survey, 24,267 farmers grow table grapes. Of these farmers, 4,186 cultivate at least 0.3 hectares of grapes and are considered commercial grape farmers. Commercial farmers employ 12,241 year round workers and an additional seasonal workforce that works a total of 788,907 workdays; or the equivalent of an additional 5,529 full time workers. In this assessment, we classify commercial farmers based on size of farm into three classifications; small, medium, and large farmers. As seen in Figure 23, small-scale farmers cultivate between 3 and 15 dunums, medium-scale farmers farm between 16 and 70 dunums, and large-scale farmers farm over 70 dunums. Just over 80 percent of farmers are small-scale, 17.3 percent of farmers are medium-scale, and 2.3 percent are large scale farms or mega-farms of over 250 dunums. Although there are only 11 mega farms (farms with over 25 hectares), these farms claim over 50 percent of all land planted to grapes. Small and medium scale farmers each claim just over 19 percent of total land planted with grapes, while large scale farms claim the remaining 11.6 percent.

FIGURE 23: LIVCD CLASSIFICATION AND DISTRIBUTION OF COMMERCIAL GRAPE FARMER

	Size of farm (dunum)	Number of farms	% of total farms	Total commercial area planted	% of total area
Small scale farmers	3 to 15	3,367	80.4%	21,569	38.2%
Medium scale farmers	16 to 70	726	17.3%	21,758	38.6%
Large-scale farms	larger than 70	93	2.3%	13,078	23.2%
Total	-	4,186	-	56,405	-

Source: MoA 2010 Survey

Although some commercial farmers may own the land that they farm, it is more common for farmers to lease land. Leases can vary in duration from 2 to 15 years, depending in part on how much the farmer will invest in the land. For example, some land will have healthy grape vines, some have old vines that need to be upgraded or re-planted, and some land is leased without any pre-existing grape infrastructure investments. Land that has healthy productive vines may be leased for as short a period as 2 years, however properties that require extensive work and planting new vines, is typically leased for at least 10 years, and typically 15 years.

SMALL COMMERCIAL FARMERS: These farmers cultivate between 3 and 15 dunums, and make up over 80 percent of all grape farmers in Lebanon. Small farmers are located throughout Lebanon, and are typically not in the fertile Bekaa valley where larger farms dominate. These farmers utilize traditional farming practices, and most of them plant just one variety of grape. Small scale farmers have the lowest level of efficiency with an output between 20 and 35 percent less than that of farms managed with modern agricultural practices in terms of production, irrigation, and harvest.

Small-scale farmers typically do not resort to using harvest crews, but will work with other farmers in a given zone to harvest each other's plots. Small farmers who are located far from the wholesale market tend to sell their output at a preset price to larger farmers who act as dammans. By preselling to dammans, small farmers reduce their sales risk, and ensure that they will get paid in a timely fashion. Working with a damman also reduces borrowing to cover costs of harvest, packaging, and transportation

MEDIUM-SCALE FARMERS: These farmers make up over 17 percent of grape farmers in Lebanon. Depending on their level of sophistication, some medium-scale farmers will utilize modern grape production practices. The majority plant only one although some will plant 2-3 varieties. This scale of farmer has a typical productivity that is 10 to 20 percent less than that managed with best agricultural practices. Medium-scale farmers tend to be located close to wholesale markets, and depending on their community, will either work with other farmers to harvest or hire a harvest crew.

LARGE SCALE FARMERS: There are 93 large scale farms that cultivate more than 70 dunums of grapes. These farms occupy 23 percent of total grape area. Typically these farms occupy high quality farmland, and are located in the Bekaa. Large scale farmers utilize modern farming practices for grape production, and lose as little as 5-10 percent of potential yields to poor management. It is becoming increasingly common that large farmers are Global Gap certified, facilitating flow of their product to high value export markets.

These farmers will often have year round farm staff, and will hire additional crews during the harvest and pruning seasons. Many large scale farmers will act as aggregators for surrounding medium and small scale farmers- buying grapes to bring to wholesale markets or directly to exporters. Large scale farmers typically have established relationships with wholesalers at the Ferzol market, and can modify their harvesting quantities depending on the level of grape demand anticipated by wholesalers.

LARGE SCALE FARMERS WITH INTEGRATED PACKING AND EXPORT OPERATIONS: These farmers have premium grape growing land that is either leased or owned and is not always contiguous. Production practices at these large farms meet international best practices including Global Gap and HAACP. They typically employ year round farm crews including specialized agricultural engineers, and additional labor to help with harvesting, pruning and thinning. Additional discussion on export practices is found below in the discussion of Exporters.

AGGREGATION

Depending on the scale of farming, location, and farmers' preferences, production from small and medium sized farms will often be aggregated by a "damman". A damman is typically a large or medium scale farmer who purchases grapes from other farmers in his or her area, though some work strictly as traders. Dammans aggregate grapes and sell them to wholesale markets, exporters, and other grape buyers.

Involvement of the damman in production and harvesting varies depending on how long before harvest they commit to buying the crop. If they buy the crop just before harvest then they have little involvement. If however they commit to buying the crop

early in the season, then they may dictate the type and frequency of applying pesticides and fertilizers, and the frequency of irrigation.

Dammans buy the crop at 15-25 percent less than the farm gate price and they cover the cost of harvest, packaging which is usually done in the field. They deliver the harvest to the wholesale market or to exporters. In this role, damans assume a varying level of risk that can include possible price drops after they commit to buying the crop at a set price, unsold product, and delays in getting paid by exporters and retailers. Damman pay farmers in three installments; at beginning, middle, and end of the harvest period, which extends from July to November and varies depending on the variety of grape.

Some dammans who intend to export or sell at a later time use cold storage to extend the shelf life of grapes and take advantage of rising grape prices after peak season. Some large dammans own their own cold storage facilities, and as listed in Section 4, there are over 45 major cold storage facilities, 13 of which are located in the Bekaa and cater to the grape industry. These facilities are available for rent by damans or farmers who do not own cold storage, and by large damans when their own facilities are overflowing. The ability of cold storage to extend the shelf life of grapes is determined in large part by the harvesting technique (mainly if the grapes are exposed for extended period to high heat in the field) and use of pre-cooling which is rarely done. Another important factor affecting shelf life is the quality of the refrigeration. Over 90 percent of cold storage facilities use old technology and do not have humidity control, whereby the humidity ranges between 70 percent to 75percent when it should be at 90 percent.

WHOLESALERS

There are seven main wholesale markets in Lebanon. The most important market for grapes is the Ferzol market, which is located in the Bekaa, and specializes in grapes and cherries. Over 80 percent of all grapes for the domestic market pass through the Ferzol market, and go either to other urban wholesale markets, or directly to exporters and retail outlets. During the harvest season, almost all grapes are sold in the Ferzol market, and after the season ends, grapes are sold mainly in the wholesale market in Sin El Fil. The remaining 20 percent of local grapes bypass wholesale and are sold directly from farmers to exporters or other end markets.

Approximately 30,000 tons of grapes are sold in the Ferzol wholesale market, with the bulk sold during the peak season of September and October, when sales reach a maximum rate of 500 tons per day. Sales are coordinated by the largest wholesalers, who track market demand, and communicate with medium and large farmers to advise them on the quantities they should bring to the market to avoid over-supply. Although there are 45 stands at the Ferzol market, 7 stands account for 70 percent of grape sales. The largest stand, which sells 12 percent of all grapes at the market, is recognized as the daily or hourly price maker.

Prices at the Ferzol market vary based on supply and demand, and quality and freshness of grapes. Farmers bring their grapes to the wholesale market using trucks, minivans, or other types of vehicles- typically in quantities under one ton at a time. High quality grapes are purchased immediately upon arrival to the market at premium prices, and the longer a load of grapes sits, the more the price declines. All sales at the Ferzol market are completed by 10:30 AM, and any leftovers are sold the next day at a large discount since there is no cold storage available. Grapes can stay at the

wholesale market for a maximum of 2-3 days, after which they are spoiled and discarded.

Farmers will wait at the wholesale market until their product is sold to know the selling price. Once the wholesaler commits to buying the product, he will pay the farmer. If the sale is under USD \$700, the wholesaler will pay the full amount, otherwise he will pay a certain percentage on the spot, and the remainder at a later date, most often a Friday, using 25-day post-dated checks. Wholesalers are paid by their customers on a weekly or monthly basis. Usually, 70 percent of wholesale customers pay weekly, while 30 percent pay monthly. Payments are made with 45 day post-dated checks, but at the end of the grape season; big customers such as supermarkets pay in postdated checks that could extend for 3 to 4 months.

Grapes from Ferzol are sold to other wholesale markets, to supermarkets, and to exporters. Approximately 75 percent of grapes are sold to other wholesale markets described in Figure 24. The majority of these sales are made to stand owners in other wholesale markets for sale to the local and export markets, although sometimes sales are made to traders who place grapes on consignment in other wholesale markets. Approximately 15 percent of Ferzol grapes are sold to supermarkets including Monoprix, Aoun, Goodies, other small supermarkets and specialty stores. Finally, approximately 10 percent of grapes are exported directly from the Ferzol market in 20-ton refrigerated trucks to GCC markets.

Wholesalers may act as lenders to small and medium farmers with the loans covering up to 70% of the value of the crop. Farmers use the money to 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 price.

FIGURE 24: OTHER WHOLESALE MARKETS

Wholesale Market	# of Wholesalers	Value of total produce sales (USD millions)	Tons (thousands)
Beirut- Jnah	200	\$240	363
Beirut- Sin el Fil	135	\$101	183
Bekaa	150	\$40	61
Jbeil	100	\$45	68
South Lebanon	200	\$52	79
North Lebanon	150	\$32	48

PROCESSING

Processors play an important role in the grape value chain, as they purchase table grapes that are not suitable for sale in the retail market- and process them into vinegar and grape molasses. Grape vinegar is a low value product, whereas grape molasses, which was traditionally used as a natural sweetener, can claim relatively high prices. It is estimated that 1,200 tons of grapes are used to produce grape molasses, producing 200 tons of molasses annually, with a wholesale value of USD\$ 5.50 per Kg. Molasses is sold predominantly in domestic markets, although one or two grape molasses companies export to GCC countries and the US. In these markets, grape

molasses competes with a commercial product that is processed from concentrated grape juice, sugar, water, and citric acid and has a wholesale price of USD\$ 3.50/Kg.

