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LEBANON INDUSTRY VALUE CHAIN DEVELOPMENT (LIVCD) PROJECT

OLIVE VALUE CHAIN ASSESSMENT REPORT
DRAFT
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1. OVERVIEW

Olive production covers over 20 percent of agricultural land in Lebanon, and accounts for over seven percent of agricultural GDP. Olive production and processing occur in all regions of Lebanon, but are concentrated in the North and South. The vast majority of olive producers operate with very small plots of land- under five dunums, although there are also a small number of large scale tracts of olive trees. Many olive farms are not actually managed by the land owners, who often live in urban areas, but by specialists in olive production called "wood damans." Wood damans manage olive production and harvesting in return for payments in processed oil or cash to the landowners. Many of the larger plots of land cultivating olives belong to Monasteries or expatriates living abroad who have long-term relationships with wood damans.

Olive oil milling is conducted mainly by small-scale mills in the zones of production. These include both traditional mills and an increasing number of upgraded facilities using modern milling technology. The major differences between these types of mills is that traditional mills extract oil with hydraulic pressing that produce a cloudy, opaque oil that is in high demand in Lebanon, despite its lower quality (as determined by international norms), while modern mills use horizontal centrifuges to produce more transparent oil that results in superior performance in separating water and solid matter. Modern mills with their greater mechanization are also less labor intensive.

Lebanon's high cost of olive production has negative consequences for its competitiveness in international markets. To compensate for this constraint, Lebanon imports inexpensive oil from Syria, where the cost of production is much lower. Since the onset of the Syrian crisis in 2010, stakeholders have reported an unprecedented volume of Syrian oil imports flowing into the Lebanese market that is reducing the demand for Lebanese oil and placing downward pressure on prices in some market channels. This trend has profited bottlers, who mix lower priced Syrian oil with Lebanese oil to reduce costs and sell into both domestic and international markets. Lebanon does not impose any traceability or labeling requirements with regards to origin, making it easier to blend oil imported from abroad that may be lower quality. Lebanese producers benefit from high levels of protection, including a 70 percent tariff on European imports of olive oil which will remain in force until 2014. In addition, the country maintains free trade with Greater Arab Free Trade Agreement (GAFTA) countries. Lebanon exports over $7 million of olive oil, mostly to GCC countries and countries with a large Lebanese diaspora such as the U.S., Canada, and Australia.

The donor community has invested substantially in upgrading milling equipment within the olive value chain, and more recently, the MoA has been developing programs to improve technical extension and farmer registration. Despite these efforts, many farmers lack awareness of efficient olive production techniques. Systems for ensuring quality testing and traceability of oil are not widely available. In fact, Lebanese consumers do not have a high awareness of the main international olive oil quality standards or product origins, which minimizes the incentives for farmers and processors to improve their practices.

Despite the complexity of the olive oil value chain in Lebanon, there are a few meaningful ways LIVCD can engage with stakeholders to improve productivity and sales. LIVCD can work with bottlers and brands, both large scale and artisanal, to strengthen market linkages in key export markets, creating strategies to stimulate demand while also pushing more Lebanese olive oil into this high value channel. LIVCD can also create a new label or promote the use of existing origin labels and quality seals that are not being used, to increase returns to producers and processors of

high quality olive oil that is purely Lebanese. This will increase consumer confidence in bottled oil and support a price premium for Lebanese oil. With higher volumes of exports and a more robust domestic retail market for olive oil, producers and millers will be incentivized to improve practices and storage capacity, improving the overall quality and increasing sales throughout the value chain.

2. VISION FOR THE OLIVE VALUE CHAIN

LIVCD's intervention aims to increase the consumption and sales of Lebanese olive oil domestically and internationally through the adoption of new labeling schemes certifying quality and origin. Promotional and advertising campaigns will accompany the launch and usage of such labels—leading to improved market conditions that will raise the volume of Lebanese olive oil sold into both the domestic bottled and branded export market segments. This increase in demand for higher-quality Lebanese oil from commercial actors subject to international norms will strengthen vertical linkages between growers, mills, and bottlers. These linkages will be centered on improved milling and storage options, along with the creation of service centers to offer improved production techniques to farmers. Farmers will be able to sell their production surpluses into the growing higher priced market channel and benefit from the increased demand for Lebanese oil that meets international quality standards. Producers, both farmers and wood damans, who adopt the new productivity enhancing technologies will also benefit from an increase in revenues along with millers and bottlers.

3. END MARKET ANALYSIS

WORLD OLIVE OIL TRADE

World production of olive oil has been trending upward since 2000. In 2010, world production was just over 3.4 million tons. Over 70 percent of this oil was produced in the Mediterranean countries of Italy and Spain. Approximately half of all total olive oil production is traded internationally. In 2011 this was equivalent to over 1.5 million tons for a value of over $5.5 billion. Figure 1 below presents values, volumes, average price per ton, and world market share for the largest exporters and importers of olive oil. As shown in the figure, Spain is the largest exporter of olive oil, exporting over 70 percent of production to Italy, where it is branded, and re-exported at premium prices, largely to the United States. Other Mediterranean olive oil producers also export oil to high value western markets including the U.S., the EU, and Brazil. International flows of olive oil include pure, virgin, and extra virgin quality (see text box). Although olive oil is in many cases considered a commodity, as demonstrated by the example of Italian exports, there is potential to differentiate based on the reputation of the exporting country as a producer of high quality oil—which is mainly extra virgin. Although Lebanon produces at a much smaller scale than Italy or Spain, among Lebanese and other Arab consumers, Lebanon has a reputation for producing high quality artisanal oils. These are sold domestically and regionally in bulk packaging without formal classification according to the International Olive Oil Council (IOOC) grading system. Lebanon also exports bottled oil to these markets.

International Olive Oil Council: Qualities of Olive Oil

- **Extra Virgin**: zero defects. Acidity range less than 0.8g per 100g. Peroxide content less than 20
- **Virgin**: Acidity range between 0.8 and 2g per 100g, Peroxide content less than 20
- **Pure Olive Oil:** Blended, virgin and refined olive oil. Acidity range between 2 and 3.3g per 100g. Peroxide content less than 15*.
- **Refined Oil**: Acidity range between 0.3 and 2g per 100g. Peroxide content less than 5*.
- **Pomace Oil:** Extracted from olive husk after milling. Acidity range, up to 1g per 100g. Peroxide content less than 15. Inedible oil.

*Refined oils and oils blended with refined oil have a lower peroxide content due to the refining process.

FIGURE 1: GLOBAL TRADE IN OLIVE OIL

	Value US$ (millions)	Volume Tons	Price $USD per ton	Share of world market by value %
Exporters of Olive Oil in 2011				
World	$5,554,185	1,597,378	$3,477	100%
Spain	$2,562,420	842,451	$3,042	46.1%
Italy	$1,634,161	363,562	$4,495	29.4%
Greece	$310,743	86,814	$3,579	5.6%
Tunisia	$286,069	100,294	$2,852	5.2%
Importers of Olive Oil in 2011				
World	$5,870,632	1,750,307	3,354	100%
Italy	$1,624,601	583,968	2,782	33.4%
United States	$960,077	276,036	3,478	15.8%
France	$415,691	113,591	3,660	6.5%
Brazil	$286,323	62,920	4,551	3.6%

Source: Comtrade

LEBANESE OLIVE OIL IMPORTS AND EXPORTS

Lebanon is also a player in the international olive oil trade, although on a much smaller scale than the major exporters and importers. LIVCD estimates that Lebanon imported at least 4,000 tons while exporting just over 3,000 tons in 2011. It is important to note that according to stakeholders in the Lebanese olive oil value chain, imports from Syria are likely higher than the figures reported by Lebanese customs or other official sources, as high volumes of oil flow through unofficial trade channels. For example, with the onset of the Syrian crisis in 2010 official sources reported a fall in imports from Syria of over 20 percent from the previous year with occasional small increases. However, value chain stakeholders report that in 2011 and 2012 there has been a significant increase in the volume of Syrian oil flowing through informal channels. Imports of Syrian oil seem to have displaced imports from Tunisia in the past few years. See Annex 1 for more detail regarding imports from Syria. The official statistics noted in Figure 2 show a lower level of imports in 2011 (2,374 tons) that fall into two categories, low-value high-volume imports from Syria and Tunisia, and high-value low-volume imports from France and Italy. Syria plays a critical role in the Lebanese olive oil sector, with over 88 percent of olive oil imports to Lebanon originating from Syria.

FIGURE 2: LEBANON IMPORT TRADE INDICATORS

	Imported value 2011 ($USD thousand)	Share in Lebanon's imports (%)	Imported quantity 2011 (tons)	Unit value ($USD per ton)	Imported growth in value 2007-2011 (%)	Imported growth in quantity 2007-2011 (%)	Imported growth in value 2010-2011 (%)
World	$7,071	100%	2,374	$2,979	18%	16%	-23%
Syria	$5,320	75.2%	1,779	$2,990	9%	7%	-19%
Tunisia	$1,688	23.9%	566	$2,982	-	-	-33%
France	$24	0.3%	4	$6,000	-4%	-4%	100%
Italy	$24	0.3%	4	$6,000	3%	9%	-25%

Source: Comtrade

Most olive oil imports are in bulk for mixing by Lebanese bottlers/exporters. As noted above, Lebanese olive oil generally has extremely high costs of production combined with significant domestic demand, which limits its competitiveness in international markets. Typically, only international consumers who have a specific affinity for Lebanese products are willing to pay the market premium that pure Lebanese olive oil requires. To reduce the cost of Lebanese olive oil, bottlers/exporters mix Lebanese oil with imports mainly from Syria and Tunisia which are brought in without any tariffs under GAFTA that abolished tariffs on imported olive oil from Arab and regional countries in 2005. Producers who mix oil report that they try to engineer their product so that the specific flavor of Lebanese olive oil is the most dominant. With respect to international trade in olive oil, Lebanon occupies a role similar to that of Italy, albeit on a much smaller scale. Both countries are relatively high cost producers who import large quantities of oil from nearby lower-cost producers with whom they have favorable trade agreements. This imported oil may or may not be mixed with domestic oil, and is exported as a product that is "Bottled in Lebanon" or "Bottled in Italy." This strategy capitalizes on the specific demand for Lebanese olive oil which has a solid international reputation, especially in the Arab Gulf and other Middle East countries, by creating a product that is a mix of foreign and Lebanese oil,

though often made up entirely of foreign origin. The strategy is critical in lowering the costs of production to meet international market price levels.[1]

Exports of olive oil from Lebanon have grown considerably since 2006, increasing on average 15 percent in value each year. Despite this growth, Lebanese exports are dwarfed by imports from other Mediterranean countries, and does not capture market share greater than six percent in any of the largest export markets. As shown in Figure 3, the U.S. was the largest single importer of Lebanese olive oil in both volume and value, importing 1,053 tons valued at $4,358,000 in 2011. GCC and Arab countries including UAE, Kuwait, Egypt, and Oman also import substantial quantities of Lebanese olive oil, at prices that are significantly above the average export price per ton. With the exception of exports to Qatar, exports to GCC and Arab countries have been expanding the fastest since 2007 in terms of volume and value. For example, exports to Egypt have increased by 101 percent measured by value, while exports to UAE and Oman have both expanded by over 50 percent in value. Figure 3 provides additional information on the value of Lebanese exports to various market destinations.

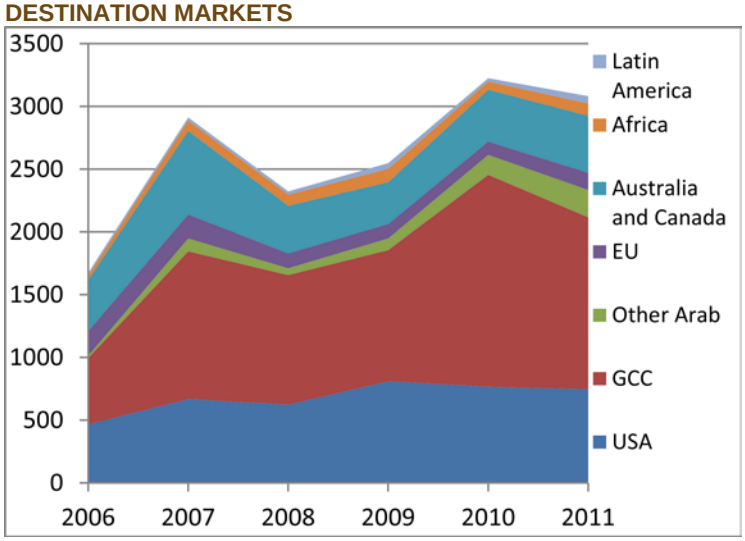
FIGURE 3: LEBANESE OLIVE OIL EXPORTS

	Exported value 2011 ($USD thousand)	Share in Lebanon's exports (%)	Exported quantity 2011 (tons)	Unit value ($USD per ton)	Exported growth in value 2007-2011 (%)	Exported growth in quantity 2007-2011 (%)	Exported growth in value 2010-2011 (%)
World	$13,480	100%	3,238	$4,163	9%	3%	1%
USA	$2,882	21.4%	747	$3,858	5%	4%	-4%
Kuwait	$2,509	18.6%	406	$6,180	20%	3%	57%
Saudi Arabia	$2,130	15.8%	473	$4,503	41%	17%	-45%
UAE	$1,101	8.2%	323	$3,409	9%	4%	41%
Canada	$971	7.2%	273	$3,557	-11%	-9%	-3%
Qatar	$672	5%	168	$4,000	8%	3%	66%
Australia	$515	3.8%	181	$2,845	2%	2%	-1%
Egypt	$399	3%	80	$4,988	84%	86%	94%

Source: Comtrade

[1] Due to the origin of the oil bottled locally it is important to remember that exports of olive oil from Lebanon are not the same thing as exports of Lebanese olive oil.