There is a maximum of 10 commercial grape molasses processors in Lebanon, 3 of which are based in Rachia Al Wadi, a region recognized for high quality grape molasses. Most of the grapes used to make molasses are produced by very small non-commercial farms, but small-scale commercial farmers who do not achieve table grape quality also send some low quality production to processors.

Processors procure grapes in a variety of ways, which affect the purchasing price. Some farmers deliver grapes to the facility, and receive an average selling price of USD\$ 0.20/kg. Processors will also go to wholesale markets and buy grapes that have not sold for consumption, paying an average selling price of US\$0.30/Kg. Finally, processors will take bunches of grapes that are left on the vine during harvest because they were not ripe or suitable for picking. This is considered a service to farmers, as it is healthier for the vine and will lead to higher yields next year, so processors do not pay for grapes, and farmers do not pay processors for labor. Farmers can also use molasses facilities on a fee for service basis. In this situation, the processor will charge USD\$1.3/Kg of processed molasses, which covers cost of fuel, labor, water, and limestone used in processing.

PACKERS/EXPORTERS

There are 12 major table grape packer/exporters in Lebanon. These actors are divided into two categories that are discussed below—those that have their own in-house production of grapes and those who only pack and export others' production. In terms of overall volumes packer/exporters produce 10 percent of their export-quality grapes, purchase 80 percent from large and medium farmers and they buy the remainder from the wholesale markets (mainly Ferzol and Tripoli). The overwhelming majority of grape exports flow to GCC countries and only Adel al Tini has gained consistent access to European markets through a contract with an international produce brand. At least one other exporter also sends grapes to Europe, but this has been just 1-2 containers at a time on an ad hoc basis. Over 50 percent of exporters are based outside of Tripoli between Qobeh and Sir Donieh, and the rest are in the Bekaa and other areas. Many of these export operations are run by Lebanese who returned to Lebanon after living abroad during the civil war, and began exporting Lebanese produce to relatives and other contacts in the Gulf. In order to meet high value export market requirements, exporters must operate according to Global Gap and HAACP practices without necessarily being certified. However, certification increases subsidies from the Lebanese government's IDAL program.

Even though selling price into the GCC market does not provide a clear advantage relative to prices of the local wholesale market, large producers export a significant portion of their production to avoid oversupplying the local market which will affect prices and revenue. This is the case during the peak season. This is one indication that the local market is saturated or close to saturation.

Exporters buy grapes from the wholesale market or directly from farmers. Exporters are familiar with most grape farmers; they know their farms and the quality and volume of output. Moreover buyers working for exporters have expertise in grape production and post harvest handling and through regular visits to the farms are able to assess output quantities, quality, and harvest times. Exporters typically make commitments to farmers 3-4 weeks prior to the beginning of harvest. Exporters buy the crop at prices 30% to 50% below the wholesale price of good quality product.

However they cover the cost of harvesting, packing, transportation, yield losses, and delays in receiving payments from their customers. They also assume the risk of potential local and regional instability that may affect sales. Buyers make an average profit of 10-15 percent.

Most exports to the GCC are sold on consignment through the wholesale markets in these countries; however some exporters of high quality grapes sell to such importers as Del Monte and Dole or they sell to specific wholesalers using pre-agreed prices. Except for high-value exporters, most exporters have no control on selling price.

There are two major types of exporters in the grape industry, those with integrated growing, and those that source grapes externally from farmers, damans or the wholesale markets.

GRAPE EXPORTERS WITH INTEGRATED GROWING:

These exporters are vertically integrated farms that produce and pack high value grapes for export to the Gulf and the EU. These exporters control production practices, and can invest in long term market strategies such as planting new high value varieties or organic growing practices. To supplement private production, integrated exporters also engage in purchase of grapes- but this is usually from farmers with whom they have established, long term relationships and can be confident about growing practices and quality. Since they have control over growing practices, integrated growers are best positioned to consistently meet quality requirements for high value EU markets. The four main exporters in this category are Adel Al Tini, Ali Jaber, Wadih Riachi, and Emile and Abdo Skaff. Notably, Adel Al Tini, who owns Medigardens, is the primary exporter to the EU.

NON- INTEGRATED GRAPE EXPORTERS AND PACKERS: These value chain stakeholders buy from wholesale markets and medium and large-scale farmers for export, and rely more heavily on the buyer-purchasing system described above. There are 8 major non-integrated grape exporters in Lebanon: Ahmad Alam, Ali Alam, Abdel Aziz Samad, Shaker Samad, Marwan Samad, Ahmad Samad, Ali Ghemrawi, and Jamil Al Shakik. It is important to note that these 8 companies are owned by only 4 families. The Samad family is the largest exporter to the Gulf and maintains 30 pack houses outside Tripoli. They also own wholesale market stands in a few GCC countries.

Medigardens Company Profile

Medigardens and Lebanon Quality Packaging (LQP) are twin companies both located near Zahleh in the Bekaa. LQP was established in 1984, and Medigardens was established more recently in 2008. Both companies are involved in growing, packaging, and export of fresh table grapes to many destinations including Europe, Africa, and most Arab countries. In 2012, the companies sold over 3,000 tons of grapes, with over 90 percent serving export markets. To ensure the high quality of its produce and access to export markets, Medigardens employs ten agricultural engineers, a higher ratio than most other growers. Additional laborers, as many as 300 in peak season, work on grape production and harvesting. The companies operate two pack-houses for packing, pre-cooling, and cold storage for grapes, and a third pack-house is coming online in 2013.

DISTRIBUTION

In fresh produce value chains such as grapes, distributors buy from wholesale markets and from importers and then distribute to the retail market and restaurants and catering operations on a regular schedule. Those who sell to fresh F&V stores and small groceries, usually cover 5 to 6 of these stores. The distribution markup is 10%-15%.

RETAIL

There are three major retail markets for table grapes in Lebanon: traditional neighborhood retailers and grocers, supermarkets, and restaurants and hotels. The proportion of grapes that flow through each type of retail and their sub-categories is described below in Figure 25.

FIGURE 25: PERCENTAGE SPLIT OF TRADE CHANNELS IN LEBANON

Retail Market	Sub-Market Type	Split	Source of Data
Supermarket	Supermarkets Tier 1	11%	Split based on Transmed food sales
	Supermarkets Tier 2	4%	Split based on Transmed food sales
	Supermarkets Tier 3	2%	Split based on Transmed food sales
Traditional Neighborhood Retailers and Grocers	Produce Markets	18%	Assumption
	Groceries A	15%	Split based on Transmed food sales
	Groceries B	19%	Split based on Transmed food sales
	Groceries C	15%	Split based on Transmed food sales
HoReCa	Food Service	12%	Based on Nielsen
	Industry	2%	Based on Ministry of agriculture website
	Push cart peddlers	2%	Assumption

Sources: Nielsen, Transmed; a major distributor of food and non food leading brands , Abou Rjeily and Abou Ali wholesalers.

Definitions of major retailer types are as follows:

SUPERMARKETS: Supermarkets include large scale chain retailers such as Spinney’s and TSC. The majority of supermarkets are located in Beirut, its northern suburbs, Mount Lebanon and main cities such as Tripoli, Saida, Sour, Chtoura and Zahle. Supermarkets can be further grouped into three tiers based on number of outlets and turnover. Figure 22 provides additional information on Supermarket classification and numbers in Lebanon. In sum, 17 percent of table grape sales occur at supermarkets.

TRADITIONAL NEIGHBORHOOD RETAILERS AND GROCERS: This category of retail includes small, single outlet grocers in residential community settings that can be up to 100 square meters in size and sell a variety of grocery products. It also includes small stores that specialize in fresh fruit and vegetables. Grocers buy the produce they sell either directly from the wholesale markets or through a distributor who delivers it to them, mostly in unrefrigerated vans or pickup trucks. As presented in Figure 26, there are over 22,000 traditional neighborhood retailers and grocers in Lebanon, and they account for over 67% of table grape sales.

FIGURE 26: TRADE CHANNEL TYPE AND NUMBER OF OUTLETS IN 2009

Trade Channel	Number of Outlets	Basis of Classification
Supermarkets Tier 1	8 chains, 53 outlets	More than 1 outlet, high turnover, and potential to open more than 1 outlet
Supermarkets Tier 2 and Tier 3	1,032	Tier 2: Single outlet and high turnover Tier 3: Single outlet mini markets
Groceries A	4,132	Size of store: 41 sqm to 100 sqm. Represent 30% of all grocery stores
Groceries B and C	17,992	Size of store: up to 41 sqm. Grocery B:40%, Grocery C: 30%

Source: Nielsen Company, 2009

HOTELS, RESTAURANTS, CATERING: Food service providers account for 14% of fresh fruits and vegetable sales. Like grocers, these retail outlets purchase grapes from distributors who deliver grapes and other produce in trucks and vans on a regular basis.

BUSINESS DEVELOPMENT SERVICE PROVIDERS

INPUT SUPPLIERS

There are two main types of input suppliers: Agricultural chemical providers and nurseries. Agricultural chemical providers deal in fertilizers and pesticides and sell to farmers across Lebanon. These firms serve a variety of crops, including grapes. There are many suppliers of fertilizers and pesticides for grape production in Lebanon, with over 75 registered in the Bekaa alone.