FIGURE 4: VOLUME OF LEBANESE EXPORTS AND REGIONAL DESTINATION MARKETS



Source: Comtrade

U.S. AND EU OLIVE OIL MARKET

The United States is the second largest olive oil importer in the world, importing over 276,000 tons in 2011 valued at $960 million and an average sales price of $3,478 per ton. American imports of olive oil shrank by two percent between 2007 and 2011 largely due to its weak domestic economy and the global recession, but started to rebound between 2010 and 2011, growing by six percent. Over half of all olive oil imports are Italian with an average sales price of $3,758 per ton, slightly above the average price of all imports. Spanish imports claim an additional 20 percent of total imports at an average price of $3,221 per ton. Other countries claim significantly smaller market shares. Although Lebanese imports shrank by five percent in value between 2007 and 2011, they rebounded with 15 percent growth between 2010 and 2011. Although it is a good sign that olive oil imports to the U.S. seem to be holding firm with a slightly increasing trend, the rate of growth is small compared to other Middle Eastern countries such as Morocco and Israel, that saw huge growth to the US, growing by 118 and 119 percent respectively. In contrast, imports from Turkey shrank by 34 percent in value since 2007, and continued to decline by 77 percent between 2010 and 2011.

FIGURE 5: USA OLIVE OIL IMPORT TRADE INDICATORS

Country and rank by value	Imported value 2011 ($USD thousand)	Share in United States of America's imports (%)	Imported quantity 2011 (tons)	Unit value ($USD per ton)	Imported growth in value 2007-2011 (%)	Imported growth in quantity 2007-2011 (%)	Imported growth in value 2010-2011 (%)
Total	$960,077	100%	276,036	$3,478	-2%	2%	6%
Italy (1)	$529,459	55.1%	140,886	$3,758	-5%	-1%	5%
Spain (2)	$197,968	20.6%	61,470	$3,221	4%	9%	-7%
Tunisia (3)	$75,830	7.9%	24,116	$3,144	0%	4%	-9%
Morocco (4)	$62,987	6.6%	23,678	$2,660	70%	81%	118%
Argentina (5)	$33,795	3.5%	11,613	$2,910	-6%	-2%	215%
Turkey (10)	$4,546	0.5%	1,105	$4,114	-34%	-35%	-77%
Lebanon (11)	$3,188	0.3%	838	$3,804	-5%	-6%	15%
Israel (12)	$2,935	0.3%	395	$7,430	4%	-4%	109%
Jordan (14)	$1,138	0.1%	119	$9,563	80%	46%	1,829%
Mexico (16)	$745	0.1%	241	$3,091	-17%	-17%	868%
Syria (17)	$526	0.1%	124	$4,242	-33%	-37%	-34%

Source: Comtrade

In general, the American olive oil market is price competitive with well-established commercial brands claiming a large proportion of mainstream retail shelf space. The price of Lebanese olive oil is high compared to similar imported artisan and high quality products. Due to the intense competition, Lebanese olive oil is imported predominantly for sale in ethnic markets, where consumers, especially the Lebanese diaspora, will support a price premium for oil that is (or is perceived to be) from Lebanon.

Lebanese olive oil exports to the United States are often small volume transactions arranged through personal trade contacts established by Lebanese expatriates. For example, working in collaboration with a Lebanese NGO, Mr. Farid Rebeiz, a Lebanese American living in the United States imported 8,000 liters of extra virgin olive oil to the United States between 2010 and 2011. Oil was imported in 16 kilogram tins, and bottled in the United States under the label, "Corners of Time." Sales were made through a website built specifically for niche Lebanese brands, which are sold in Corners of Time gift boxes.

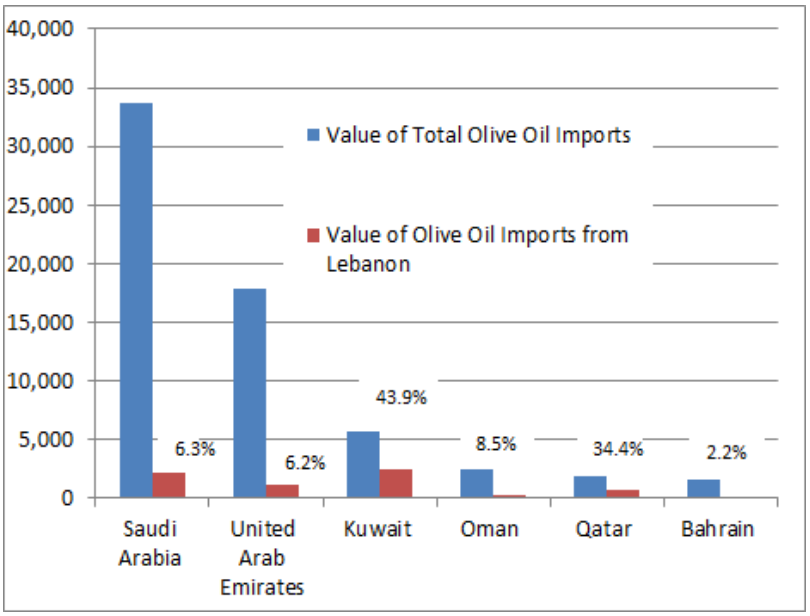
Lebanese olive oil is exported to the US in both bulk and retail sizes. Bulk exports are sent mainly in 16.5 kg tins that may be used in the restaurant trade or for repacking and mixing by the importer. Retail oil is sold in bottles ranging from 250 ml to 3 liters. These bottles have either Lebanese brands or the brand of the importer, specifying that it was bottled in Lebanon. Exports are sent mainly to ethnic importers in either whole containers or mixed containers with other products. Exports to Canada and European countries mirror those to the U.S. in that transactions typically involve a Lebanese importer who sells to members of the Lebanese diaspora. Exports to the EU are much smaller than to the US and Canada because of more stringent export regulations and tougher competition with oil from Spain and Italy.

UAE AND OTHER ARAB COUNTRY OLIVE OIL IMPORT MARKETS

In 2011, Arab countries imported a total value of over $63.5 million of olive oil. Although the U.S. is the largest single importer of Lebanese olive oil, at an aggregate level GCC and other

Arab countries import the highest volume of Lebanese olive oil. As seen below in Figure 6, Lebanese market share in each GCC country market varies between 43.9 percent in Kuwait to 2.2 percent in Bahrain. This suggests that Lebanon's potential to expand varies considerably in each market, with higher potential in larger markets such as Saudi Arabia and UAE, where Lebanon's market share is fairly low, and less opportunity in Kuwait and Qatar, where overall market size is smaller, and Lebanon already claims a significant portion. Oman and Bahrain have relatively small total markets, though Lebanon's small market share conceivably leaves room for expansion.

FIGURE 6: LEBANESE MARKET SHARE IN GCC COUNTRIES



Source: Comtrade

The UAE is the largest importer of Lebanese olive oil in the GCC and its market structure is similar to other GCC countries. As shown in Figure 7, in 2011, UAE imported a total 4,166 tons of olive oil valued at $17.9 million. Spain, Italy, and Tunisia dominate UAE olive oil imports, each claiming between 20 and 30 percent of imports by value, while Lebanon claims only 6.2 percent. Imports from Spain, Italy, and Tunisia claim slightly higher prices, above the average price of $4,290 per ton. Although imports of olive oil from Arab countries including Tunisia, Turkey, and Jordan declined between 2010 and 2011, olive oil imports from Lebanon increased by over 40 percent. The average price of Lebanese oil being exported to UAE is also considerably below the average price of olive oil imports, suggesting that product shipped from Lebanon is relatively competitive in terms of price, though it may be perceived as lower quality. As mentioned above, it is likely that this oil is a blend of Lebanese and Syrian oil. A large part of Lebanese exports to the region consists of private labels of retailer brands, including international supermarket chains. These tend to have very low transaction prices.

FIGURE 7: UAE OLIVE OIL TRADE INDICATORS

	Imported value 2011 ($USD thousand)	Share in UAE's imports (%)	Imported quantity 2011	Unit value ($USD per ton)	Imported growth in value 2007-2011 (%)	Imported growth in quantity 2007-2011 (%)	Imported growth in value 2010-2011 (%)
Total	$17,874	100%	4,166	$4,290	10%	12%	11%
Spain (1)	$5,280	29.5%	1,141	$4,628	15%	19%	31%
Italy (2)	$3,721	20.8%	766	$4,858	16%	23%	70%
Tunisia (3)	$3,609	20.2%	796	$4,534	15%	19%	-13%
Turkey (4)	$2,899	16.2%	840	$3,451	05	3%	-9%
Lebanon (5)	$1,101	6.2%	323	$3,409	9%	4%	41%
Greece (6)	$555	3.1%	129	$4,302	30%	41%	55%
Jordan (7)	$242	1.4%	80	$3,025	-14%	-17%	-77%
United Kingdom (8)	$161	0.9%	30	$5,367	81%	109%	243%
France (10)	$121	0.7%	17	$7,118	-8%	-8%	11%

Source: Comtrade

In the past, significant volumes of Lebanese olive oil were exported through unofficial channels to GCC countries, although recently unofficial exports have diminished. In interviews, respondents reported that unofficial exports were household products, thus they most likely consisted of unbranded tins of oil sent via passenger buses to wholesalers in the various GCC countries in order to circumvent reporting to customs or paying required duties. As Lebanon has increasingly tightened its borders and enforcement of trade regulations, and as the Syrian crisis has led to reduced overland traffic to GCC countries, this trade channel has been cut off, and more oil is flowing through official trade channels.

Key Import and Export Market Characteristics and Trends

- Lebanon imports large quantities of oil from Syria through formal and informal channels. Since the onset of the crisis in Syria, exceptionally high volumes of Syrian oil have been coming through unofficial channels into the Lebanese market.
- Lebanese oil is expensive. However, overall export numbers show that oil shipped from Lebanon is surprisingly competitive in GCC and other Arab export markets. A factor contributing to this competitiveness is the ability of Lebanese exporters to mix expensive Lebanese oil with inexpensive oil from Syria as well as refined oil that is derived from cheap non-comestible Lebanese lampante oil. Stakeholder interviews indicate that Syrian oil flows are continuing to increase into Lebanon with the deepening of the crisis.
- Exports to Arab countries are expanding slowly but steadily with more oil flowing through formal trade channels, while informal channels are diminishing. There has been a reduction in unbranded oil exports which have been a staple in the GCC markets. Lebanese and other Arab expatriates in the GCC are willing to pay higher prices to get “authentic” Lebanese product through informal channels.

LEBANESE DOMESTIC MARKET

Consumption of olive oil in Lebanon is relatively low compared to other countries in the region that produce olives. While consumption of olive oil per capita is about 4.3 liters in Lebanon, it is double and quadruple that in Greece and Syria, where consumption is 10 and 20 liters per capita respectively.

FIGURE 8: OLIVE OIL CONSUMPTION

		Volumes
Lebanon	Production	20,000 tons
	Imports	2,374 tons
	Exports	3,238 tons
	Consumption per capita	4.3 liters
	Greek consumption per capita	10 liters
	Italian consumption per capita	20 liters

Source: FAOStat, Comtrade

The domestic market for olive oil in Lebanon is serviced predominantly by Lebanese oil, much of which is sold at premium prices directly from the producer to the consumer. Lebanese consumers have a distinct preference for locally produced oil, and tend to buy olive oil in bulk from trusted family or neighbors with whom they have an established relationship. In general, Lebanese consumers care little about formal standards and do not distinguish between extra virgin, virgin, and pure olive oil. Rather, the key factor most consumers look for is a "trusted" and "authentic" rural connection, which is most often guaranteed by family or a personal relationship with the farmer or, failing that, with a particular olive mill. Taste preferences are somewhat different from international norms, as the majority of consumers are unaccustomed to the more 'peppery' taste of the better quality extra virgin oils, and prefer a sweeter taste that is often characteristic of older oils with a higher acidity.

Olive oil is also available in branded bottles in retail outlets, although it is unclear to what extent this segment is growing or shrinking. A small sample of retail data suggests that total value and units sold of bottled oil has declined significantly since 2008, although two large olive oil bottlers reported to LIVCD that sales are increasing. The amount of domestically milled oil flowing to the branded/bottled segment of the market varies from year to year. In years with high levels of production, farmers are more willing to sell oil at reasonable prices, so bottlers will source higher volumes of oil domestically. In lower production years, farmers ask for very high prices, and prefer to store their olive oil until prices rise later in the year. Unfortunately, many farmers do not have adequate storage infrastructure or capability, which results in the oil deteriorating. By the following August or September, farmers must sell off surplus oil to make room for new stocks, and are forced to sell stocks of oil to bottlers at lower prices in August, when they are desperate to move the product and have limited bargaining power. The high levels of Syrian imports are, however, reducing the demand for oil on the part of bottlers later in the season.

Key Domestic Market Characteristics and Trends

- Strong preference for and willingness to pay premium prices for Lebanese olive oil purchased directly from farmers or mills, where consumers can be sure they are getting real oil sourced close to the farm.
- Increased flow of unreported inexpensive olives and olive oil from Syria and likely blending of oils.
- Low per capita consumption compared to other regional olive oil producers such as Greece and Syria.

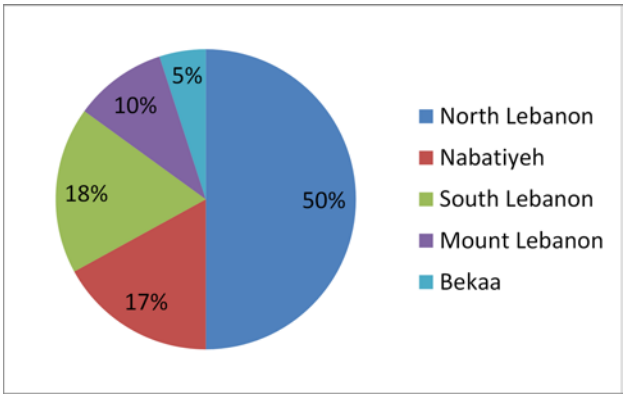
4. PRODUCTION AND PROCESSING

Production of olives in Lebanon has been rising steadily since 2007 despite alternating productive and unproductive years with widely varying yields. Lebanon produced just over 81,000 tons of olives in 2010. Processing olives into olive oil adds considerable value to the crop. In 2010, Lebanon produced 14,000 tons of olive oil for a value of approximately $60 million[2]. Byproducts of olive oil production include pomace, biofuel, and soap.

PRODUCTION AREA

Olive production accounts for approximately seven percent of the value of agricultural production in Lebanon, and covers over 20 percent of cultivated agricultural land, with an estimated 55,000 Hectares in 2010. As show in Figure 9, North Lebanon, especially the cazas of Akkar, Koura, and Zgharta claim over 50 percent of olive cultivation, followed by Nabatiyeh and South Lebanon with 17 and 18 percent of total land use. Mount Lebanon and the Bekaa lag well behind. Recent expansion of olive cultivation in west-Bekaa and Hermel in north Bekaa, is not captured in these data, but could increase the relative importance of Bekaa as an olive growing region.