Over 90 percent of input sales are made on credit, as farmers need supplies at the beginning of the season, but are unable to pay until harvest time. Thus, input suppliers provide farmers with loan facilities to cover the cost of pesticides and liquid fertilizers that amount to approximately 15 to 20 percent of the cost of production. Farmers do not make down payments or place collateral, however they pay on average 25 percent of the loan during the production season and the balance at harvest once they start selling their produce. Input suppliers do not charge interest rates however they may provide discounts for cash payments that can average 10 percent. Discounts are higher if they are a sole supplier of an item. Input suppliers lend only to farmers they know and for those they do not know, they conduct an informal credit check, which is easy to do in Lebanon. In rare cases, input suppliers request postdated checks. The large corporate suppliers obtain information about a farmer's assets, however they only pursue collection through the legal system if the farmer defaults and is not able to pay within two growing seasons. Input suppliers provide farmers, especially small ones, with technical advice on types, amounts, and methods of applying pesticides.

FIGURE 27: INPUT SUPPLIERS IN THE BEKAA THAT ARE LICENSED TO SELL PESTICIDES:

Location	Number of Outlets
Zahle	39
West Bekaa	9
Rachia	0
Hermel	5
Baalbak	22
Total	75

Nurseries provide grape rootstock and planting material. The genetic material for grapes is usually imported by large grape farmers and specialized fruit tree nurseries from the EU and USA. These service providers will multiply and sell planting material to farmers and provide varying levels of technical assistance. In general, getting plant materials is not a problem for farmers.

COLD STORAGE PROVIDERS

There are 45 commercially available cold storage facilities in Lebanon, and the following 13 major cold storage facilities located in the Bekaa cater to the grape industry:

- Marzouk Mansour- Located in Taanayel
- Akram sultan- Located in Taanayel
- Saleh kattan - Located in Taanayel
- Ali jaber –Located in Qab Elias
- Awadis - (Feyez Kattan) Located in Anjar
- El ghandour- Located in Majdal Anjar
- Selman Selman – Located in Beit Chama

- Ibrahim Nassar- Located in Tamnin
- Hasan Mounzer- Located in Tamnin
- Haidar Ahmad- Located in Mashghara
- Charaf - Located in Mashghara
- Jeb Farah- Rachaya (jeb farah name of the area but cold storage also knows as jeb farah)
- Nahhas- (Najib Nahhas) Located in Ksara

Despite the availability of cold storage, the facilities are inadequate in terms of capacity and quality of refrigeration. Cold storage is one of the bottlenecks affecting the growth of the grape value chain, as poor storage conditions significantly affect the shelf life of grapes. Almost all storage facilities do not have humidity control and they use old cooling technologies that use Freon a banned refrigerant. Moreover, these facilities do not have precooling refrigerators. Precooling is the rapid removal of field heat and is critical to reducing water loss. Studies have shown that by reducing the temperature of grapes by 9.5°C, the shelf will double.

VALUE CHAIN CHANNELS AND GOVERNANCE

The value chain map in Figure 20 shows a number of distinct market channels. Each of these has a distinct set of governance relationships embedded within it. These are described briefly below.

Channel 1: Processing flows

This channel serves mainly as a conduit for delivering damaged or 3rd choice product to processors of vinegar and grape molasses. Volumes are relatively small, with an estimated 1,200 tons of grapes per year flowing to the ten commercial molasses processors. Most of the volumes in this channel are produced by smaller non commercial grape farmers who deliver their harvest directly to the processors for around \$0.20 per kg. Processors also purchase directly from wholesalers in the Ferzol market who have damaged grapes. The price for such grapes is around \$0.30 per Kg. The key actors in this channel are the processors who set prices and transaction terms. This channel offers some interesting opportunities for developing market outlets for damaged or stunted grapes, thereby improving producer profitability and risk management. This is probably most relevant for small and medium producers producing for the local market who have less access to improved production techniques.

Channel 2: Wholesale market intermediated flows

Grapes in this channel flow through the main wholesale markets, with the Ferzol market playing a dominant role. Wholesalers in these markets play a key overall role in value chain governance by assembling product and dispatching it with some degree of quality differentiation that determines whether product is sent to export or domestic markets. The specialized grape wholesalers in Ferzol often work closely with exporters to identify specific large farms with good quality production for export, often even serving as damans for exporters by organizing harvest teams who will deliver product directly to the exporter without it physically transiting the wholesale market. This is by far the largest channel in the value chain as a whole. Given the limited shelf life of grapes, the ability of wholesalers to rapidly organize harvesting and sales to local retailers and export packers means that they are key actors on which

both farmers and downstream buyers must rely. However, the inevitable mixing of lots and lack of traceability that result from product passing through the wholesale markets means that it is difficult to enforce the highest quality standards and documentation requirements that are needed to access the EU and high-quality Gulf markets.

Channel 3: Un-intermediated flows

In this channel, which is essentially oriented for export, packers buy grapes directly from farmers or from harvest teams organized by damans or Ferzol wholesalers. Grapes in this channel tend to be of the highest quality. Since this is a direct farm-to-exporter channel, it concerns large farmers who can provide minimum volumes justifying individual transactions from exporters. These large farmers tend to apply improved production and harvesting protocols and more of them have the non-traditional grape varieties most in demand internationally. Medigardens in particular purchases grapes from a network of larger farmers who agree to follow production protocols that guarantee their ability to meet EU standards for pesticide residue and product quality, which it is able to verify through visits from its own extension personnel. Farmgate prices in this channel are high relative to the flows in Channel 2. Governance systems in this channel are mainly set by the procurement policies of the exporter/packers.

Channel 4: Vertically integrated flows

This channel is essentially limited to Medigardens and the two to three other exporter packers who have invested in production of table grapes on a major scale. These actors have internalized all the steps involved in grape production, packing and export. Each of these actors relies first of all on their own grape production to form the basis of their export business, with additional purchases from large farmers in channel 3 and wholesalers in channel 3 when market conditions are favorable. This channel is important for proving the basic feasibility of growing table grapes in Lebanon for export into the high quality international market and providing a model that can be replicated and expanded. Actors in this channel are good potential anchor firms for LIVCD activities seeking to expand high quality export sales.

Implications for LIVCD

The most promising channels for potential project interventions are clearly channels 3 and 4. The packers/exporters in Channel 4, led by Medigardens, have established footholds in key markets in the EU and the Gulf that can take much larger volumes. Good potential exists for using these market relationships to provide outlets for increased flows that would be governed by the system of vertical linkages that now exists in Channel 3 for larger farmers. Thus, Channel 3 provides a blueprint for possible LIVCD interventions, since it is serving as a vector for the introduction of improved production practices—driven by the high prices paid for high quality export grapes. The challenge will be to expand the draw of this channel by widening its base to include a larger number of medium and small farmers. This can be done by improving horizontal linkages between farmers through lead farmer and/or cooperative marketing to reduce the transaction costs to packers/exporters of dealing with larger number of smaller farmers. It will also be necessary to work with the some of the packer/exporters in Channel 4 to help them replicated the quality procedures and develop the high quality market outlets established by Medigardens.

6. BUSINESS ENVIRONMENT FACTORS AFFECTING THE VALUE CHAIN

Key elements of the business enabling environment surrounding the grapes value chain are described below.

ACCESS TO FINANCE

Actors in the grape value chain face many of the same constraints in seeking credit that are faced by actors in other agricultural value chains. Although Lebanon's commercial banking sector is one of the most advanced in the region, with 54 commercial and 10 specialized banks, 23 MFIs, multiple finance companies, and leasing offered through retailers and manufacturers, lending to agriculture is limited. In fact loans to the agricultural sector account for only one percent of all lending. Common problems are the mismatch between terms and conditions of available loan products and the needs and capacities of farmers in the grape sector, including high interest rates, high collateral requirements, and a lack of seasonal loans structured for agriculture. However, due to successes of some grape producers and exporters, banks have recognized grape production to be less risky than other agricultural crops and have eased up lending to grape producers. This explains the rapid expansion of grape production- 300,000 grape vines were sold in 2012; with only 20% replacing old vines, and the rest either replaced other crops or in new fields.

The chief program for promoting SME lending with a particular focus on agriculture 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. As current interest rates are low enough that they fall under the program ceiling, thus the program effectively pays all interest charges. Other windows offer higher levels of guarantee for larger loan amounts along with similar interest subsidies. 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. New Kafalat loans financed by a \$4.5 Million EU grant, were announced on January 28, 2013 following an agreement between the EU and the MoA. The new program aims at supporting the agricultural sector through extending loans to small- and medium-scale farmers. The loans, supported by the Central Bank and guaranteed by Kafalat, will have low interest rates.

The grant will allow Kafalat to increase the guarantee ratio it offers on loans (75 percent of the loan amount) by an additional ten percent in order to further lower the interest rates and reach new borrowers. Under the new program, two types of loans will be offered: The first loan could reach \$350,000 and has a maturity of ten years with a three-year repayment grace period; the second loan is for a maximum amount of \$45,000 and has a maturity of seven years with a six-month grace period.

In 2012, Kafalat offered guarantees to 1,025 loans, including some 400 loans for agricultural projects.

There is little doubt that the Kafalat program can, if correctly accessed, provide an attractive source of commercial financing for medium and small-sized grape value

chain farmers and packers. The main hurdle for smaller actors will be the loan application documentary requirements imposed by the participating banks—notably having a business plan.

Grape farmers with over 1.5 hectares usually possess the minimum collateral required (in terms of land holdings) to access loans from financial institutions when used for capital investments. However for working capital, farmers rely on input suppliers who extend them credit for input supplies they need for the production season. Farmers, especially small ones, also borrow cash from wholesalers at the beginning of the season to cover their production costs. The amount borrowed is usually less than 75% of the expected farm gate value of their output. In return wholesalers sell the output and give the farmers the remaining balance, while benefiting from 15% to 20% markup. This type of unofficial value chain finance comes at a very high cost to small farmers.