FIGURE 9: DISTRIBUTION OF LAND USED FOR OLIVE CULTIVATION



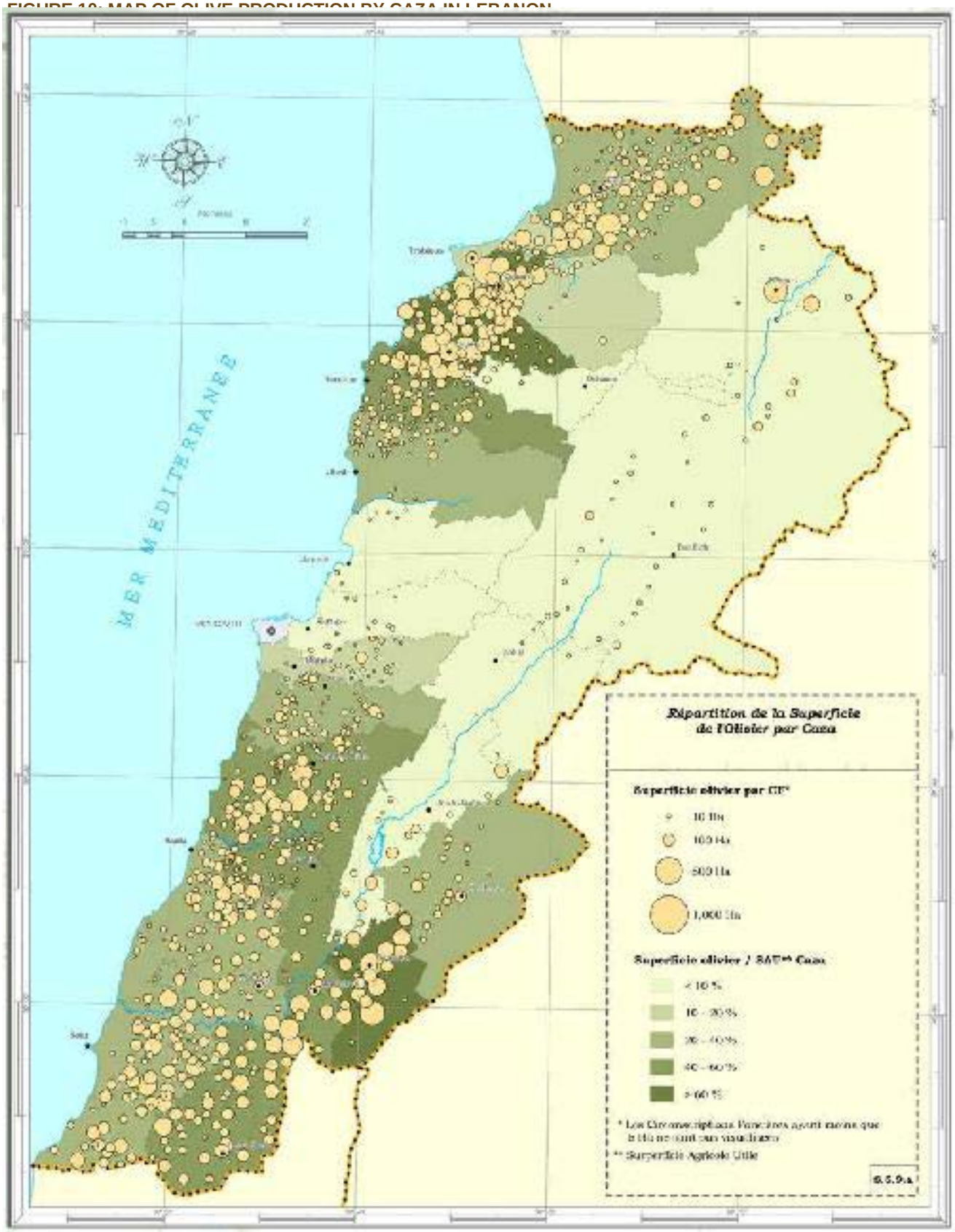
Source: MoA, 2010

The vast majority of olive farms- over 75 percent- are under five dunums. An additional 14 percent of farms are between six and 10 dunums, and the remaining 10 percent are farms that are greater than 10 dunums in size. In terms of olive output approximately 58 percent of olive production is generated on large scale farms, with 22 percent of total olive production generated on medium sized farms, and the remaining 20 percent on small sized farms[3].

[2] This value was calculated by adding 5,250 tons of oil sold directly to households at an average sales price of $5.45 per kg to the value of the 10,150 tons of domestically produced oil sold through the retail channel at an average price of $3 per kg.

[3] Lebanon 2010 Census Data (unpublished)

FIGURE 10: MAP OF OLIVE PRODUCTION BY CAZA IN LEBANON



VARIETIES AND PRODUCTIVITY

There are about ten olive varieties grown in Lebanon. Sourani is the most prevalent variety in the North, and the Baladi variety, which is very similar to Sourani, is the most popular in the South. Other varieties include Samakmaki, Ayrouni, and Chami, which are distinct in terms of shape, color, and the taste produced. Stakeholders in the olive oil value chain report that many farmers are unsure of the variety of olive they produce, and that many orchards are of mixed varieties. Stakeholders reported that the Ayrouni variety has a lower conversion rate into olive oil. Lebanese varieties produce high quality, flavorful oil. Growers and millers agree that most varieties used in Lebanon are not ideal for use as table olives due to their small size.

Productivity of olive trees in Lebanon is estimated between 1.4 and 1.7 tons per hectare. Factors affecting productivity include the age of the tree, agricultural practices, and climatic conditions. In Lebanon, according to the last agriculture census of 2000, 36 percent of trees are over 50 years old, 56 percent of trees are between five and 50 years old, and 8 percent are less than five years old. In some regions of Lebanon, 500 year old trees still exist, and have been maintained productivity by utilizing grafting and pruning. Newly planted olive trees usually need 10-15 years to become fully productive. In Lebanon over 85 percent of the existing orchards are rain fed and therefore require minimal maintenance.

PRODUCTION TECHNIQUES AND COST

For the purposes of this assessment, the LIVCD team has divided olive farmers into three categories based on farm size. Similar to production of other agricultural crops, the technical capacity of farmers tends to decrease with the scale of farming, as smaller farmers typically have less expertise and less investment capital. Figure 11 describes traditional minimal investment olive farming practices which are used by small scale farmers and the Lebanese best practices that are used by large-scale growers. Consistent with stakeholder interviews and data collected, the model shown in Figure 11 assumes that large scale farmers are using conventional “best practices”, while small-scale farmers use traditional practices that minimize short term investment. Medium-scale growers use a combination of these practices depending on their situation.

As seen below, a farmer using minimal investment practices will prune trees and apply manure once every three years with no chemical spraying or weeding. These farmers will till the land twice a season to reduce the number of weeds growing, though they do not remove weeds. (Although small and large-scale farmers alike use tillage, there is an emerging consensus among technical experts that tillage damages the shallow roots of olive trees and should not be used in olive farming.) Minimal-investment farmers use manual harvesting techniques such as beating olives off the trees with sticks, and packing them into sacks. Beating the trees breaks branches and reduces the amount of buds the following season, resulting in lower yields. Harvesting olives into 20-25 kg sacks causes significant crushing of olives, especially when sacks are stacked for transport. This situation causes spoilage and reduces the oil quality.

Farmers that use common best practices in olive growing prune and apply manure every two years. These farmers also spray pesticides and fungicides in two year intervals. Tillage is done twice a season with additional weeding to ensure that weeds are completely removed. Although hand picking causes the least amount of damage to the trees, it is very labor intensive and expensive. Instead, farmers use harvesting machines and powered tools to shake olives off trees, causing minimal damage to the branches. Olives are packed in 15 kg and 25 kg plastic crates that provide better protection than sacks. The crates are easily stacked for transport.

FIGURE 11: OLIVE GROWING PRACTICES: MINIMAL INVESTMENT AND LEBANESE BEST PRACTICES

Activity	Minimal Investment /Traditional Practice	Common Best Practice *
Pruning	Three year intervals	Two year intervals
Manure application	Three year intervals	Two year intervals
Chemical spraying	Not Applied	Pesticide and fungicide are applied on two year intervals
Tillage	Two times annually	Two times annually
Weeding	No	Yes
Harvesting	Manual harvesting into sacks	Harvesting machine or clamping tools that shake olives off trees without damaging the branches. Olives are put into crates that allow them to be stacked without damaging the olives.

*Lebanese best practices cannot be considered industry best practices because of the widespread use of tillage.

Figure 12 below provides average costs of production for small, medium, and large scale olive growers based on traditional practices for small scale farmers, common best practices for large-scale farmers, and a combination of the two for medium-scale farmers. For detailed notes on each line item and practice, see Annex 2.

Based on this model, small scale farmers spend $117 per dunum on tree maintenance activities (not counting agricultural inputs), which is more than medium or large scale farmers who spend $90 and $66 respectively. The discrepancy is largely due to the high cost of manual harvesting versus harvesting using a machine or specialized power tool. Small scale farmers spend significantly less on agricultural inputs because they do not use pesticides. Large-scale farmers have lowered costs of production because they own mechanized assets such as harvesting machines and trucks for transportation. They also take advantage of economies of scale in purchasing. Overall, the cost of production per dunum is $136.83 for small-scale farmers, $198.25 for medium-scale farmers, and $168.88 for large-scale farmers. Farming practices affect yields, with small scale farmers achieving the lowest yields and large scale farmers achieving the highest yields. Unit cost of production of olive oil is $4.56 per kg for small-scale farmers, $3.97 per kg for medium-scale farmers, and $2.81 per kg for large-scale farmers.

FIGURE 12: COST OF PRODUCTION PER DUNUM FOR SMALL, MEDIUM, AND LARGE SCALE FARMERS

			Small-Scale Producer (5 dunums)			Medium-Scale Producer (50 dunums)			Large-Scale Producer (100 dunums)		
	Action	**Unit**	**Qty per year**	**Cost per Unit $**	**Total cost $**	**Qty. per year**	**Cost per unit $**	**Total cost $**	**Qty per year**	**Cost per unit $**	**Total cost $**
Activities	Pruning	Worker	0.33	33	$11.00	0.25	33	$8.25	0.25	33	$8.25
	Fertilizer application (Manure)	worker	0.07	20	$1.33	0.05	20	$1.00	0.05	20	$1.00
	Fertilizer application (Chemical)	Worker	0	0	$0.00	0.05	20	$1.00	0.05	20	$1.00
	Weeding	Worker	0	0	$0.00	0	0	$0.00	0	0	$0.00
	Tillage	Tractor Hour	2	20	$40.00	2	17	$34.00	2	10	$20.00
	Irrigation		0	0	$0.00	0	0	$0.00	0	0	$0.00
	Harvesting	Worker	2.5	25	$62.50	1.5	20	$30.00	1.25	20	$25.00
	Harvester machine	Day/ Work	0	0	$0.00	0.5	10	$5.00	0.25	15	$3.75
	Transportation to mill	vehicle (car or truck)	1	2	$2.00	0.25	20	$5.00	0.125	15	$1.88
	Pesticide spraying	Worker	0	0	$0.00	0.2	30	$6.00	0.2	30	$6.00
Total					***$116.83***			***$90.25***			***$66.88***
Inputs	Animal manure	Bag	10	2	$20.00	15	1.9	$28.50	15	1.8	$27.00
	Fertilizers	Kg	0	0	$0.00	0.5	115	$57.50	0.5	110	$55.00
	Pesticides insecticide and fungicide	Kg	0	0	$0.00	1	22	$22.00	1	20	$20.00
	Water	m^3	0	0	$0.00	0	0	$0.00	0	0	$0.00
Total					***$20.00***			***$108.00***			***$102.00***
Total Cost of Production per dunum					**$136.83**			**$198.25**			**$168.88**
Estimated olive production per dunum (kg)					150			250			300
Estimated olive oil production per dunum (kg)					30			50			60
Cost of Production per kg of olive oil					**$4.56**			**$3.97**			**$2.81**

Source: Information provided directly from mills

PROCESSING

FINAL PRODUCTS: Olives are processed into oil and a variety of other products at olive mills. Major categories of olive oil include extra virgin olive oil (EVOO), virgin olive oil (VOO), olive oil, refined oil, and pomace oil. These categories are differentiated according to the level of acidity, peroxide, and a few other factors described in Figure 13 below. Oleic acid expression, peroxide levels, and coefficient of absorbency all indicate different aspects of fatty acid content, freshness, and potential shelf life of the oil. Extra virgin olive oil is also subject to certain organoleptic (flavor and smell) standards, and can be described as having a "peppery" flavor that is due to low acidity and high antioxidants. As olive oil ages it becomes more mild or "sweet."

FIGURE 13: OILS DERIVED FROM OLIVES

	Origin	Oleic Acid Expression	Peroxide	Coefficient of absorbency under UV270nm	Transfat Content (C18:1 T
Extra Virgin Olive Oil	Oils derived from olives using only mechanical processes- no solvents. Extra virgin olive oil has more stringent quality requirements.	<0.8g/100g	< 20	<.22	0.0-0.5
Virgin Olive Oil		0.8<2.0g/100g	< 20	<.25	0.0-0.6
Olive Oil	Blended virgin and refined olive oil	2.0<3.3g/100g	< 0.90	<.30	0.0-0.20
Refined Olive Oil	Oil obtained from low quality virgin olive oil through refining process	2.0<0.3g/100g	< 5	<1.10	0.0-0.21
Olive Pomace Oil	Oil derived from treating the olive pomace with solvents to extract remaining oils. This oil is unfit for eating.	1.0g/100g	<15	<1.70	0.0-0.4

Source: Codex Standards

Farmers and mills will sort olives into two or three of the categories described below in table 14. Farmers always sort out low quality blemished olives that are unfit for processing. Depending on the facilities at the mill, some farmers or millers will also sort olives separating the highest quality (largest) olives as table olives that are typically pickled and sold at a market premium while using the remainder for olive oil. Sorting is mainly done by farmers themselves, although in some cases mills are offering such service for free. Commercial olive bottler/millers working through daman buyers will often assess the quality of a particular farmer's olives while they are still on the tree, and if the quality is high, they will offer to purchase the lot and sort it. A farmer using the common best practices will yield a higher ratio of table-quality olives.

FIGURE 14: OLIVE QUALITY CATEGORIES

	Average Ratio of Yield	Size/Quality	Price/Kg
Table Olives	10%	20 mm or greater	$2.00
Processing	80%	under 20 mm	$0.80-$1.20
Deteriorated	10%	blemished and deteriorated	N/A

Source: Field Interviews

Several factors determine the quality of olive oil including the climate, production practices, harvesting practices, and the length of delay between harvesting and milling. The time between harvesting and milling is perhaps the most sensitive as olives begin to deteriorate immediately after they are harvested. Olives should be milled no later than 48 hours after harvesting, and protected from bruising, which quickens oxidation of the fruit.

Milling Process and Practices:

In Lebanon, there are two types of olive mills, traditional mills and modern mills. Figure 15 presents the basic differences in milling processes between a traditional and modern mill. There is significant variation within traditional and modern mill categories as each piece of equipment can be upgraded independently. For example, some traditional mills have upgraded certain pieces of equipment, such as the basin that holds olives as they are crushed with stainless steel crushers, even though most traditional mills are not equipped with stainless steel. Modern mills produce a higher quality product because the oil will have higher levels of polyphenols, natural anti-oxidants with beneficial health effects which retard oxidation and maintain the flavor. Modern mills also extract more oil and produce pomace with a lower oil content estimated to be between one and five percent against eight and 15 percent in traditional mills. This lower oil content results in pomace logs that give superior performance and fewer disagreeable odors when burned for heat.

FIGURE 15: TRADITIONAL AND MODERN MILLING PRACTICES

Process	Typical Traditional Mill	Typical Modern Mill
Receiving olives	Depending on how well the mill is managed, farmers make appointments or simply bring olives to the mills. Olives wait in line in piled sacks or stacked crates.	
Sorting and Leaf Removal	All mills sort out deteriorated olives that are not suitable for milling. In addition, some traditional and modern mills offer sorting services to separate table-quality olives by size and color. There are various degrees of automation available for sorting, with some operations using only hand sorting on a conveyor belt, while others use mechanical sorting, and a very small number use very modern light-sensor sorting.	
Removal of leaves and washing of olives	Olives go through a coarse strainer to remove leaves and twigs, and fall onto a conveyor belt that passes through an air blower for leaf removal, and then dumps them into a washing basin.	
Crushing olives	Olives are fed directly into a basin with a vertically mounted granite wheel that crushes olives for approximately 30 minutes into a coarse paste.	Olives are fed into an automated grinding chute. (This is not a key criteria of modern mills, and many modern mills still use the traditional granite wheel to crush olives)
Malaxation	Olive paste is transferred into a tub outfitted with either a steel kneader or a wooden paddle. The paste is stirred another 30 minutes to separate water from the emulsion. Warm water can be used to facilitate this process. Some very old mills do not have a malaxer.	
Pressing	A machine spreads the thickened olive paste onto round "fiscoli" pads that are stacked onto a large press. A steel plate is placed between every five pads. Over a period of about 45 minutes, olive paste is pressed to extract oil.	Olive paste is transferred to a horizontal centrifuge that separates oil from water. Separation is either completed in two or three phases. Two phase centrifuges separate olive oil from the water and pomace mixture, and the oil is ready to be used, while three phase centrifuges separate pomace from the olive oil and water mixture.
Separating water from oil	Oil is either placed into a centrifuge and mixed with additional water to separate oil from water, or placed in sedimentation tanks where remaining solids and water are precipitated out of oil.	In the case of three phase separation, oil passes through a centrifuge with additional water, which separates remaining water from oil.
Cleaning oil in storage	Over time, organic matter will precipitate from oil. In cases where oil is stored in large cylindrical tanks, the owner of the oil can open a valve at the bottom to release precipitate matter. This improves the quality and shelf life of the oil.	
Pomace processing	Pomace is cleaned off the fiscoli pads and treated as waste or processed into pomace logs.	In some cases, modern mills may have a final centrifuge to remove oil from remaining pomace. This oil is called second extraction oil, and is typically of a lower quality. Pomace is either discarded or processed into pomace logs.

Source: LIVCD field interviews

Oil Yield:

The conversion rate of olives to olive oil varies depending on the quality of olives and the milling process. The average yield for olive oil in Lebanon is 22 percent, although it can range from as low as 10 percent and reach as high as 35 percent. Most of the variability is due to the quality of the olives, which is determined by the weather during the season, the variety,

production practices, and time between harvest and milling as described above. Additionally, as a rule of thumb olives harvested in October and November produce higher yields than those harvested earlier or later in the season. The milling process also affects yields, as modern mills extract between eight and 12 percent more oil from the olives at each stage, including oil that must be refined, and pomace oil.

Cost of Olive Milling

The main cost components of olive milling include the cost of olives and their transportation to the mill, the cost of labor, water, electricity, fuel, maintenance, rent or cost of land, and the depreciation of machinery. Each category of expense varies depending on the type of mill. Figure 16 below presents the costs of milling for a traditional mill and two modern mills as presented in the Ministry of Environment and the UNDP (MoE) studies of 2005 and 2008. Figures for cost of production in specific mills were reported to LIVCD by mill owners. Although mills generate revenue in multiple ways (milling service fees, sales of oil and other by-products), in order to compare costs and profitability of mills, this model assumes that the mills purchase olives at an average price of $0.80 per kg, and sell oil at an average price of $100 per 16.5 Kg tin, which is reasonable if oil is being sold directly to households.

FIGURE 16: OPERATIONAL COST OF MODERN AND TRADITIONAL OLIVE MILLING

(ALL COSTS PER TON OF OIL, 2012)

	Type of Cost	Traditional/ Deir Mimas Coop-South	Modern/Olive Trade-Akkar	Modern/ Paul Khoury-North	Modern Cost per ton from MoE/UNDP study In 2005	Modern Cost per ton from MoE/UNDP study In 2008
	Scale of Processing (tons of olives per season	**330 tons**	**600 tons**	**800 tons**	-	-
Operational Costs	Water	$1.21	$1.11	$3.09	$7.45	$14.48
	Diesel	$96.97	$58.33	$20.83	$35.75	$36.45
	Electricity	$0.61	$1.11	$7.41	$30.45	$39.15
	Labor	$161.82	$50.00	$21.60	$219.65	$150.70
	Rent and maintenance	$29.09	$19.44	$18.52	$67.45	$21.50
	Total Operational Cost per Ton	**$289.70**	**$130.00**	**$71.45**	**$360.75**	**$262.28**
Cost of Olives	Conversions rate	16%*	20%	27%	*22%***	*22%***
	Olives milled to produce 1 ton of oil	6.25 tons	5.00 tons	3.70 tons	4.5 tons	4.5 tons
	Cost of Olives	$5,000.00	$4,000.00	$2,962.96	$3,636.36	$3,636.36
	Total Cost	**$5,289.70**	**$4,130.00**	**$3,034.41**	**$3,997.11**	**$3,898.64**
	Revenue at $100 per 16.5 kg tin	$6,100.00	$6,100.00	$6,100.00	$6,060.61	$6,060.61
	Profit per ton of oil	**$810.30**	**$1,970.00**	**$3,065.59**	**$2,063.49**	**$2,161.96**

Source: Information collected directly from farmers

*The conversion rate in Deir Mimas of 16 percent was exceptionally low, because of drought at harvesting time.

** A 22 percent conversion rate, which is the average rate for milling in Lebanon, was applied to the LOE/UNDP figures to calculate illustrative revenues and profit.

As shown in Figure 16, the traditional mill is significantly more costly than the modern mills, and processes about half as many olives per season. Diesel and labor costs are also much higher for traditional milling. In the case of diesel fuel, this is likely because traditional mills tend to be in more rural locations than modern mills, where extended power cuts are more common. Traditional mills are less automated than modern mills, so must employ three to six times as many laborers. The difference between the cost build-up of the two modern mills is due to different ratios of diesel versus electricity use and labor costs. The larger scale has slightly more automated infrastructure, which reduces labor costs and increases conversion of olives to oil. Olives are the most expensive cost of oil processing, and the conversion rate of olives to olive oil impacts profitability much more that operational costs.

The average costs of production presented by the MOE and UNDP studies resemble costs reported by the traditional mill. These studies reveal a significant drop in the cost of labor

between 2005 and 2008, which suggests that on average, mills operated with a higher level of automation in 2008. Other increases in costs are consistent with normal rising costs of diesel and electricity.

TABLE OLIVES

Table olive processing involves cracking the olives, storing the olives in fermentation drums for about a month, and packing the olives into jars or large plastic buckets. Depending on the type of olive, processors can add lemon, vinegar, or other flavors to the brine. Pasteurizing the containers and increasing the salt content helps extend the shelf life of table olives. The cost of olive production is mainly labor, salt, and packaging.

OLIVE OIL EXTRACTION BY-PRODUCTS

Husk or pomace coming out of olive oil extraction is usually used for fuel and in some cases as compost. Depending on the method of extraction whether traditional or centrifugal, the quantity of oil contained inside the husk varies between one and six percent. The price of pomace falls as oil content increases. After drying off the pomace, it is processed and compacted by a simple machine into logs that are approximately 10 centimeters in diameter and 30 cm in length, although these measurements can vary. Pomace logs can be utilized for lighting chimneys and heaters and are sold wholesale for about $150 per mt and sometimes more, versus $20-$30 per ton of pomace in bulk.

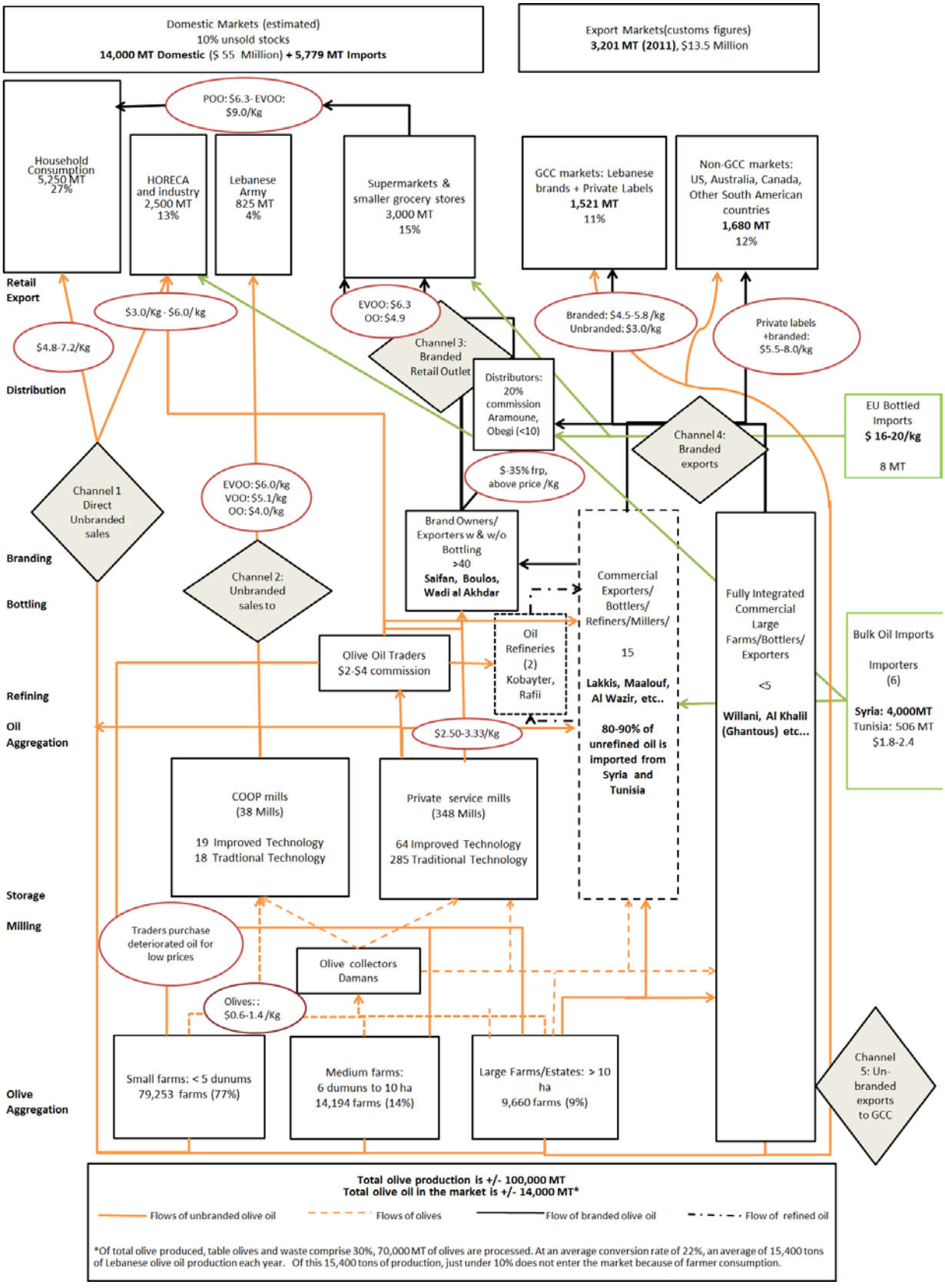
5. STAKEHOLDER ANALYSIS

The olive value chain is one of the most complex value chains in Lebanon. Like many agricultural value chains it has many small production units; however, it also has a layer of many small primary processors, such as mills, who produce olive oil, as well as a variety of both small and large commercial actors who may combine production and milling with refining of lower quality oils, as well as bottling and export. Cooperatives have also been created and funded, mainly by donor projects, to fill many of these functions. The complexity of the olive value chain in part reflects a simple physical fact: olives need to be milled soon after harvesting to ensure superior extra virgin quality. Given the large and widely scattered areas with multiple small production units, there is a corresponding need for an extensive network of decentralized olive oil mills close to producers. The large presence of commercial players also reflects the fact that olives are the largest processed agricultural product value chain in Lebanon—attracting the interest of commercial processors, traders, distributors, and exporters.

Figure 17 below gives a schematic overview of the olive value chain—focusing narrowly on the olive oil segment.[4] The section below describes the main actors at each level of the value chain and the associated service providers. Also, the main value chain segments and market channels are described, including a discussion of the value chain governance relationships that prevail in each segment.