PRODUCT TRACEABILITY AND PESTICIDE RESIDUE LEVELS

The EU and GCC countries impose Minimum Residue Levels (MRLs) for pesticides on fresh fruit imports including grapes. For the EU, MRLs are set in the Council regulation 396/2005 of the 23rd February 2005. Detailed MRLs are published online, and include thresholds for hundreds of chemicals and substances. The GCC-s MRLs are set in “Maximum Limits of Pesticide Residue in Agricultural and Food Products Part 1 — UAEs GSO 382/1994⁹ and Maximum Limits of Pesticide Residue in Agricultural and Food Products Part 2 — UAEs GSO 383/1994. CODEX MRLs are used for any pesticide that isn’t specifically addressed in these documents.

The MoA in Lebanon has recently passed two laws to improve product traceability for grapes. In 2010, the MoA launched in 2010 a voluntary policy requiring farmers to register and wholesale market sellers to record the origin of produce moving through the wholesale markets. More recently in May 2012, the MoA passed decision 380/1, requiring table grape producers to contact the MoA before harvest so that the ministry can test table grapes for pesticide residues against Codex Standards. In June 2012, the Ministry also passed Decision 507/1, which regulates the use of pesticides and fertilizers. While implementation of these regulations will be difficult, particularly because many small farmers’ lots are mixed by damans, the regulations should improve the ability to hold farmers accountable for pesticide residues, increase compliance with export MLRs, and improve domestic consumer confidence. Although it has yet to be determined how these regulations will be enforced, many damans, wholesalers and larger farmers in the grape sector are aware of them and state their readiness to comply.

GOVERNMENT SUPPORT SERVICES AND NGO SUPPORT PROGRAMS

Farmers in Lebanon rely on input suppliers to provide them with extension support, mainly relating to the application of fertilizers and pesticides. Until 2012, there have been no public programs to promote knowledge of export market trends or extension support on much needed production practices such as irrigation, pruning, thinning, or on business management practices such as cost accounting. Beginning in 2012, however, the MoA has begun to encourage farmers, including grape farmers, to form cooperatives to access public subsidies for production and processing equipment. As

⁹ http://www.apeda.gov.in/apedawebsite/HACCP/UAE.S.GSO_382_1994.pdf

of early 2013, a number of cooperatives involving grape growers have been formed to access these subsidies can be as much as \$100,000 per cooperative. The cooperatives are also supposed to receive technical support for grape production from MoA agronomists.

Still in the absence of formal extension, some medium sized and large sized farmers have invested in hiring local, regional and/or international agronomists and marketing specialists. Small farmers depend almost exclusively on traditional production methods, pesticide and fertilizer input suppliers, and on other farmers as their source of knowledge. In some cases this serves to replicate dangerous practices such as uncontrolled grafting, or the input supplier may suggest pesticides that are not required and/or not in proper application rates.

In contrast to grape farmers, grape packers/exporters have been eligible for export subsidies in the past under the IDAL export subsidy program. This program has been recently renewed with an additional round of subsidies and renamed “AgriPlus”, although the goals and strategy of the program remain largely the same as the previous export subsidy program. AgriPlus subsidizes packaging and transportation to help exporters to be more competitive with other grape exporting countries in the region that enjoy considerably lower transportation costs due to subsidized fuel. The program also encourages farmers to upgrade of agricultural practices and improve packaging. AgriPlus gives packaging and transportation subsidies that are conditional on quality of the product and the type of packaging. The program provides an additional 30% over base level subsidies to products that are organic, have international certification such as GLOBALG.A.P., ISO22000 or HACCP. To encourage introduction of new products AgriPlus adds an additional 10% for exports of products not previously exported. For example, subsidies to GCC will be as low as USD\$53 per ton for relatively low product and packaging quality, while subsidies to Europe on products that have international certification will receive USD\$107 per ton for average packaging and USD\$133 for premium packaging. To see the positive effects of the subsidy on transportation to export destinations, transportation costs to Saudi Arabia are USD\$188 per ton to UAE they are USD\$213 per ton to UAE, while it costs USD\$128 per ton to ship to London.

Beyond some specific regional development projects that have worked on grape production, donor financed projects have been mostly absent from the grape value chain.

7. DYNAMIC TRENDS

The grape value chain has been marked by a number of important trends over the past five years:

Trend #1: There is an interest among medium and larger farmers in modernized production methods focusing on higher quality table grapes. The success of the one or two large farmers who have planted the new varieties of table grapes (e.g. Red Globe, Crimson, Thompson Seedless) demanded by European markets and who have adopted modern cultivation methods, notably with bunch cutting and proper application of approved pesticides, has clearly spurred the interest of an increasing number of medium and large farmers in the Bekaa who want to gain access to higher quality market segments both in Europe and in the region. Because of the higher yields, expanded harvest calendar, (particularly for the Red Globe and Black Pearl

varieties) and more stable international demand, improved table grape production is profitable for the farmers who are able to adopt the new production practices and plant the new varieties. Possibilities for expanding the model that has been developed in the central Bekaa into the peripheral areas of the Bekaa valley and into South, where market windows in the early season are even more favorable, are highly promising.

Trends #2: new export markets for high-quality grapes are emerging in the GCC and in Europe. Two new market channels have been developed over the past five years. The first is the expansion of table grape exports to Europe, with the necessary documentation on farming practices and pesticide residues within maximum limits required by European countries. At least two exporters are now exporting to Europe. The second is the expansion of sales of high quality grapes to the Arab Gulf countries. This market channel has been established for some time, but is now poised to benefit from the general upgrading that is taking place as packer/exporters make necessary improvements to access the European market. This opens up new possibilities for moving Lebanese table grapes out of the wholesale consignment market and into the market segment focused on higher quality supermarket buyers and hotels and restaurants.

Trend #3: an increase in the number of integrated packers/exporters. With the visible success of the model established by Dr. al Tini, four out of the twelve currently active grape exporters have established their own farms either on their own lands or on land they have rented as “wood damans.” This is a significant development, as it means the body of packer/exporters with some expertise in table grape production is increasing, which increases their ability to serve as focal points for expanding out-grower relationships with other medium and larger farmers who are able to emulate their production practices. The expansion of these out-grower networks also plays a critical role in supporting increased product traceability as it creates a clear chain of transactions without the mixing of lots that occurs in the major wholesale markets.

Trend #4: a push to form small and medium farmer coops. The recent move by the Ministry of Agriculture to encourage farmers to form cooperatives provides a favorable basic push for improved horizontal linkages between farmers. This can provide an important lever for introducing improved harvesting and production practices among smaller farmers within a given zone, facilitating product traceability that is required in the high quality markets. It can also lead to reduction in costs of key production and post-harvest services by allowing smaller farmers to capture economies of scale in extension, input supply, and purchases and use of post-harvest equipment.

8. CHALLENGES AND OPPORTUNITIES

To improve the grape value chain, Lebanese farmers should focus on international markets. The domestic market is already saturated and any measurable increase in volumes sold will cause prices to fall to a level that will not cover costs of production. The saturation of Lebanese table grape market poses a special challenge to the smaller less efficient farmers who are now exclusively dependent on the local wholesale markets. Such farmers need to gain access to export markets and to develop new channels with more direct sales to consumers that do not flow through the major wholesale markets. Achieving both these goals will require that small farmers adopt many of the same improved production practices that are being implemented by medium and large farmers. To do so, however, they will need to develop new horizontal and vertical linkages to help them overcome market access obstacles and capture scale economies in needed production and post-harvesting services that require some degree of grouped demand to be feasible.

OPPORTUNITY #1: INCREASE PARTICIPATION OF SMALL AND MEDIUM SCALE FARMERS IN EXPORT MARKETS BY VERTICALLY INTEGRATING THE VALUE CHAIN AND PROVIDING ACCESS TO FINANCE AND TECHNICAL SUPPORT FOR NEW PRODUCTION METHODS

The grape value chain is notable for the existence of a working “out-grower” model used by Dr. Adel al Tini. Dr. al Tini buys output of medium and large farmers who are able to meet his required production standards. There is considerable scope for expanding this model by working with Dr. al Tini and with other grape exporters to cover a much higher number of grape farmers, with a special focus on the inclusion of small and medium-scale farmers with between 3 and 70 dunums. Such a system could be developed as an add-on to the current traditional arrangements under which small farmers often sell their output to neighboring larger farmers acting as dammans. Developing networks of such larger farmers and linking them both to smaller farmers in their surrounding zones and to the exporters who provide the key market linkage will create benefits to all actors in the value chain. The better-financed grape exporters, who can provide a stable market for the new varieties of high quality new variety grapes, will be able to source more grapes for the growing premium export markets. As exports increase, it will reduce supply to domestic wholesale markets, making room for small scale farmers to expand. Greater use of the out-grower program will address problems related to accessing new planting material and the approved inputs—particularly pesticides. LIVCD can catalyze the development of a larger out grower system. Constraints that must be overcome to capitalize on this opportunity include:

A shortage of exporters and packers with an understanding of table grape specifications for high quality export markets: Currently, there are only two integrated packers/exporters able to export to Europe and only one is doing this through standing order contracts with an importer for a major brand. Other exporters are now beginning to access the higher quality market segments in the GCC countries. It will be necessary to expand the number and to strengthen exporters focusing on these high quality markets to provide the critical “top of the value chain” anchor points needed for the development of more vertically integrated table grape production channels. The existence of a larger pool of packers/exporters with some knowledge of table grape specifications for high quality markets is important for

increasing the potential pool of exporters able to sell into the high quality market segments in both Europe and the GCC.

Developing contractual forms to structure grape buying that incentivize small and larger farmers to stay within the integrated system. As more exporters/packers enter the high quality market, farmers will have increased opportunity to sell outside the out grower system, thereby avoiding payment for inputs/technical assistance received on credit from their supplying exporter. Contractual forms will have to be developed to ensure that such practices do not threaten the integrated production systems that depend on long term loyalty between out-growers and exporters.

Developing harvesting protocols and procedures for ensuring proper and efficient collection of out-grower production. The mobilization of needed labor input at harvesting, its supervision, and costing will need to be addressed as part of the vertical integration agreements linking out-growers to exporters/packers. Although availability of labor is not a constraint, harvest crews must be trained on correct harvesting practices and monitored.

OPPORTUNITY #2: EXPAND SALES OF FRESH TABLE GRAPES IN EUROPEAN MARKETS AND INTO HIGH VALUE CHANNELS IN THE GCC MARKET

An expansion of Lebanese table grape exports to the high quality market segments in Europe and the GCC will pose challenges to packers/exporters and grape farmers on a number of levels. The most important challenges will include:

Increasing exporters' ability to deliver consistent quality that meets target market's MRL requirements. As integrated production schemes linked to specific packers/exporters grow, they will need to install needed post-harvest protocols and, in many cases, make new physical investments in improved packing facilities. Chief among these are pre-cooling facilities, which play a critical role in preserving grape quality. For exporters targeting the high quality market segments, improvements in post-harvest handling will be essential in improving product shelf life and overall quality.

For all grapes farmers selling in the local or export markets, increased knowledge and awareness of the use of pesticides are critical to meet local and export market requirements.

Fine tuning of export product strategies—based on specific market preferences. Diverse export market preferences will need to dictate exporters brand strategies and this in turn will influence production level decisions regarding grape varieties and post-harvest handling and packaging choices. For instance, focusing on European markets will require new varieties. There is scope for increasing the value of traditional Lebanese varieties in regional markets with improved production, handling and packing. Adjusting to consumer preferences in terms of berry size, color and weights of cluster will also all play an important role in determining market acceptance and price.

FOLLOWING ARE UPDATED CHALLENGES AND OPPORTUNITIES:

OPPORTUNITY #1: INCREASE GRAPE EXPORTS TO HIGH-VALUE EUROPEAN AND ASIAN MARKETS BY IMPROVING QUALITY, AND CONSISTENTLY DELIVERING HIGH QUALITY SAFE PRODUCT, ESTABLISHING A HIGH QUALITY BRAND NAME, AND INCREASING SUPPLY OF NEW VARIETIES. CURRENTLY ONLY ONE FIRM; MEDIGARDENS

CONSISTENTLY EXPORTS TO THESE MARKETS, WITH A VERY SMALL NUMBER OF FARMERS ENGAGED IN THESE EXPORTS. THE PRESIDENT OF MEDIGARDENS STATES THAT EVEN IF HIS FIRM DELIVERS 10 MORE THAN WHAT IT DELIVERED IN 2012 (3,000 TONS), IT WILL NOT BE ABLE MEET EXISTING DEMAND.

Constraints:

1. Product quality: European and Asian markets have high quality requirements that generally Lebanese farmers are not aware of, and are not always able to meet, and when they meet them, many of them don't do that consistently.
Factors affecting quality of Lebanese grapes:
 - a. Short shelf life. Due to longer transportation periods, shelf life becomes more critical for shipments to Europe and Asia.
 - b. Exceeding MRL (Maximum Residue Limits).
 - c. Packaging that doesn't meet form, fit, and function.
 - d. Production Practices:
 - i. Planting
 - ii. Irrigation
 - iii. Pruning
 - iv. Thinning
 - v. Harvesting
2. Lack of enough supply of desired product varieties. The vast majority of Lebanese grape growers plant local varieties that are not desirable in European and Asian markets.
3. Farmers are limited to only one exporter. There is only one exporter; Medigardens that has been able to consistently grow its exports to the European and Asian markets.
4. Limited number of growers is engaged in exports to European and Asian markets; mainly due to the limited capacity that Medigardens has for it to work with different growers. To insure that the product it ships meets high quality standards; Medigardens has to work closely with farmers to oversee their production, harvest, packaging, and cold chain practices in order to insure that the final product quality meets target market expectations. As such, Medigardens or other exporters that wish to sell to Europe have limited resources and as such prefer to work with a small number of farmers that can provide them with the required quality. Moreover, few small and medium farmers have the minimum level of know-how that exporters expect and the necessary equipment, including proper cold storage that is required to insure high quality product that maintains its quality after extended shipping and storage periods.
5. Limited market access. Until new entrants to the European markets prove that they are able to consistently meet quality and quantity requirements; their sales will be limited to the wholesale market. It takes 2-3 years of consistently meeting these requirements, and creating a recognized brand name for exporters to have direct access to supermarkets where they can sell at higher prices with better predictability of required volumes.

6. Lack of certification that insures compliance with international food safety standards such as GLOBALG.A.P.

OPPORTUNITY #2: INCREASE EXPORT TO GCC AND THE PARTICIPATION OF SMALL AND MEDIUM SCALE FARMERS BY HORIZONTALLY AND VERTICALLY INTEGRATING THE VALUE CHAIN AND PROVIDING ACCESS TO FINANCE AND TECHNICAL SUPPORT FOR NEW VARIETIES AND NEW PRODUCTION METHODS

Constraints:

1. Access is limited to low-value trade channels. Many Lebanese exporters sell into the GCC market, however almost all are limited to the low value wholesale market.
2. Generally low and inconsistent product quality. Even though the GCC market is more tolerant than European and Asian markets, the GCC high-value market channel does expect minimum standards that Lebanese grape producers are not able to consistently meet.
3. Small and medium farmers don't collaborate together to aggregate their output so they can sell directly to exporters and command higher prices.
4. Small and medium farmers don't have access to the necessary equipment required for proper production, harvesting, and storing of their product. By collaborating together and through some financial support, small farmer can share the cost of acquiring and maintaining such equipment.
5. Small and medium farmers don't have the necessary knowhow, or the means to obtain it.
6. Limited product variety. Even though Lebanese grape varieties are desirable in the GCC, other varieties are in demand in the high value trade channel. It is not feasible without support for small scale farmers to replace their trees and incur the associated cost, while at the same time having to wait 3 years before they can start to generate income.
7. Negative reputation of Lebanese grapes due to previous incidents of high pesticide residue levels. Farmers would insure easier access to high value markets by obtaining GLOBALG.A.P. certification for their products. The GOL through IDAL program has provided incentives for farmers to implement GLOBALG.A.P. which should encourage more farmers to obtain certification.

OPPORTUNITY #3: INCREASE PROFITABILITY AND THUS SUSTAINABILITY OF SMALL AND MEDIUM FARMERS BY HAVING DIRECT ACCESS TO LOCAL TRADE CHANNELS THROUGH IMPROVED QUALITY, AND NEW VARIETIES.

The Lebanese market has the ability to absorb high value products, but due to the harvest calendar being limited to a relatively short period, and due to poor quality practices; Lebanese farmers, especially small and medium scale ones that don't have access to export markets, sell at low prices that are close to, or even in some years, below cost.

Constraints:

1. Limited varieties that have similar harvest period.
2. Inconsistent quality.
3. Inadequate and inconsistent supply. Buyers in supermarkets prefer to work with smallest possible number of suppliers; as such they prefer to deal with wholesalers or middlemen who can meet their demand.

OPPORTUNITY #4: REPLACE LOW COST IMPORTS BY IMPROVING QUALITY AND HAVING DIRECT ACCESS TO RETAIL CHANNELS. LEBANON HAS SEEN A 4-FOLD INCREASE IN IMPORTS OF SYRIAN GRAPES IN 2011 AND 2010 RELATIVE TO 2009 WHICH HAD A LARGE NEGATIVE IMPACT ON SMALL SCALE GRAPE PRODUCERS.

Constraints:

1. Cost. High production cost of local grapes relative to Syrian imports.
2. Quality. Quality of Lebanese grapes sold in the local low value trade channels is not measurably different than that of the Syrian imports. By improving quality, Lebanese farmers can fetch higher prices.
3. Varieties. Selling new varieties will allow Lebanese farmers to differentiate their product and sell in different calendars than that of Syrian grapes.
4. Selling in the same trade channels. Lebanese farmers, especially the small scale ones, are competing with Syrian imports in wholesale markets. By establishing direct sales to retail markets they can reduce their time to market which impacts freshness and quality, and they can improve their margins.

9. VALUE CHAIN UPGRADING STRATEGY AND INTERVENTIONS

The overall objective of LIVCD's upgrading strategy will be to accelerate the adoption of new varieties and improved table grape production, harvest, and post-harvest practices that are necessary to fuel an expansion of Lebanese table grape exports into high quality market segments in the region and in Europe. Interventions in the grape value chain will focus on expanding access to high value markets, increasing vertical integration of small farmers in the local and export markets, and developing the needed support services and forms of horizontal and vertical cooperation so that the different actors in the value chain can come together to supporting small and medium farmers to better integrate in the value chain and maximize their growth and sustainability.

AXIS 1: Determine high value target markets, varieties, and market requirements.

To expand sales into high value markets, LIVCD will work with exporters/packers, particularly those that have vertically integrated table grape production to conduct market research on the various markets that are accessible to Lebanese grape producers.

Determine appropriate target markets.

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

Determine appropriate varieties for the selected target markets.

- In the identified target markets, study consumer demands for the different varieties of grapes, wholesale and retail prices, market trends, competing countries and their export windows.
- Ascertain the suitability of these varieties within the different micro climates of Lebanon and for their impact on the harvest calendar. This will be especially important in the South, where table grapes are less well established.

AXIS 2: SET-UP INTEGRATED OUT-GROWER SCHEMES FOR QUALITY GRAPE PRODUCTION FOCUSED ON SMALL AND MEDIUM FARMERS BY LINKING THEM TO PACKERS/EXPORTERS AND FOSTERING COOPERATIVE SERVICE PROVISION

LIVCD will center its table grape strategy around the creation of integrated out-growing schemes that would link small and medium farmers to vertically integrated packers/exporters. These schemes will use lead farmers or cooperative representatives as the focal point for key market linkages. These systems will be based on the quality standards and production model established by the packer/exporter in accordance with his buyers' demands and the results of the analyses conducted under Axis 1. Thus

specific variety choices and detailed cultivations protocols will be set by the packer/exporter acting as lead firm in the value chain and with LIVCD working with the packer/exporter to identify specific geographic areas of concentration with “constellations” of large farmer-small farmer networks and/or small farmer cooperatives in which LIVCD will focus its technical assistance and in which the packer/exporter will agree to make longer term commitments which, at a minimum would consist of purchasing agreements, but should also include such elements as: joint financing or co-guarantees to facilitate outside financing of investments in improved small and medium farmer production; provision of key inputs such as planting material and chemicals and or spraying equipment; and extension support from agronomists or technicians. LIVCD will structure these agreements with packers/exporters as Private Public Partnerships (PPPs) detailing the specific contributions of all parties—including the packer/exporter, participating farmers, cooperatives and LIVCD.