[4] Although table olives are important to the olive sector as a whole, approximately 30 percent of total olive production volume, we have focused our analysis more narrowly on the olive oil value chain, since this is the main motor for the olive industry as a whole (with the majority of total end market value), is the source of most lost value added due to problems of unsold production and quality deterioration, and is the most closely linked to international markets with important dynamic challenges and opportunities that warrant in-depth analysis.

FIGURE 17: OLIVE VALUE CHAIN MAP



The different actors are described below by level in the value chain:

PRODUCTION

SMALL GROWERS These actors usually manage olive orchards of five dunums or less. MOA figures from the 2010 census indicate that there are about 80,000 farmers in this category who constitute 77 percent of all olive producers. These types of producers usually work on land they own and farm personally—most often next to their homes. These growers do not always follow the best production and orchard management practices; they follow traditional practices listed in section 4. Standard yields for good years are approximately 150 kg of olives per dunum (if the orchard is mature, at least ten years old) that convert into 30 kg of oil or about two total 15 kg tins per dunum. The oil produced by small farmers is usually consumed by the household and sometimes distributed to friends. In some cases, excess oil is sold to mills or other customers at $80-$120 per 16.5 kg tin and supplies a modest supplemental income to the household. Small growers' total production is around 5,000 mt of oil representing about 20 percent of total production.

MEDIUM GROWERS Medium growers have larger orchards between six and 100 dunums (6 to 10 ha). The land is either owned by the family, purchased several years ago, or has been inherited from older generations. Growers belonging to this category implement better agricultural practices and professionally manage their land and, therefore, incur a higher production cost per dunum. An undetermined though very significant fraction of growers (perhaps the majority) in this category do not actually work the land themselves. Instead the land is managed by wood damans that are responsible for all phases of production up to harvesting (see text box below). Yields for medium sized olive producers reach about 250 kg per dunum, or 50 kg of oil. These growers mill their olives themselves at local service mills or sell the olives on the tree to damans specializing in harvesting who then organize the harvesting and milling and pay back the grower in cash or by returning one third to one half of the milled oil. Unlike small growers, medium producers have significant surplus production after their own household consumption quantity is removed. They generally sell this in two ways. The first is through their personal network of family and friends at $80-$120 per 16.5 kg tin. The quantity of oil sold into this channel is dependent on the absorptive capacity of their personal networks. Generally these buyers are unable to take all of the oil that medium farmers can produce—leading them to store oil over the course of the year in their homes, often in plastic, metal, or clay containers. The farmers may store the oil for a significant period of time causing some degradation in quality. This quality issue heavily influences the conditions through which the oil is sold through the second channel, mainly in larger volumes to olive oil traders or commercial bottlers at prices that are in the range of $35 to $45 per tin depending on acidity levels. MOA figures from 2011 indicate that 14 percent of olive farmers belong to the medium grower category and produce around 5,000 mt or 20 percent of Lebanese oil.

Wood damans: key players in olive production

Wood damans specializing in olive production are an extremely widespread phenomenon in Lebanon. This is because in olive production areas absentee landowners predominate, as the most active members of families have largely deserted the rural producing areas in favor of Beirut or foreign countries, while desiring to keep the important familial land passed down through generations. Due to this phenomenon, medium and large farms tend to be looked after by wood damans who undertake common production tasks including: tilling, fertilizing, spraying of olives, as well as harvesting and milling (although these are often also arranged by harvesting damans listed below). Since larger landowners are particularly likely to use the services of wood damans, due to the challenges of working on larger areas it is probably safe to say that most of the olive oil production in Lebanon is not actually produced by landowners but by wood damans.

While arrangements between wood damans and landowners vary, in many cases the wood damans pay only $20 per dunum per year or, in some cases just a few tins for the land owner's family consumption. Most of the production risk, however falls on the wood daman who needs to pay for inputs, part time laborers (mostly Syrians) with very significant outlays at harvest time (if he also arranges to do the harvesting and milling). Wood damans may manage up to 15-20 separate parcels with specialized equipment including tractors, sprayers, and harvesters.

LARGE GROWERS Large growers own or manage fields that are greater than 100 dunums or 10 ha. They represent nine percent of Lebanese olive farms. Most of them are located in the North of the country. The largest tracts are owned by large families, religious institutions, or the major oil bottlers and traders. These institutional growers are usually highly efficient in managing their orchards, they own machinery and harvesting equipment that reduces their unit costs and increases their per dunum production to 300 kg, or approximately 60 kg of oil. Because of their greater efficiency, these large growers produce more than half the total olive oil produced in Lebanon with around 12,000 tons in a good year. As noted above, most large land owners, if they are not fully present on their land, will rent out the land to a wood daman. Large growers' sales strategies are largely the same as medium farmers- including a small initial amount of production sold at high prices into the direct household channel governed by personal relationships with the remainder being sold to traders or bottlers at much lower prices. Large producers have significant incentives to develop downstream bottling and/or milling operations to increase their value added—essentially transforming into fully integrated operators (see below). However, very few of them have developed effective export or domestic distribution strategies that are needed to make such investments worthwhile.

FULLY INTEGRATED LARGE FARMING/MILLING/BOTTLING/EXPORTING OPERATIONS Very few (no more than five) large producers have made the required investments in milling technology, bottling, effective branding, and distribution to operate as fully integrated olive production, milling, and bottling enterprises. These actors combine significant levels of production with processing and sales of a branded product. As with the non-integrated large growers, integrated large producers apply better and more efficient farming practices. Their production is entirely channeled to their own milling and bottling operations, which may also involve purchasing olives from other farmers for milling, as well as olive oil for bottling. Yet, actors in this category are fundamentally different from other commercial processors and exporters since they source at least 50 percent of their total oil volume from their own in-house production.

AGGREGATION

OLIVE HARVESTING DAMANS Olive harvesting damans are middlemen that agree to purchase the olives on the tree from land owners one to two months prior to harvest. Harvesting damans are responsible for all harvesting and milling arrangements and release their clients from having to organize these complicated tasks. Experienced harvesting damans assess the bearing trees and negotiate payment terms with the land owner by paying him or a wood daman from one-third of

the harvest, if the trees are expected to produce high yields, to one-half of the harvest if the yield is expected to be lower. This balance of power is highly related to the levels of overall production volume during the season. If it is high, then the damans have the upper hand and can negotiate to pay back one-third of the harvested olives or oil to the farmer. If the season is bad, then the farmer most often has the upper hand since his product is in higher demand and he can command a higher share. More rarely, harvest damans will pay in cash around $0.70 per kg of olives harvested.

Harvesting damans contract teams of laborers that they use from season to season and in some cases invest in harvesting machines. They do not always select the same olive orchards, but have clear zones of specialization where they know most of the key farmers. Mostly they act as oil sellers in a manner similar to medium and large farmers, selling small volumes into their own high priced personal network or higher volumes to olive oil traders. In some instances they simply supply olives for milling to commercial exporters/bottlers/millers who expect them to use their personal relationships with farmers and wood damans to secure olives at lower prices than commercial actors could obtain directly. Harvesting damans are necessary actors especially for farmers who cannot afford the harvesting and transportation costs that account for up to half of the total production costs of olive oil in Lebanon.

OLIVE OIL TRADERS Olive oil traders are middlemen who collect and aggregate olive oil in all quantities and volumes at very low prices from growers and mills that possess unsold oil. Traders collect the oil late in the season right before harvesting begins as growers and mills need to remove stock before the new campaign begins. These actors perform a key role by linking the commercial exporters/bottlers/millers with the widely dispersed mills and farmers who store oil with grouped transactions at larger volumes that reach into the tens of tons. However, they are the subject of much criticism with charges that they use larger non-standard volume measures for purchasing and give incorrect measures of acidity to lower prices. They purchase very low quality oil at $20-$30 a tin to sell to oil refineries with a 10-20 percent markup. In other cases commercial bottlers hire traders to aggregate higher quality oil (virgin or extra-virgin) which they buy at about $40 per tin and sell at $45.

PROCESSING

OLIVE MILLING According to the latest comprehensive survey of olive mills in Lebanon, conducted by the MoE/UNDP team in 2005, there are 492 olive mills in Lebanon. The breakdown of mills according to the type of technologies used is given below in Figure 18. The LIVCD team identified new mills established by development projects and private investments as well as traditional mills that were closed through extensive consultations with olive oil experts and meetings with farmers, municipalities, and other stakeholders.

FIGURE 18: NUMBER OF EACH TYPE OF MILL

	Type of mills	Total	Private (95%)	Coops (5%)
Total per 2005 census	Traditional	428	407	21
	Modern	64	61	3
	Total	**492**	**467**	**25**
2010 total accounting for new improved mills and - 30% closure of traditional mills	Traditional	303	285	18
	Modern	83	64	19
	Total	**386**	**348**	**38**

Source: MoE/UNDP and LIVCD Consultations

Most olive mills are found in areas with a high concentration of olive orchards and are still operating in a traditional configuration.

FIGURE 19: LOCATION OF OLIVE OIL MILLS, 2003

Region	Number of mills
South Lebanon	139
Bekaa	21
Mount Lebanon	110
North Lebanon	274
Total	544

Source- Ministry of Industry 2003

Following the 2006 war, there has been a drastic increase in donor funds and support to the rehabilitation and improvements of olive mills. Although the latest official survey of olive mills dates back to 2005, the study team estimates that since that year, more than 20 cooperative mills using the new two and three phase extraction technologies have been established with donor support along with at least five private mills also using the new technologies. The section below details the main operating strategies of both cooperative and private mills.

COOPERATIVE MILLS As noted above, after the 2006 conflict, Lebanon witnessed a surge in internationally funded development projects targeting the olive oil sub-sector—most of which offered support to cooperatives with improved stainless steel storage and new mills using the horizontal two and three phase centrifuges. Most of these cooperative mills also offer storage facilities to members using stainless steel storage tanks. The study team estimates that there are 38 cooperative mills in Lebanon.

In general, cooperatives offer milling services to farmers for a 10 to 20 percent reduction in price compared to private service mills. They do not serve as important loci of olive oil sales, however, as members prefer to sell on their own rather than through the cooperative. This reflects the widespread reported reluctance of members to mix their own oil with that of other members and the fact that small producers are able to sell oil at extremely attractive prices through personal and family relationships. Consequently, cooperative storage facilities are rarely used at full capacity. Though no global volume data were available, the anecdotal and expert opinion indicates that milling capacity utilization in the 38 cooperative mills is fairly low. The Deir Mimas Cooperative in Marjaoun for instance, milled approximately 60 tons of olives in

2012, which only represents about 12 days of production at full capacity. This generally somber picture of cooperative milling is not without some exceptions. The recently established Cooperative for Production and Development of Olives in Dier Beshtar and Koura milled 153 tons of olives last season and created a brand "Zeit Zaman" that it is trying to market to the Lebanese diaspora in Brazil through the personal contacts of its directors. This example is somewhat misleading, however, since they only have 17 members, some of whom are drawn from among the upper-strata of the business elite. Clearly this type of cooperative and the management talent it has at its disposal are exceptional and cannot be considered to be representative of a wider small farmer cooperative movement.[5]

PRIVATELY-OWNED INDEPENDENT SERVICE MILLS Approximately ninety percent of mills in Lebanon are privately owned by individuals and companies. Although the majority of these mills are traditional, there have been at least twenty new modern mills in the last ten years funded by private investments. Modes of operation differ widely between private service mills in the North and South. Mills in the North charge $6-$8 per 16.5 kg tin. In the South it is more common for mills to charge around $0.67 per kg of oil produced which is almost 40 percent more expensive than in the North. This is mainly due to the higher cost of labor in the South. When paid in-kind, mills keep 10 percent of the oil produced that they aggregate in tanks according to its quality or grade. Most mill owners claim to be able to grade oil by judging the olives that are being milled and by sight or tasting the oil. However, a minority of mills, particularly modernized ones, conduct tests for acidity and (less often) peroxide levels.

The vast majority of oil produced at service mills stays with the farmers or damans who bring the olives in for milling, yet service mills do also trade the oil they earn from milling or produce from their owners' own orchards. In most cases the oil is sold in unbranded tins of 16.5 kg to clients for household consumption from $80-$120. Mills are an important locus of trade in the unbranded household market, as many urban clients end up trusting and recommending particular mills to which they will return year after year to purchase for home consumption. These clients usually do not require that testing be done before they purchase for personal use. When they start to amass stocks and have a problem in selling the oil, service mills can sell to larger oil traders or bottlers that are in need of oil. All privately owned mills surveyed sell unbranded tins in bulk.

A typical modern service milling operation

Paul Khoury, owner of a modern three phase mill in Koura processed more than 500 tons of olives last season for his clients and has secured a stock of 600 tins. Half of his oil stock was sold in bulk unbranded tins to households that trust the quality of his oil, and the second half was exported partly in bulk unbranded tins to a restaurant chain in Dubai, to the U.S., and to a Kuwaiti bottler with his own private label. He does not own a brand nor does he intend to acquire one. He does intend to invest in additional milling equipment to increase his productivity.

Other service mills engage in minor bottling operations, which are either located at their premises or at a rented bottling line, to pack private labels for domestic or export markets or for their own labels that are later sold in neighborhood markets. These mills often have inconsistent sales that vary from season to season depending on the spot deals they can secure. The more aggressive service mills will serve as brokers for larger farmers in their area who need to sell in larger volumes. Service millers will link these large scale farmers to specific buyers on an as-needed basis. A small number of such mills will also make available improved stainless steel storage facilities available to such farmer clients. Some service mills also try to diversify their product offerings by producing pickled table olives, soap, and pomace logs.

[5] This example also shows that the institutional category of the cooperative can regroup a wide variety of forms—with large cooperatives regrouping many smaller farmers or more circumscribed cooperatives regrouping smaller more homogenous member groupings.

COMMERCIAL OLIVE MILLERS/BOTTLERS/EXPORTERS This category of actor is responsible for the vast majority of bottled and branded olive oil production in Lebanon. It includes some of the better known names in the Lebanese olive industry such as Lakkis, Maalouf, and Kobayter. The core of these actors' operations consist of combining both milling and bottling operations with commercial strategies for either filling on-demand contracts for private brands (domestic or export), or for promoting their own in-house brand, or for doing both at the same time. While these commercial millers/bottlers/exporters all have their own olive orchards, in-house production from their own farms is only a residual part of their overall volume. Their main business model consists of milling the olives of other farmers and purchasing already milled olive oil. They have storage tanks that can store 50,000 to 500,000 liters. Actors at this level maintain in-house laboratories capable of doing acidity, peroxide, and lipid profile testing (the latter being used to detect blending of olive oil with other types of oil).