Specific interventions sites will be determined in discussions with packers/exporters, but LIVCD will make a concerted effort to expand the areas under improved grape production beyond the current “core zone” in the central Bekaa. Specifically, LIVCD will aim to double table grape production in the Akkar, Qaa, and South of Lebanon.

Specific activities in support of this axis include:

Developing improved vertical linkages between farmers and packers/exporters through Private Public Partnerships

Since exporters prefer to work with a small number of famers, the project will help group small farmers in coops or establish informal groups through a lead farmer and link them directly with exporters. LIVCD staff will serve as facilitators in brokering the necessary agreements between the packer/exporters and farmers with the objective of having all parties enter into PPP to support the necessary upgrading in small and medium farmer production and post-harvest practices. Key foci of these PPP agreements will include:

- ***Financing of harvesting equipment and vehicles.*** PPP mechanisms will be used where possible, minimizing the provision of direct financing by LIVCD, unless there is an especially sound rationale.
- ***Provision of inputs supply utilizing the resources of the packer/exporter and/or approved input suppliers.*** Strategies for minimizing costs, such as discounts for advanced orders and payments; grouped orders from smaller farmers and co-financing between farmers and the packer/exporter will be pursued as much as possible.
- ***Improving of harvesting*** by training the foremen of harvesting crews on proper harvesting procedures following quality protocols established by the packer/exporter

Spurring the development of improved horizontal linkages among small and medium farmers through cooperatives

In many cases it will be important to organize smaller and medium farmers as formal cooperatives who can access subsidies for some of the equipment and inputs needed to improve production and post-harvest handling. Cooperatives can also serve as a focal point for structuring commercial purchase and outgrowing relationships between the farmers and the packer/exporter, although this is not a necessary condition.

LIVCD can support this in the following ways

- **Promote coops with small farmers.** LIVCD can hold information sessions for small and medium farmers to show the benefits and challenges of coops and help them obtain legal recognition.
- **Strengthen existing and new cooperatives.** LIVCD will strengthen coops that have already been formed and ones it has formed to help them focus on services needed within the framework of the larger agreement with the packer/exporter. This can include developing the needed internal bylaws and a business plan.
- **Provide training** so that the cooperative can provide extension services to improve production, grow new varieties, access new high value markets
- **Help coops to access external sources of financing.** This would include both subsidies from public authorities and commercial sources of financing from MFIs and commercial lenders. PPP funds from LIVCD would mostly be used where they could leverage other outside sources of funding.
- **Help coops to develop marketing structures to obtain a higher value for domestic market sales.** Packers/exporters are unlikely to purchase the entire output of small and medium farmers, who will need to also develop marketing strategies for selling second choice product or un-exportable varieties in the local market. Developing new links to downstream distributors and retailers with larger quantities and improved handling and packaging will be a necessary part of cooperative development.

Encourage the adoption of improved production practices. Following the identification of particularly promising region/variety pairings and the formation of the PPP agreements linking packers/exporters to small and medium farmers, LIVCD will work to expand the use of improved table grape production practices, including both technical improvements in production methods and the use of new varieties of grapes. This will be achieved by:

- **Providing extension services to farmers in order to produce high quality output.** This will include: proper planting dimensions within a farm, proper irrigation systems and frequency; standardized and documented application of fertilizers and pesticides; pruning and thinning with particular attention to bunching; and harvesting. LIVCD will work with the different partners involved in each PPP to develop appropriate delivery mechanisms that will be tailored to each situation. These may include contracts with local agronomists, foundations, NGOs or local cooperatives for which financing would be provided by some combination of the farmers themselves, the packer/exporter and LIVCD.
- **Improve small farmer access to new varieties.** LIVCD can identify the source of the new varieties and work with local input suppliers to introduce them into the market. One of the big challenges in this area is the availability of certified grape vines. The project will work with input suppliers to insure that varieties sold are certified to be the correct variety and are free of diseases. Another constraint is the higher cost of certified vines. To save money, small farmers tend to buy uncertified trees without recognizing the high risk and higher consequential costs. LIVCD can work on educating the farmers on the risk, and work with international rootstock suppliers and local input suppliers to reduce the cost of certified grape vines.
- **Supporting needed equipment for production upgrading.** To competitively grow high quality grapes LIVCD will work with the PPP partners to support farmers in

acquiring equipment that will increase their efficiency, reduce cost, and improve yield and quality of production. Examples of such equipment are: low profile tractors that can work in grape orchards, vine planters, ESD sprayers that significantly reduce the cost of labor and material while effectively applying pesticides and gibberellic acid.

- ***Collaborate with local universities to develop and implement improved production methodologies.*** The objective of collaboration would be to leverage local knowledge and research facilities, engage students, and help insure sustainability.

AXIS 3: Work with farmers and packers/exporters to extend the shelf life of grapes through improved harvest, handling and packaging

Considering that the cold chain has a significant impact on the quality grapes and as a result on the ability to enter high value markets, the LIVCD project will invest resources and will work in partnership with key stakeholders to significantly improve harvest and post-harvest handling practices and infrastructure. This will be achieved through the following activities:

- ***Provide technical Assistance on cold chain management for grapes.*** LIVCD can provide training to farmers and their harvesting teams on the following: proper harvest time, transportation from field to storage, importance of using pre-cooling and cold storage for grapes including the proper use of sulfur papers and pads in ways that maximize their efficiency.
- ***Invest in cold storage facilities*** that include precooling and cold storage facilities that meet international environmental standards and provide the proper storage environment for grapes. LIVCD will coordinate with large farmers and/or exporters who have access to international markets and have demand for high quality grapes from small and medium farmers. We envision an arrangement whereby the larger farmers and/or exporters, along with the project, will co-invest under the PPP mechanism in cold storage facilities that they will own and will serve at least 10 small and medium farmers who are supplying them.
- ***Design and implement improve packaging for export grapes.*** Use appropriate packaging material for target markets. The packaging material should help improve shelf life, reduce transportation damage, and are appealing to buyers. Collaborate with institutions such as LibanPack to develop the appropriate packaging that meet visual and functional requirements.

GRAPE VALUE CHAIN 5 YEAR TARGETS

- Number of small and medium farmers receiving technical support and extension services: 2,000 farmers
- Number of small and medium farmers with increased production: 1,000 farmers
- Metric tons of increased production: 5,000 tons
- Number of new farmer exporting to Europe or to high value channels in the GCC: 500
- Value of sales to Europe and to Quality segment of market in GCC: Increase sales value to high value markets by 100%

ANNEX 1: DATA QUALITY

Figures for value and volume of Lebanese grape exports vary widely between sources. As noted in Section 3, for the purpose of this study, we use information from key stakeholders and Chambers of Commerce to calculate export volumes and average sales prices, and information from the UN Comtrade database to assess five year trends and percentages of exports going to key import markets. Because grape exporters and importers frequently under-report quantity and value of grapes moving between countries, Comtrade data show unreasonably low volumes, values and average sales prices. Additional rationale and assumptions for these decisions are found below:

1. In discussions with growers, exporters, wholesalers, and Chambers of commerce, it is clear that volume of exports is considerably higher than officially reported by Comtrade and FAO. Using the FAO data to determine the per capita consumption for 2010 we obtain 21Kg per person which is significantly higher than that of Europe which is 5 Kg/person¹⁰ and 3.4 Kg per person in the US¹¹. If however we use MoA's output data obtained in the 2010 survey, along with the key stakeholders' estimate of exports, we obtain a per capita consumption of 4.66 Kg per person. This number compares reasonably with the US number of 3.4 Kg per person and the European per capita value of 5 Kg/person.
2. Value of sales is also considerably understated. For example the Lebanese customs website reports an average selling price (ASP) of grapes to Saudi Arabia in 2010 of 0.16/Kg and Trademap reports for the same year an ASP of 0.19/Kg. Both prices do not cover the cost of harvesting, packaging and transportation. Based on data we obtained from the Dubai wholesale market, in addition to statements made by exporters and wholesalers during interviews, the ASP for fresh grapes in the GCC market ranges from 0.95 to 1.35.

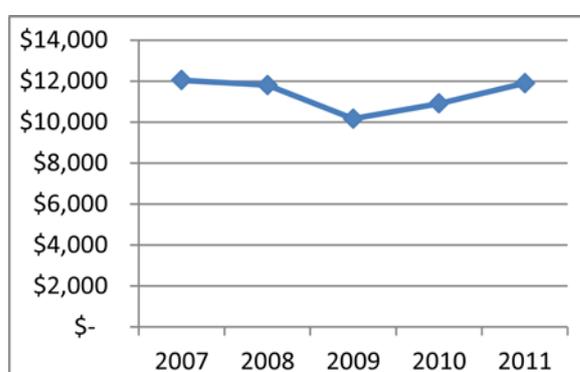
¹⁰ "Fresh Table Grapes in Poland" published by the Ministry of Foreign Affairs of the Netherlands. http://miepo.md/public/files/cbi/grapes/Fresh_grapes_in_Poland.pdf

¹¹ (UC Davis Study, 2006 <http://aic.ucdavis.edu/profiles/GrapesFreshMarket-2006.pdf>)

ANNEX 2: WINE GRAPES

As part of the broader grape value chain, the LIVCD team has completed some preliminary research on grapes used specifically for wine and arak production. Further work on this part of the grape value chain is pending USAID approval. Lebanon produces grapes into processing for wine and arak. In 2010 this amounted to over 6 million bottles of wine with an industry value of \$26 million¹². A number of Lebanese wineries have received technical assistance from France, and produce high quality wine and arak for domestic and international consumption. Based on Trademap and Lebanese Customs data, Lebanese wine exports have been increasing, and in 2010 Lebanon exported 2,138 tons of wine at a value of USD10.9 million. According to Lebanese Customs data, in 2010, Europe captured 44 percent of Lebanese wine exports by value, North America captured 19 percent and the remainder went to end markets in GCC countries.