The mills of commercial olive millers/bottlers/exporters are furnished with olives by harvest damans and farmers directly on the same terms as the smaller private service mills. Olive oil purchases are largely done at the end of the season, beginning in July, when farmers and service mills need to sell the stocks they have accumulated but have been unable to sell directly to individual households. A critical issue for such purchases is the quality of the oil which often has deteriorated below extra virgin or virgin acidity and peroxide thresholds due to poor storage in plastic or clay containers. This strategy allows commercial millers/bottlers/exporters to lower their raw product cost, which is critical since, with their bottled and branded products they are more subject to price competition in international markets than are sellers into the direct household market channel. Another way in which these actors lower their raw product costs is to purchase lower priced Syrian olive oil which has been flowing into Lebanon in larger quantities since the Syrian conflict (see market analysis section above).

The end markets for these actors are divided between domestic branded sales and exports, with slightly larger volumes going into the export channel. Major export markets include the GCC countries and Egypt, much of which is exported for private labels (including major supermarket chains and international consumer goods product companies), as well as exports to Lebanese overseas communities in the U.S., Canada, and Australia. Exports to these overseas ethnic markets outside of the Middle East region tend to be retail sized branded bottles, although importer brand labels are also common and there are some bulk exports. The prevalence of bulk exports to the region that are eventually repackaged, mixed, or used in the restaurant trade, explains the generally higher unit values observed for the non-regional exports. Domestic sales consist of both own-brand sales and private label contracts for Lebanese brand owners without bottling facilities. Product offerings of actors in this category cover a wide range of olive oil grades such as Extra Virgin Olive Oil, Virgin Olive Oil, and Pure Olive Oil. They also engage in side production of pickled olives, soap, and pomace logs for heating.

FULLY INTEGRATED OPERATORS The production activities for the estimated five actors in this category were described in the prior section. These integrated production and processing operators share much of the same business models and technical characteristics as the commercial millers/bottlers/exporters. They include Willani (Zgharta), Olive Trade (Biano Akkar), Derbieh (Ain Jarfa), Haddad (Kfarkila) and Ghantous (Koura). The main difference between these actors and those in the previous category is that the fully integrated operators have a product strategy that is founded on the promotion of olive oil coming from their own trees. With their total control of production and milling all the way from the tree to the bottle, they have a much greater ability to deliver constant product quality. They also have less incentive to purchase Syrian olive oil since they are wedded to a strategy that creates markets for their own higher priced production. In consequence the sales strategy of these actors is to sell as much as they can in direct sales to consumers and to concentrate their marketing efforts on international niche markets where they can sell a pure Lebanese product at a premium market price. Actors in this category have made efforts to develop independent export channels that often bypass the main ethnic market importers by making direct export sales closer to the retail level at lower volumes (often facilitated by personal or family contacts) or by focusing on specialty food niches in the mainstream markets. The box above profiles the largest player in this category.

Willani: the largest integrated olive oil producer

Willani is a typical company that has an integrated operation that produces up to 15,000 tins out of their own orchards. They have two modern (two phase and three phase) milling lines with a capacity to process four tons of olives per hour. They have ISO 22000 and international certifications for organic production but do not currently sell any organic product since they have no markets that will pay a premium for it. They sell some product directly to consumers at prices set by the smaller and less advanced mills in the area. Willani owns two brand labels that are exclusively exported and not sold in the local market because they are unable to promote it in Lebanon due to low volumes and low prices in the bottled market segment. They aim instead for higher value markets in the U.S. and South America. Occasionally, other bottlers will purchase oil in bulk from Willani to obtain the volumes they need to satisfy specific markets.

BRAND OWNERS/BOTTLERS This category of actors describes commercial level players who own local consumer product brands that they use to sell olive oil and who may or may not also have an in-house bottling capacity. Actors such as Boulos and Saifan possess their own bottling facilities which they fill by purchasing both Lebanese and imported olive oil. Whereas actors such as Wadi al Akhdar do not even have bottling facilities and contract out the totality of their olive oil operations to commercial bottlers/millers/exporters. Thus players such as Boulos and Saifan own several large containers and mixers and contract out to traders or work with mills to secure oil at the volumes required. They taste the oil and run in-house laboratory tests on all batches to be purchased. In contrast, pure brand owners who lack bottling facilities, simply place orders with commercial bottlers/millers/exporters to fill contracts to the desired level. These actors main asset is their distribution network and complete line of consumer products under a single brand which gives them leverage with key distributors to reach a large number of neighborhood stores and supermarkets.

See text box for a summary of one of the leading brand owners with bottling facilities.

Saifan

Saifan is a leading oil bottling business, located in Koura that buys from oil traders and mills, and has a turnover of approximately 300-400 mt of branded oil per year. It sells 30 percent of its output into the domestic market and exports the remaining 70 percent to the GCC, U.S., Latin America, and other countries. It has two automatic filling lines with bottle closing and labeling capacities

REFINERIES There are three olive oil refineries, all of them in North Lebanon: Two of these are independent businesses who specialize purely in refining olive oil (Qobayter and Rafii). The

third belongs to the Maalouf commercial bottling/milling enterprise. These refineries perform an important service to the industry by transforming low quality degraded lampante olive oil with high levels of acidity that render it unfit for human consumption into refined olive oil with zero acidity and neutral taste that can be blended with other virgin olive oil to create "pure olive oil". This process provides another way in which commercial bottlers/millers/exporters can lower their raw product cost to maintain competiveness in both local and international markets. The two independent refineries operate mainly as service providers for both mills and commercial actors charging $0.36 per kg for refining. This refined oil is sold for $2.40-$2.70 per kg of refined oil.

WHOLESALE/IMPORT

DISTRIBUTORS Distributors are important middlemen between commercial bottlers, brand owners, and retailers. They usually offer a wide range of products to supermarkets and other retail shops, have negotiated access to shelf space, and have leverage with supermarkets. They sometimes import olive oil from Europe or sell local brands for which they charge a 25 percent to 35 percent mark-up to distribute to their network of retailers. Distributors are very selective in choosing local olive oil brands and require a minimal level of organizational and professional skills from the bottler. Not all bottlers possess the skills they require.

SYRIAN BULK IMPORTERS OF OLIVE OIL A small number of traders located in North Lebanon act as bulk importers of Syrian olive oil. They sell mainly in large transaction volumes to the commercial exporters/bottlers/millers and to the bottlers/brand owners, although they also sell to small scale distributors who supply the HoReCa market.

RETAIL

DIRECT TO HOUSEHOLD SALES. Households in Lebanon purchase mostly olive oil in bulk unbranded tins through friends or family networks, family owned farms, other contacts, and olive mills. Around 5,250 mt or 27 percent of total olive oil production is estimated to be sold through direct sales to households. In this part of the market, very little consideration is given to the label and formal quality specifications of the oil. Consumers rely mostly on their organoleptic evaluation and on the personal reputation of the seller or the geographic location of the mill where it is produced. Intermediation in this market segment is minimal to none, as farmers and mills who supply most of this oil use family connections and personal networks to sell it. Prices are quite high for this type of oil, with households willing to pay between $80 to $120 per 16.5 kg tin or between $4.80 and $8.00 per kg.

HORECA AND FOOD SERVICE INDUSTRY Hotels, restaurants, and catering businesses provide a major outlet for olive oil consumption. This sector however is highly affected by tourist demand and varies from year to year with changes in the political environment. Current sales volumes are estimated to be around 2,500 mt or 13 percent of total olive oil production. A survey conducted by ICU/ROSS in 2008 highlighted that quality is not very important to restaurants. Purchasing decisions lie with the chef who selects based on taste. Restaurants have different factors for selecting olive oil sources; some prefer to deal with the same supplier over a long term basis and are generally price insensitive (paying around $80-$100 per tin) as long as the quality is judged to be acceptable by the chef. Other restaurants are exclusively price-driven and have very limited budget for olive oil purchases ($50 per tin) which implies that the oil they get is probably not of

Lebanese origin. This sector is supplied both through the same direct sales channels as households, though also later in the season by olive oil traders who specialize in lower quality oil.

LEBANESE ARMY The Ministry of Agriculture facilitated a deal with the Lebanese Army to purchase 50,000 tins of olive oil from cooperatives in 2011 and is trying to negotiate a deal for 100,000 tins in the 2012-2013 season. Three prices were paid depending on the quality and grade of the oil received, ranging from $4.00, $5.10 and $6.00 per kg for Pure Olive Oil, Virgin Olive Oil, and Extra Virgin Olive Oil. Laboratory tests to document the required acidity and peroxide are also required by the sellers. In addition, a commission of $0.31 per kg goes directly to the cooperatives to pay for overhead costs associated with this collection program. However, value chain actors report that participants have not yet been paid for the 2011 sales and few expect that they will receive timely payment for any sales in 2012-2013. Still, these prices are judged to be quite attractive, as they provide an outlet for excess end of season volumes that is significantly more attractive than what is available through olive oil traders and bottlers.

SUPERMARKETS AND TRADITIONAL GROCERY STORES Supermarket shelves are not easily accessible to brand owners or bottlers. Supermarkets have limited shelf space and require minimum turnover volumes from $500,000 to $1 million that many bottlers are unable to supply. Supermarkets are accessed either through distributors or through the brand owner's own contacts. Their profit margin ranges between 20 and 25 percent and in some cases they request further discounts from suppliers on a monthly or annual basis. Some supermarkets such as Spinney's fill oil under their own label with local bottlers and sell at competitive prices. Maalouf supplies international and local orders from Carrefour, which despite their low price requirements are attractive because of the large volumes.

Traditional neighborhood shops and grocery stores operate slightly differently than larger supermarkets. Although they work with distributors in many cases bottlers and brand owners sell to them directly. They usually add a higher margin than supermarkets on the products they place on their shelves- up to 50 percent.

The study team estimates that this market segment accounts for 3,000 mt, equivalent to 35 percent of olive oil sales.

VALUE CHAIN CHANNELS AND GOVERNANCE RELATIONS

The value chain map in Figure 17 shows five main olive oil channels. These are described below in terms of how the internal vertical and horizontal linkages are structured, the power dynamics that exist, and the prospects for project interventions to achieve beneficial changes.

CHANNEL 1: DIRECT SALES TO HOUSEHOLDS AND HORECA

This is by far the largest channel in the value chain in both volume and value terms. With prices being paid directly to producers (mainly farmers but also mills) that are comparable with high level retail sales in international markets for oil that would most often not qualify for sale into these markets, this channel offers a very attractive opportunity to Lebanese producers. It rests on the high level of confidence that consumers have in authentic products that are perceived as being "direct from the farm" for which the guarantee of quality is mainly provided by the presence of a network of personal relationships that link the consumer with the producer. As such, it is governed by informal codes of conduct with little objective means of verification or control. Prices vary substantially depending on perceptions of quality, geographic origin, and personal relationships between the buyer and seller. Sales in this sector are limited by the

capacity of sellers to manage their personal networks and by the total absorptive capacity of each network. Further limitations are imposed by changes in household income, as the basic unit of sale in this channel is the 15.5 kg or 16.5 kg tin, which sells from $80 to $120 per unit and can price poorer households out of the market.

Given the high prices and basic self-sufficiency of actors in this channel, prospects for project interventions to augment value are minimal. The lack of traction in terms of volume of activity on the part of many cooperatives is a reflection of the simple fact that farmers, and particularly small farmers, have little need for collective marketing actions as long as they can sell into this highly profitable channel. The issue of unsold stock then, becomes relevant only with larger farmers and wood damans who deal in bigger volumes.

An important element in this channel that is consequential to the value chain as a whole is the fact that the basic norms governing what consumers consider to be "good olive oil" are not set according to international standards of quality in this channel. Thus the often reported preferences of Lebanese consumers for olive oil that is sweeter and yellower are largely based on the type of oil that is sold in this part of the chain- which has more often than not been produced on traditional mills with unclean presses and stored in clay or plastic containers that may have contributed to oxidation and higher levels of acidity. This scenario has created a situation where the normal international best practices in olive milling, resulting in higher extra virgin olive oil yields with oil that has lower acidity, a greenish color and a peppery taste, may not actually produce an end product that the average Lebanese consumer associates with authentic farm-produced olive oil. This paradox may result in an instance where achieving international standards could result in a decrease in demand and sales for Lebanese producers.

Channel 2: Unbranded Sales to the Public Sector

This channel is unique in that its norms and modes of functioning are a pure product of public sector decisions. The key motivating factor in this channel seems to be the MoA's desire to promote the cooperative sector by offering favorable purchase terms for the procurement of olive oil by the army. The government procurement referenced above occurred for the first time in 2011, when high volumes of unofficial Syrian oil imports led to reduced demand for oil and high stocks of unsold oil at the producer and cooperative level. To alleviate these unsold stocks, the MoA decided to purchase 50,000 tins of olive oil from cooperatives for the Lebanese army. The purchasing prices for each 15 kg tin was $90 for extra virgin, $76.70 for virgin, and $60 for olive oil. The government provided $4.60 per tin to the cooperative to cover some direct costs related to this collection program. Although they accepted the deal, cooperatives initially countered that the quantity of oil purchased was far too low, and requested that the government purchase 200,000 tins. The government has not paid cooperatives for the oil, and there is little capacity for recourse. The MoA intends to renew this offer in 2012.

This channel is of limited relevance to the sector as a whole. It remains to be seen if the cooperatives will be able to provide the requested volumes in 2012, given the long payment delays associated with this channel and the strong "pull" from Channel 1. If anything, this channel is likely to provide arbitrage opportunities to olive oil traders willing to supply cooperatives with larger volumes of oil at good prices although these traders do not usually work with long delays in payments since they pose a major challenge to the cooperatives who decide to enter this market channel.