FIGURE 28: WINE EXPORT VALUE USD\$ '000



Source: Comtrade

FIGURE 2: TOP EXPORT DESTINATIONS

Country	% of Total exports
United Kingdom	30%
France	22%
United States	8%
Syria	7%
Sweden	5%
Switzerland	3%
United Arab Emirates	3%

Source: Lebanese Customs

As Lebanese wines have gained increasing traction in export markets, there has been an expansion in the number of wineries in Lebanon, from 7 in 1995 to 32 at present. The industry has an active association, The Union Vinicole Du Liban (UVL), which provides technical assistance and other services to wineries across Lebanon. The largest wineries, Chateau Ksara and Chateau Kefraya, produce around 2 million bottles annually, with smaller vineyards producing less than 60,000 bottles.

Wine grapes are sourced from winery-owned vineyards or directly from groups of farmers who grow the required varieties. Thus, there could be an opportunity to work with small scale wine grape producers to improve their production practices and margins- increasing household income.

¹² http://www.lebanonwines.com/fast_facts.html

ANNEX 3: HIGH VALUE IMPORT MARKET REQUIREMENTS

Supermarket chains in high value markets, such as the EU, have strict requirements for imported produce. Figure 2 below displays table grape summary specifications for Sainsbury's, a supermarket chain in the United Kingdom. These specifications are comprehensive, and include packing size, weight, coloration, berry size, sugar content, sugar acid ratio, bag count per box, and bunches per bag. Sainsbury's also has a list of approved countries of origin, which serves as an initial filter for suppliers. Notably, as of 2012, Lebanon is not on the list of approved countries. This is likely due to Lebanon's relative new entry to the European market.

FIGURE 29: GRAPE SPECIFICATIONS AND APPROVED COUNTRIES OF ORIGIN FROM

Sainsbury's Table Grape Summary Specifications			Sainsbury's		
DCP/ On pack Title	Summary Product Spec:	Tolerances	Approved Countries of Origin	Supplier	Summary Packaging Spec:
889 131	<u>Weight:</u> Min 9.0Kg netwt	<u>Colouration:</u> QAS 2: Uneven berry colour within case. No green berries. Must be corrected for next delivery	Israel, Brazil, Chile, South Africa, Italy, Spain, Egypt, USA, Mexico, Peru, Namibia, Morocco, Greece, Australia,	Grapes Direct Ltd G0624	60 x 40 cm Black Box (Process C)
Sainsbury's Red Seedless Grapes	<u>Colouration:</u> Even coloured berries- Pale red / pink to dark red	<u>Berry Size:</u> QAS 2: Tolerance 10 berries / bunch 1mm below agreed berry size.		Mack Multiples M0249	SQ2 Pad Plastic only (with removal notice) Sainsbury's Zip lock bag
9. Kg Loose	<u>Berry size:</u> Min 17mm	<u>Sugar:</u> QAS 2: 5 berries from 10 random individual sugar tests below agreed brix. Must be corrected for next delivery.		International Grape C0163	Transparent perforated liner with tear-off section
	<u>Sugar:</u> Crimson Min 17 % Flame Min 16 %	<u>Shatter:</u> QAS 2: Tolerance 6 berries / bag.		Capespan C1362	
	<u>Sugar Acid ratio:</u> Min 18:1	<u>Minor marking:</u> QAS 2: Tolerance 10 berries / bag.		Poggi P0637	
	<u>Bag weight:</u> 450g – 800g				
	<u>Bunch weight minimum:</u> 225g	<u>Bag Weight:</u> QAS 2: 1-3 bags per carton outside the specified weight range			
	<u>Bag count per box:</u> 15 promo bags 18 in non promotional bags	<u>Split / Waste berry:</u> QAS 2: 2 berries per box.			
	<u>Bunches per bag:</u> 1 bunch preferred, 2 accepted.	<u>Insect/spiders:</u> No Tolerance. ZERO			

ANNEX 4: COST OF PRODUCTION

The figures below present detailed costs of production per dunum for modern and traditional production. Data reflect averages reported from Medigardens and farmers operating at small, medium, and large scales of production.

	Action	Men/Women	Workers/ Dunom/ Operation	Daily Salary/ Worker	Cost/ Operation	Modern		Traditional	
						Repetition	Cost/ Dunom	Repetition	Cost/ Dunom
Labor for Vine Maintenance	Pruning	Men	3	35	105	1	105	1	105
	Organic Fertilizers Spreading	Men	0.5	15	7.5	1	7.5	0	0
	Weeding	Women	2	10	20	3	60	0	0
	Shoot positionings	Women	2	10	20	1	20	1	20
	Shoot thinning and leaf removal	Women	2	10	20	2	40	2	40
	Shoot trimming	Men	1	10	10	2	20	0	0
	Cutting (Bunches)	Women	2	10	20	3	60	0	0
	Trunk girdling	Men	1	15	15	1	15	0	0
Harvesting	Women	2	10	20	1	20	1	20	
Guard	6 mnths, 500 USD/Mnth	Average of 1 Guard for each 50 Dunoms			3000	1	60	1	60
Total Labor Cost per Dunum							407.5		\$245.00
Action	Item	Details	Price USD (kg or L)	Dosage/Ha	Unit	Repetition	Cost/ Dunom	Repetition	Cost/ Dunom
Insecticide	Lufenuron	Berry moth	78	500	ml	1	3.9	1	3.9
	Lambda cyhalothrin 5%	Berry moth	45	250	ml	2	2.25	2	2.25
	Indoxacarb 15%	Berry moth	107	500	ml	2	10.7	2	10.7
	Thiametoxam	Aphid	188	250	g	1	4.7	1	4.7
	Methiocarb	Bird repeller		2000	g	1	0	1	0
Fungicide	Sulphur	P. Mildew	3	3000	g	2	1.8	2	1.8
	Azoxystrobin+Difencconazole	P. Mildew	130	50	ml	1	0.65	1	0.65
	Pyraclostrobin+Boscalid	P. Mildew	97	300	g	1	2.91	1	2.91
	Trifloxistrobine	P. Mildew	200	150	g	2	6	2	6
	Kresoxim Methyl	P. Mildew	200	200	g	2	8	2	8
	Fenhexamid 500 g/l	Botrytis	92	750	ml	1	6.9	1	6.9
	Switch	Botrytis		1200	g	1	0	1	0
Nutrients spraying	Magnesium Sulfate	Wettable pow	0.5	2	Kg	3	0.3	0	0
	BASIC Combo	Multivitamine	13	1	Kg	3	3.9	0	0
	Kelpak	Organic Liquid	8	2	L	3	4.8	0	0
	Terrasorb	Liquid N	9	2	L	3	5.4	0	0
	NPK (20-20-20)	Wettable pow	1.8	2	Kg	3	1.08	0	0
	Amino Calcium	Liquid Ca	5.6	2	L	3	3.36	0	0
	Amino Zinc	Liquid Zn	9.6	1	L	3	2.88	0	0
	Amino Bore	Amino B	9	1	L	3	2.7	0	0
Others	Dormex	Used to wake	10.5	1.2	L	1	1.26	0	0
Total Spraying Cost per Dunum							\$ 73.49		\$ 47.81
Elements			Price/kg	Kg/Dunom		Repetition	Cost/ Dunom	Repetition	Cost/ Dunom
Fertilizers	Magnesium Sulfate		0.7	17		1	11.9	1	11.9
	Calcium Nitrate		0.8	6.5		1	5.2	1	5.2
	MAP(mono amonium)		1.35	7		1	9.45	1	9.45
	Potassium Sulfate		1.15	10		1	11.5	1	11.5
Fertilizer Cost per Dunum							\$ 38.05		\$ 38.05
TOTAL PRODUCTION COSTS PER DUNUM						MODERN	\$ 519.04	TRADITIONAL	\$ 330.86

ANNEX 5: YIELDS AND REVENUE BY GRAPE VARIETY

This Annex presents the net income generated from production of the four major grape varieties, Halawani, Baytamoune, Red Globe, and Crimson. Figures are provided for farms of various sizes, from 1 to 150 dunum. As seen in Figures 3 to 6, yield per tree, tree planting density, all vary by variety. Average sales prices reflect farm gate prices, and harvesting and packaging costs are based on packaging required for domestic wholesale markets. Cost of production figures are based on calculations presented in Annex 6. For traditional grape varieties such as Halawani and Baytamouni, cost of production figures reflect traditional practices. For new grape varieties such as Red Globe and Crimson, cost of production figures reflect cost modern practices.

Figure 7, below, provides additional information about the cost of packaging that is not included in Figures 3 through 6. The cost of harvest and packaging vary depending on where the grapes are packed, at the farm or at pack house; and by destination market, wholesale, export to GCC, export to EU and high end GCC markets. These figures, along with shipping costs presented in Annex 6, can be used to modify cost and revenue figures by variety presented below.

FIGURE 30: HALAWANI

Dunums	# of trees	Yield, Kg/Tree	Yield	Yield Loss	Net Yield, [Kg]	ASP, USD\$/Kg	Gross, USD\$	Production Cost, USD\$	Harvest & Packaging Cost per Kg	Total Harvest & Packaging Cost	Net USD\$
1	70	30	2,100	10%	1,890	0.60	1,134	331	0.15	284	520
3	70	30	6,300	10%	5,670	0.60	3,402	993	0.15	851	1,559
5	70	30	10,500	10%	9,450	0.60	5,670	1,654	0.15	1,418	2,598
10	70	30	21,000	10%	18,900	0.60	11,340	3,309	0.15	2,835	5,196
15	70	30	31,500	10%	28,350	0.60	17,010	4,963	0.15	4,253	7,795
16	70	30	33,600	10%	30,240	0.60	18,144	5,294	0.15	4,536	8,314
20	70	30	42,000	10%	37,800	0.60	22,680	6,617	0.15	5,103	10,960
70	70	30		10%		0.60	79,380	23,160	0.15	17,861	38,359

			147,000		132,300						
100	70	30	210,000	10%	189,000	0.60	113,400	33,086	0.15	25,515	54,799
250	70	30	525,000	10%	472,500	0.60	283,500	82,715	0.15	63,788	136,998

FIGURE 31: BAYTAMOUNE

Dunums	# of trees	Yield, Kg/Tree	Yield	Yield Loss	Net Yield, [Kg]	ASP, /Kg	Gross, USD\$	Production Cost, USD\$	Harvest & Packaging Cost per Kg	Harvest & Packaging Cost	Net USD\$
1	70	30	2,100	10%	1,890	0.83	1,575	331	0.15	284	961
3	70	30	6,300	10%	5,670	0.83	4,725	993	0.15	851	2,882
5	70	30	10,500	10%	9,450	0.83	7,875	1,654	0.15	1,418	4,803
10	70	30	21,000	10%	18,900	0.83	15,750	3,309	0.15	2,835	9,606
15	70	30	31,500	10%	28,350	0.83	23,625	4,963	0.15	4,253	14,410
16	70	30	33,600	10%	30,240	0.83	25,200	5,294	0.15	4,536	15,370
20	70	30	42,000	10%	37,800	0.83	31,500	6,617	0.15	5,103	19,780
70	70	30	147,000	10%	132,300	0.83	110,250	23,160	0.15	17,861	69,229
100	70	30	210,000	10%	189,000	0.83	157,500	33,086	0.15	25,515	98,899
250	70	30	525,000	10%	472,500	0.83	393,750	82,715	0.15	63,788	247,248

FIGURE 32: CRIMSON

Dunums	# of trees	Yield, Kg/Tree	Yield	Yield Loss	Net Yield, [Kg]	ASP, /Kg	Gross, USD\$	Production Cost, USD\$	Harvest & Packaging Cost per Kg	Harvest & Packaging Cost	Net USD\$
1	110	20	2,200	10%	1,980	1.17	2,310	519	0.15	396	1,395
3	110	20	6,600	10%	5,940	1.17	6,930	1,557	0.15	1,188	4,185
5	110	20	11,000	10%	9,900	1.17	11,550	2,595	0.15	1,980	6,975
10	110	20	22,000	10%	19,800	1.17	23,100	5,190	0.15	3,960	13,950
15	110	20	33,000	10%	29,700	1.17	34,650	7,786	0.15	5,940	20,924
16	110	20	35,200	10%	31,680	1.17	36,960	8,305	0.15	6,336	22,319
20	110	20	44,000	10%	39,600	1.17	46,200	10,381	0.15	7,128	28,691
70	110	20	154,000	10%	138,600	1.17	161,700	36,333	0.15	24,948	100,419
100	110	20	220,000	10%	198,000	1.17	231,000	51,904	0.15	35,640	143,456
250	110	20	550,000	10%	495,000	1.17	577,500	129,760	0.15	89,100	358,640

FIGURE 33: RED GLOBE

Dunums	# of trees	Yield, Kg/Tree	Yield, Kg	Yield Loss	Net Yield, [Kg]	ASP, /Kg	Gross, USD\$	Production Cost, USD\$	Harvest & Packaging Cost per Kg	Harvest & Packaging Cost	Net USD\$
1	110	40	4,400	10%	3,960	0.80	3,168	519	0.15	594	2,055
3	110	40	13,200	10%	11,880	0.80	9,504	1,557	0.15	1,782	6,165
5	110	40	22,000	10%	19,800	0.80	15,840	2,595	0.15	2,970	10,275
10	110	40	44,000	10%	39,600	0.80	31,680	5,190	0.15	5,940	20,550
15	110	40	66,000	10%	59,400	0.80	47,520	7,786	0.15	8,910	30,824
16	110	40	70,400	10%	63,360	0.80	50,688	8,305	0.15	9,504	32,879
20	110	40	88,000	10%	79,200	0.80	63,360	6,540	0.15	11,880	44,940
70	110	40	308,000	10%	277,200	0.80	221,760	21,618	0.15	41,580	158,562
100	110	40	440,000	10%	396,000	0.80	316,800	29,066	0.15	59,400	228,334
250	110	40	1,100,000	10%	990,000	0.80	792,000	63,582	0.15	148,500	579,918

FIGURE 34: COST OF HARVESTING AND PACKAGING FOR VARIOUS MARKETS

Operations and packing material	Cost	Unit	Kg	Farm Packing		Packhouse Packing	
				Wholesale Market	Export to GCC and Sudan	Export to Europe and high end GCC	
Harvesting	\$0.15	Cent/ Kg		\$0.15	\$0.15	\$0.15	
Packhouse Cleanning	\$0.15	Cent/ Kg				\$0.15	
Cold Storage/kg	\$0.15	Cent/ Kg			\$0.15	\$0.15	
Crate	\$0.18	Cents/Kg			\$0.18		
Carton Box	\$0.99	Cent/ Kg	5			\$0.20	
Liner Traditional	\$0.05	Cent/ Kg	5		\$0.01		
Liner Sophisticated	\$0.10	Cent/ Kg	5			\$0.02	
Sulfur Pad	\$0.10	Cent/ Kg	5		\$0.02	\$0.02	
Absorb Pad	\$0.10	Cent/ Kg	5		\$0.02	\$0.02	
Punnets (10/Box)	\$0.10	Cent/Punnet	0.5			\$0.20	
Bags (1 for each bunch)(10 bags/box)	\$0.08	Cent/Bag	0.56			\$0.14	
Total Cost				\$0.15	\$0.53	\$0.91	Using Punnets
						\$0.85	Using Bags

ANNEX 6: TRANSPORTATION AND SHIPPING COSTS

The cost of shipping a container of grapes varies by mode of transport and destination, and type of crate. As seen in Figure 8, Port Said offers the cheapest shipping rate and fastest delivery time. Shipping by sea to European countries is cheaper than GCC countries, but more time consuming. Shipping to Jedda, Dubai, and Port Sudan costs between USD\$ 3,370 and 3,872, and takes between 4 and 17 days. Figure 9 provides overland transport costs to Jedda and Dubai, which are slightly more expensive.

FIGURE 35: COST AND DURATION OF TRANSPORT BY SEA WITH DIFFERENT CRATE SIZES

	Kg of Grapes in Crate	Crates / Pallet	Number of Pallets	Gross Weight	Cost of Container	Cost Per Kg	High price	Cost Per Kg	Average Number of Days
JEDDA	5	115	20	11,500	\$ 3,872	\$ 0.34			4 to 8 days
	4.5	170	20	15,300		\$ 0.25			
	2.75	330	20	18,150		\$ 0.21			
	3	280	20	16,800		\$ 0.23			
	3.25	280	20	18,200		\$ 0.21			
DUBAI	5	115	20	11,500	\$ 3,670	\$ 0.32			17 days
	4.5	170	20	15,300		\$ 0.24			
	2.75	330	20	18,150		\$ 0.20			
	3	280	20	16,800		\$ 0.22			
	3.25	280	20	18,200		\$ 0.20			
PORT SUDAN	5	115	20	11,500	\$ 3,370	\$ 0.29			7.5 days
	4.5	170	20	15,300		\$ 0.22			
	2.75	330	20	18,150		\$ 0.19			
	3	280	20	16,800		\$ 0.20			
	3.25	280	20	18,200		\$ 0.19			
PORT SAID	5	115	20	11,500	\$ 1,870	\$ 0.16			2 days
	4.5	170	20	15,300		\$ 0.12			
	2.75	330	20	18,150		\$ 0.10			
	3	280	20	16,800		\$ 0.11			
	3.25	280	20	18,200		\$ 0.10			
HOLLAND	5	115	20	11,500	\$ 2,243	\$ 0.20	\$ 2,666		26.5 days
	4.5	170	20	15,300		\$ 0.15			
	2.75	330	20	18,150		\$ 0.12			
	3	280	20	16,800		\$ 0.13			
	3.25	280	20	18,200		\$ 0.12			
LONDON	5	115	20	11,500	\$ 2,336	\$ 0.20			26 days
	4.5	170	20	15,300		\$ 0.15			
	2.75	330	20	18,150		\$ 0.13			
	3	280	20	16,800		\$ 0.14			
	3.25	280	20	18,200		\$ 0.13			

FIGURE 36: COST AND DURATION OF TRANSPORT BY LAND WITH DIFFERENT CRATE SIZES

	Crates / Pallet	Number of Pallets	Gross Weight	Cost of Container	Cost Per Kg	HIGH Cost of Container	Cost Per Kg	Number of Days
JEDDA	115	26	14,950	\$ 4,450	\$ 0.30			7 to 10 days
	170	26	19,890		\$ 0.22			
	330	26	23,595		\$ 0.19			
	280	26	21,840		\$ 0.20			
	280	26	23,660		\$ 0.19			
DUBAI	115	26	14,950	\$ 4,600	\$ 0.31	\$ 5,040	\$ 0.34	10 days
	170	26	19,890		\$ 0.23		\$ 0.25	
	330	26	23,595		\$ 0.19		\$ 0.21	
	280	26	21,840		\$ 0.21		\$ 0.23	
	280	26	23,660		\$ 0.19		\$ 0.21	

ANNEX 7: BUSINESS ENABLING ENVIRONMENT MAP