Channel 3: Branded, Bottled Sales in the Lebanese Market

This channel faces a number of market constraints that have a great impact on the business strategies of actors selling into the branded and bottled part of the domestic market. The chief constraint is that if bottlers and brand owners in this segment seek high sales they need to get into many supermarkets and neighborhood grocery stores, or establish their own in-house retail distribution function. For some companies, such as the Wadi al Akhdar brand owner, they already have a strong distribution business and can contract out to commercial exporter/bottlers/millers to provide the needed olive oil products to specification on order. These are essentially distributors with their own brands who are not really olive oil specialists, but have created a retail brand and sales network that has value. Commercial bottlers without these multi-product brands and distribution units are faced with the prospect of going through distributors who are critical gate keepers. With the largest distributors setting minimum turnover thresholds of $500,000 to $1 million and passing on supermarket shelving fees, the price of an entry ticket into this segment is too high for most of the millers/bottlers Faced with these constraints, many bottlers with brands that they want to sell domestically tend to turn to the second-level of smaller distributors who offer more limited access to retailers, and who are not so demanding in terms of overall volume. Others seek to provide directly to some retailers or have plans to develop their own specialized retail outlets. In any case, the rules set by distributors have a strong impact on the level of market access that sellers into this segment can expect to achieve, and these rules tend to favor the few larger sized operations.

The other important constraint is that sellers in this market face a significant degree of consumer skepticism about product purity and quality that has its roots in a mistrust of Lebanese industrial processors. These leave actors in this market at a relative disadvantage both compared with actors selling into the direct household market and to imported bottled olive oil from the EU, which although still quite small in volume, maintains high levels of consumer trust. Coupled with lack of consumer understanding of international norms concerning extra virgin, virgin and pure olive oil, sellers into this market face a number of obstacles related to the lack of understanding and trust of consumers.

Channel 4: Branded Exports

Given the difficulty of selling into the domestic branded market, many smaller exporter/bottlers/millers and integrated processors/producers have business strategies that privilege export sales. To attain large volumes of sales, however, without a recognized international brand, exports need to be price competitive, something that is virtually impossible with Lebanese olive oil due to the strong demand pull from Channel 1 and the tendency of farmers to hold onto stock. If actors in this segment hope to reach necessary volumes they have no alternative but to sell a product that includes significant quantities of lower priced Syrian olive oil. The highest volumes of export sales whether for private labels of international brands/supermarkets (Maalouf) or under their own label (Saifan) are far from being 100 percent Lebanese olive oil.[6]

At lower volumes, however, higher prices can be had in the export market, which relaxes the constraint on using Lebanese oil. This is particularly true for exports to countries outside the Middle East region, which currently range from $5.50 to $8.00 per kg FOB for branded product

[6] The team cannot provide percentage estimates of the Lebanese content of major exporters products. This is a sensitive issue involving blends of Syrian (or Tunisian) and Lebanese product and different types of oil including extra virgin, virgin and refined olive oil. Saifan states that his percentage is 30 percent and it is highly unlikely that a bottler producing for a private supermarket labels such as Maalouf that is not even sold as Lebanese oil, would have a Lebanese content percentage that is even that high.

compared with $4.50 to $5.80 to the GCC markets. This market has attracted a number of younger integrated producer/processors and exporter/bottlers/millers who are targeting these higher quality niche markets. These players remain small, however, with limited production capacity and financial strength to support market development expenses and also find themselves in competition in these markets with the higher volume exporters from Lebanon who generally offer a cheaper product that is likely to have higher Syrian oil content. Thus, to some extent, the lack of confidence of Lebanese consumers in industrial bottled olive oil finds its parallel even in export markets, particularly in the ethnic Lebanese niche, where consumers are unaware of differences in the origin of the oil they buy, even though it is bottled in Lebanon.

This market offers more promising prospects for interventions due to the presence of committed private entrepreneurs, in both the integrated production/processing and exporter/bottler/miller categories who are experimenting with more remunerative niche export markets. Constraints tend to be linked to the small size and lack of productive and financial capacity of many of the players, which can be addressed to some degree through improved cooperation on marketing or branding to amass needed volumes of product and financial resources. Barriers include strong desires of most players to have their own independent brands despite limited volumes and lack of common effective standards that would facilitate transparency in oil assembly and quality-based differentiation.

Channel 5: Unbranded Exports

This channel is essentially an extension of Channel 1 to countries in the GCC. Until recently it mainly consisted of exports of tins in passenger buses that made their way to wholesale markets and restaurants in the Gulf. Since crackdowns on this mode of transport (see Market Analysis above), it now consists mainly of bulk cargo expeditions from large farmers and traders of unbranded tins of olive oil to family contacts, restaurants, and even distributors in the Gulf who repackage it under their own labels. Prices in this channel (around $4.00 per kg) are largely comparable to the lowest prices in Chanel 1. As with channel 1, this circuit is largely governed by personal relationships. As a result, prospects for improvements in this channel are not promising.

6. BUSINESS ENVIRONMENT FACTORS AFFECTING THE VALUE CHAIN

The olive oil value chain is heavily influenced by international trade agreements, government policies affecting value chain participants, notably cooperatives, and by a high level of donor engagement. Issues regarding product quality, food safety, and labeling requirements for origin will continue to grow in importance over the foreseeable future. Regional geopolitics, most recently the crisis in Syria, has also impacted official and unofficial flows of olive oil.

GOVERNMENT INVOLVEMENT AND REGULATION

Although the baseline for government involvement is low, recently the olive oil sub-sector has been attracting more attention from the MoA and LIBNOR (the official Lebanese Standards Institution). The MoA has spearheaded several interventions to support development of the olive oil value chain with varying levels of success. Many of the initiatives focused on olive oil have come out of the MoA sub-committee on olive oil, which was established in 2009 and is composed of governmental and non-governmental members from the private sector and NGOs. This sub-committee works to identify challenges faced by the sub-sector and suggest solutions to be adopted by the ministry. The committee meets regularly, however based on resulting interventions and interviews with olive growers from the South (Hasbayya, Marjayoun), it seems clear that the Ministry does not have an accurate understanding of the real cost of production incurred by olive growers, rather they are basing estimates on theoretical calculations that underestimate actual costs. One of the major outputs from this sub-committee is MoA Decree 1/103 regarding the "Program for Marketing of Olive Oil," which was issued in April 2012. The purpose of this decree is to incentivize olive farmers to form cooperatives. The MoA views cooperatives as a possible leverage point for interventions related to marketing of olive oil, and possibly for enforcement of new regulations concerning food safety, traceability, and labeling. There are approximately 200 cooperatives working on olive oil, yet only about 20 percent are active. At present, however the only actions taken by cooperatives with regard to product marketing has been to steer the procurement of olive oil for the army to cooperative suppliers as described in the previous section. While current Ministry policy discussions are focused on tightening regulations on quality, traceability/origin and labeling, no clear regulatory decisions have yet been set that would make any changes mandatory.

There are two labels that the LIVCD assessment team was able to identify and that could be used in the olive oil sub-sector. Both were developed by international projects:

OLIO DEL LIBANO LABEL: This label was developed by an EU-funded project and implemented by the ICU (Instituto per la Cooperazione Universitaria) and the MoA. The logo on bottles was produced during the time of the project under project supervision and control. The logo was intended to be used as a certificate of quality and origin; however it has no "cahier de charge" yet. The logo and label is owned by the MoA and is intended to be used during the Olive Oil Marketing program expected to be implemented at a later stage and with a new set of specifications.

CEDAR EXCELLENCE SEAL-NEW QUALITY SEAL FOR HIGH VALUED LEBANESE PRODUCTS: This seal was developed with support from the Swiss Economic Secretary (SECO) and the Swiss Research Institute of Organic Agriculture (FiBL) using the Participatory Market Chain Approach (PMCA). The goal of the seal was to foster trust in quality between Lebanese market actors who deal with fresh, processed, and collected wild plants. The Elaborated CES (Cedar Excellence SEAL) standards were taken over by LibanCert (Quacerta) in 2010, that is currently offering

inspection and certification services for the CES Seal on fresh unprocessed and processed products and wild collected plants. Although this label was not intended to be used for olive oil, there is no reason that olive oil could not also be included in the program.

Extension Services

Agricultural extension services offered by the government in Lebanon are limited, and only minimally effective. The few extension centers that are underfunded must provide technical assistance on all crops, so highly specialized technical expertise is rare among extension agents. Although the extension service recently received additional funding to expand staff, agents do not make field visits, and farmers did not report visiting extension centers or receiving technical support from the government. Therefore, orchard management practices are to a large extent determined by the growers or by the agricultural input suppliers.

Rather, the MoA has focused its work in the olive sector on distributing rootstock and agricultural inputs. Since 2011, the MoA has distributed more than 650,000 olive trees (of unknown varieties), 287 tons of copper oxycholoride pesticides, spraying equipment, and 380 battery operated harvesters through municipalities and cooperatives. The use of spraying equipment and pesticides among small and medium-scale farmers is unknown at this point. The Lebanese Agricultural Research Institute (LARI), which operates under the MoA, also has an ongoing program to support the varietal propagation of olive trees in Lebanon, and provides cuttings of mother olive trees from orchards in Kfarchakhna-Zghorta to propagate disease and virus-free trees with clear varietal identification.

Environmental Regulations

Acidic and contaminated water and large volumes of oily pomace are the two most damaging effluents produced from olive milling. Toxins and residues from these effluents can contaminate surface and ground water, and is difficult to clean up. There were no regulations regarding olive milling effluents until 2010, when the Ministry of Environment (MoE) issued ministerial decree number 100/A. This decree created guidance to govern milling operations in order to minimize residues and waste. Despite the intention of the decree, there is no evidence that it has been enforced due to the MoE's lack of resources and because compliance would require high investment costs that mills cannot afford.

Product Quality & Food Safety Requirements:

The Lebanese Standards Institution (LIBNOR) is responsible for quality and standard product definition criteria for olive oil. Officially, these standards became mandatory in 2010, although they are not respected by most actors. The LIBNOR standard that applies to olive oil, standard 756:2007, includes the quality standards of Extra Virgin Olive Oil, Virgin Olive Oil, Pomace Oil, Pure Olive Oil, and Refined Olive Oil in terms of sensory qualities, acidity levels, peroxide content, and UV absorption rates. LARI provides oil testing services for acidity, peroxide level, the coefficient of absorbency under UV, moisture content, insoluble impurities, copper levels (as this is used as fungicide), among other basic tests. The Industrial Research Institute and the Chamber of Commerce of Industry and Agriculture of Tripoli, Saida, and Zahle also provide these same testing services.

Quality testing is only gaining traction with stakeholders involved in branded market channels, especially for export markets, as it is nearly impossible to enforce quality testing, and traceability inside the bulk, unbranded and direct household market segments. Improvements in the quality

and standards of olive oil production are therefore mainly driven by the requirements set by the export markets, which focus mainly on acidity and peroxide content. There is a noticeable trend by the more modern mills to acquire certifications such as ISO 9001, ISO 22000, HACCP, and organic certifications by LibanCert or IMC. These mills are more likely to have the ability to conduct acidity and peroxide testing in house, compared to traditional mills.

Outside of the branded market channels, adherence to specific production quality criteria for olive oil is voluntary and unnecessary. Although the MoA states its intent to work through cooperatives to increase the prevalence of quality testing, it is unclear whether this initiative is having any impact. In part this is due to the very limited role of cooperatives in marketing olive oil, with most farmers preferring to sell unlabeled tins directly to households. Meanwhile, HoReCa sales are driven by price, and hotels, restaurants and catering businesses place very little importance on high quality olive oil with little importance attached to brand labels. There is therefore little incentive for producers to improve the quality of oil destined for the domestic market. In fact, throughout its field work, the LIVCD team learned that sometimes value chain stakeholders would mix low quality oil with a little bit of water which turns the oil opaque, and makes it look like the traditional turbid oil, which is more appealing to Lebanese consumers.

Academic and Other Institutions

The Nutrition and Food Sciences Department in the Faculty of Agricultural and Food Sciences at the American University of Beirut has introduced a number of advancements in the olive sector. The department hosted an olive oil tasting training in partnership with the IOC and the MoA and has also established an olive oil testing lab for research purposes. Other Lebanese universities with agricultural programs, namely the Holy Spirit University of Kaslik, Université Saint Joseph of Beirut, and the Lebanese University have also worked on or released publications related to the olive oil sub-sector.

The Chambers of Commerce across Lebanon also play a small, but multifaceted role in development of the olive value chain. The Chambers provide a wide range of services to agricultural stakeholders, private and public institutions, and national and international organizations, such as market information at local and foreign levels, organization and participation in international fairs, promotion of Lebanese agricultural products and technical assistance to farmers, agribusinesses and exporters. The Chambers are also responsible for issuing certificates of origin for all agricultural shipments for export, including olive oil.

Donor Community and Non-Government Organizations (NGOs)

The donor community has invested significantly in the development of the olive sector in Lebanon, providing funding to local and international NGOs to implement programs. Major funders have included UNIFIL, UNDP, the EU, and the Spanish, Italian, French, and American governments.

The largest NGOs receiving donor money for projects on the olive sector and their major activities are described below, and a complete list of NGOs receiving funding can be found in Annex 3.

- *The René Moawad Foundation (RMF)*: This Lebanese NGO is one of the most active in the olive value chain. The foundation was established in 1991, two years after President Moawad was assassinated. The Foundation receives funding through many donors, including USAID in 2002, to work with cooperatives in the olive sector. The

foundation supports olive farmers in North Lebanon through the provision of technical assistance and subsidized agricultural services. They also have a modern oil storage facility and bottling line in Zghorta, although the line operates far below capacity. RMF has also established a for-profit spin-off, FRESCO, which acts as an olive oil trader, buying oil from cooperative mills in the RMF network, identifying viable export markets in the USA, Australia, France, and GCC countries and exporting under its own branded label. The collection program ran into difficulties at the export level and was disrupted last year.

- *ITALIAN COOPERATION*: The Mediterranean Agronomic Institute of Bari (CIHEAM-IAMB) and the Lebanese Ministry of Agriculture are jointly implementing the "Social and Economic Support for the Families of producers in the Olive –growing Marginal regions in Lebanon" project. This 3.3 million Euro project was implemented from 2009 to 2012, and was funded by the Italian Ministry of Foreign Affairs through the Italian Cooperation as part of the Poverty Alleviation Fund. The project aims to support and raise the income of families working in the olive oil chain located in marginal areas. The project provided extension services and support for the extension department of the MoA, distribution of equipment to cooperatives, marketing support for cooperatives, and the creation of a national map for olive tree distribution. The project also worked with the Lebanese Agricultural Research Institute for the varietal identification of Lebanese olive trees. The project ended in 2012 but a shorter and smaller second phase has been funded to provide technical support for olive oil cooperatives

- *WORLD VISION*: With funding from USAID, World Vision has worked extensively on developing organic olive oil production. The main idea with this program was to leverage high volumes of olive oil from small farmers who do not typically spray trees with chemicals, help them obtain organic certification, and identify niche markets that would pay a price premium for organic oils. A major outcome of this project was the establishment of BioCoop, a cooperative that sources oil from Marjeyoun, Hasbaya, Nabatieh, and Jbeil through service centers. BioCoop purchases organic oil from farmers at a 25 percent market premium, and sells it under BioCoop's "Campagna" brand and other brands that have a line of organic products. BioCoop used to sell organic oil to domestic and export markets, and has received several orders requesting high volumes that they could not source. It ceased operation two years ago after the funding for the project stopped due to mismanagement of the cooperative.

- *MERCY CORPS:* Between 2005 and 2007, Mercy Corps led a project funded by USAID to refurbish 40 olive oil mills in Hasbaya, Marjeyoun, and Nabatieh. The agreement between Mercy Corps and mill owners stipulated that Mercy Corps would provide new equipment, including stainless steel containers, washers, and other pieces, while mill owners would invest in improving sanitary conditions in the mills including tiled floors and walls.

- *SRI INTERNATIONAL:* Between 2002 and 2005, SRI worked to improve the quality of olive oil produced across Lebanon and created the "Traditions du Liban" brand, that marketed olive oil from seven distinct regions of Lebanon. With support from SRI, "Traditions du Liban" was taken over by the Al Wadi brand, and promoted at international trade shows in the US, France, Germany, and the Gulf.

Trade Agreements

Lebanon is a signatory to several bilateral and multilateral trade agreements that aim to enhance and liberalize agricultural trade. These include the Taysir Agreement, the Arab Trade Agreement, the European Union-Lebanon Association Agreement, the European Free Trade Association (EFTA) Agreement, the World Trade Organization (WTO) Agreement, the Agreement on Agriculture (AOA), and the Sanitary and Phytosanitary measures (SPS). Although Lebanon has established free trade with GAFTA countries for olive oil, it maintains high levels of protection for olive oil with other trading partners, such as the EU. The main trade agreements related to olive oil can be summarized as follows:

World Trade Organization (WTO) Agreement: The Lebanese Government has embraced a strategy of trade liberalization since the early 2000s, reorienting much of its fiscal revenues from tariffs on trade to more general value added and excise taxes between 2000 and 2003. It is also working on accession to the WTO, having applied for membership in January 1999; Lebanon currently has observer status. Over the past ten years, a shift in the agriculture trade policy has been underway with a gradual lowering of tariff barriers on many agricultural products, although the transition to free trade for some products, including olives and olive oil, is occurring at a slower pace. The Ministry of Economy and Trade has managed the WTO accession process since October 2000. Since that date several meetings and working groups were held to conduct the needed preparation, yet to date no deadline was set for accession to the WTO.

Greater Arab Free Trade Agreement (signed in 1981, ratified in 1985). In 1999, Lebanon signed the Implementation Program for the Facilitation of Trade among Arab Countries Agreement for the establishment of a Greater Arab Free Trade Area (GAFTA), which includes 17 Arab member countries. The Agreement set out a plan to establish GAFTA within ten years, counting from the beginning of 1998. The Agreement called for gradual tariff reductions at an annual rate of 10 percent and 20 percent for the last two phases of cuts, and allowed some exemptions during the transitional period. In addition, an agricultural calendar for tariff reductions in10 groups of agricultural commodities was allowed in the transitional period. The agricultural calendar was repealed with the full establishment of the GAFTA in January 2005, essentially setting up a full zero-tariff regime for agricultural products. Trade in all agricultural commodities is now completely liberalized but remains subject to phytosanitary regulations.

GAFTA Member Countries:

- Bahrain
- Egypt,
- Iraq
- Jordan
- Kuwait
- Lebanon
- Libya
- Morocco
- Oman,
- Palestinian Authority
- Qatar
- Saudi Arabia
- Sudan
- Syria
- Tunisia
- United Arab Emirates
- Yemen

Bi-Lateral Arab Trade Agreements: With the full establishment of the GAFTA agreement, the movement of agricultural commodities and processed food between Arab countries now follows provisions set by the GAFTA agreement. Nevertheless, some exceptions still hold under the Lebanese-Egyptian Trade Agreement (signed in 1998, ratified in 1999). For example, the export of Lebanese apples to Egypt is allowed at zero customs duty from the period of August 1st to April 30th (as under GAFTA rules) but is prohibited outside of this period. Olive and olive oil from Egypt is not permitted to enter Lebanon at any time of the year.

EUROPEAN UNION-LEBANON ASSOCIATION AGREEMENT (signed in 2002, ratified in 2006): This agreement defines tariff levels and quotas for goods flowing between Lebanon and the EU, and grants specific exceptions for some agricultural crops including olive oil. Although most agricultural products are on a gradual tariff and customs fee reduction schedule, Lebanon has negotiated to maintain a 70 percent tariff rate and a minimum fee per liter of 6,000 Lira ($4.00) on olive oil flowing from the EU into Lebanon. The minimum fee per liter functions in a way that if one liter of olive oil has a declared value of LBP 10,000, Lebanon charges a 70 percent tariff rate of LBP 7,000 and the oil will enter the market with a value of LBP 17,000. Meanwhile if a liter of olive oil has a declared value of LBP 5,000, the 70 percent tariff fee is only LBP 3,500, but the LBP 6,000 minimum fee is still applied and oil enters the market with a value of LBP 11,000 per liter.

As shown in Figure 20, in the case of Lebanese olive oil flowing to the EU, the EU has set a quota of 1,000 tons of Lebanese olive oil that can be imported with a 100 percent reduction of the most favored nation (MFN) customs duty and ad valorum tax. As of 2011, the EU reported 1,750 tons of olive oil imports from Lebanon, 750 tons[7] did not qualify for reduction of customs duties and ad valorum taxes. The terms of the EU-Lebanon Association Agreement do not expire, but can be adjusted through future trade negotiations.

[7] Comtrade data reported by EU countries in 2011.

FIGURE 20: CONDITIONS FOR EU IMPORTS OF OLIVES AND OLIVE OIL ORIGINATING FROM LEBANON.

	Reduction of the MFN customs duty (%)	Tariff quota (tons net weight)
Olives and olive oil		
Olives, fresh or chilled, for uses other than the production of oil[1]	100	1 000
Preserved olives, for uses other than the production of oil[1]	100	1 000
Olive oil[2]	100	1 000

Source: Protocol 1 of the European Union-Lebanon Association Agreement

1. Subject to conditions of relevant Community provisions (Articles 291-300 of Commission Regulation No. 2454/93 and its amendments).

2. Only applies to imports of untreated oil, wholly obtained in Lebanon and transported direct from Lebanon to the EU.

EUROPEAN FREE TRADE ASSOCIATION AGREEMENT (EFTA). EFTA is a trade agreement that essentially extends the trading agreements governing European Union member states to include four non-EU European members: Iceland, Switzerland, Norway, and Lichtenstein. The EFTA-Lebanon agreement (signed in 2004, implemented in 2005) specifies the special market access conditions for Lebanese products in these four non-EU EFTA members. It covers trade of industrial goods, fish, and other marine products, as well as processed agricultural products. The four EFTA states eliminated duties and other restrictions on Lebanese products upon implementation of the Agreement, and Lebanon gradually has started abolishing its duties during a transition period between 2008 and 2015. Trade in non-processed agricultural products, on the other hand, is covered by bilateral agreements between each EFTA State and Lebanon. Lebanon has signed bilateral agreements with Switzerland, Norway, and Iceland, granting some tariff concessions to agricultural products originating from these countries. Table 22 sets out conditions for exports of olives and olive oil to these countries. (There is no bilateral agreement with Lichtenstein.)

FIGURE 21: EFTA-LEBANON AGREEMENT CONCESSIONS TO LEBANESE OLIVES AND OLIVE OIL

	Switzerland	Norway	Iceland
Olives	No information	Free specific or *ad valorem* duty all year round	Free specific or *ad valorem* duty all year round
Olive oil	No information	Free specific or *ad valorem* duty all year round	Free specific or *ad valorem* duty all year round

Source: Bilateral Agricultural Trade Agreements with Switzerland, Norway, Iceland

7. DYNAMIC TRENDS

The assessment team has identified four dynamic trends in the olive and olive oil value chain.

1. INCREASING ADOPTION AND KNOWLEDGE OF IMPROVED PRODUCTION PRACTICES BY FARMERS IN THE SOUTH WHICH IS SPREADING TO THE NORTH.

Farmers in the south have a higher level of knowledge regarding improved production practices, and have started adopting these practices. This trend has been largely driven by the high concentration of NGO projects in the South, which have provided training and agricultural inputs to farmers. The most significant improved practice relates to harvesting, where farmers are shifting from beating olives off trees with sticks to using manual electric harvesters. Using electric harvesters reduces breaking olive branches and increases yields for the next season. Some farmers have also started spraying pesticides, although adoption of spraying has been more prevalent in areas where the MoA or NGO community have provided sprayers and chemicals for free or at a highly subsidized rate. It is unclear if the spraying practices will continue independently of government and NGO interventions. Even though increases in knowledge and improved production practices are most pronounced in the South, some farmers in the North, particularly the ones involved in NGO projects or those integrating production milling and bottling, are also transitioning to improved practices.

2. ENTRY OF NEW ENTREPRENEURS WITH PRODUCT STRATEGIES BASED ON PRODUCT QUALITY AND AN EXPORT STRATEGY FOCUSING ON INTERNATIONAL NICHE MARKETS

New Private Investors in Upgraded technology and quality

- Ghantous (Al Khalil)
- Willani
- Youssef Fares
- Elie Fares
- Shafik/ Fawzi Maalouf

Most upgraded mills are the result of donor funding and NGO programs, yet there are still a number of private investors opening up mills using new technology. The result is a higher quality product that is more likely to meet international standards. Generally, investors are either building new facilities or are upgrading older family facilities. They tend to be under the age of 40, which is notable in a value chain where most producers and processors are members of an older generation that still lives in the villages. In most cases, the underlying business strategy behind these upgrades is to produce a product that achieves international standards of quality and can earn a premium price in niche international markets—justifying the use of mainly Lebanese olive oil.

Specifically, these new investors are investing in modern mills with stainless steel components and two or three phase centrifuges for oil extraction. It is also common for these processors to invest in stainless steel storage facilities on the premises of their mills for themselves or for larger farmers to use. This is a significant innovation as it solidifies these actors role as players in late season trading that seek larger volumes of unsold olive oil. Overall, these improved private mills operate at a higher capacity than traditional mills, and in many cases take the place of multiple small scale traditional mills in a given area. They are growing their share of the total milling service market with both better milling and better storage linked to a marketing strategy revolving around export of product that meets international norms. Volumes remain quite small, and actors suffer from a lack of economies of scale in meeting marketing and promotional hurdles, but the entrance of these actors is still a noteworthy phenomenon.

3. Flood of Syrian oil in the Lebanese Market

Since implementation of the GAFTA agreement in 2004, Lebanon has allowed the import of olives and olive oil from Syria and other GCC countries without tariffs or any legal restrictions. By 2007, Syrian olive oil production and quality improved sufficiently to enter European markets (Spanish and Italian) which reduced the inflows of high quality Syrian oil to Lebanon and kept domestic demand for Lebanese oil at acceptable levels. However, since the onset of the crisis in 2010, while Syrian olive oil coming into Lebanon through official channels has dropped, there have been large volumes of Syrian olive oil in the Lebanese olive oil market in both 2011 and 2012 according to almost all actors in the value chain. Most of these flows are fueled by the inability of Syrian producers to access domestic markets or normal export channels. The EU Foreign Affairs Council decision in May 2011 to suspend the bilateral cooperation programs with Syria essentially closed-off all exports of Syrian oil to the EU. Thus Syrian olive oil producers must use Lebanon as a way to access international markets.

Olive oil flows from Syria into the north of Lebanon, where the main bulk importers and many mills and bottlers are concentrated. While official Lebanese customs figures show virtually no imports from Syria after 2007, and Syrian figures show virtually none, analyses of production and per capita consumption figures in Syria conducted by the LIVCD Study Team in Annex 1 indicate that if Syrian consumption levels are not assumed to be vastly higher than in the highest consuming countries in the world such as Greece, unrecorded exports to Lebanon are at least three times higher than official figures would indicate. A good estimate would put exports in 2011 and 2012 in the 3,000 to 5,000 ton per year rage and potentially even higher. Lebanese bottlers, traders and consumers have benefited massively from this cheaper oil source, but it does pose a problem for Lebanese olive oil producers who find themselves with increasing quantities of unsold stock.

8. VALUE CHAIN OPPORTUNITIES

There are two main opportunities to upgrade the olive value chain in Lebanon. The first opportunity is to build on the dynamic trend for private investment in higher quality milling by helping these operators to expand their volumes and access international niche markets. The second opportunity is related to increasing income to small and medium scale farmers through improving direct sales of olive oil for household consumption. Each of these is described below.

OPPORTUNITY 1: EXPORT THE HIGHEST QUALITY EXTRA VIRGIN OIL TO SPECIALTY MARKETS, CAPITALIZING ON IMPROVED PRODUCTION PRACTICES AND NEW MODERN MILLS

Private sector investments in milling and storage investments should lead to an increase in volumes of high quality extra virgin olive oil that has a potential export market. There is also an opportunity to capitalize on donor processing and storage investments in the cooperative sector that may be underutilized. Donor investments in improved olive tree production should also be yielding more olive oil over the medium term. When these factors are coupled with the extensive, though small scale market development work that has been done by many actors to sell into higher value niche markets in the U.S., Canada, and Australia, it is clear that the groundwork has been laid for a possible growth in extra-virgin olive oil exports at higher prices than what the main exporter brand and private label businesses receive at present.

However, pursuit of this opportunity is constrained by a number of critical factors. These are detailed below.

LACK OF QUALITY CONTROL MEASURES Despite the trend of increasing investment and attention to quality standards, the vast majority of mills and bottlers in Lebanon do not have quality certifications such as ISO or Good Management Practices (GMP) that help promote exports. Complicating this is the fact that there are no measures to ensure that quality tests given in Lebanon are truly drawn from a given bottler's products. Thus bottlers can put what they want on their labels with little chance that any actual verification of the applicable LIBNOR standards will be made. Nor are there any effective guidelines for labeling product origin. In its field work, the LIVCD team also heard multiple reports that private plant certifications can simply be purchased without audits of actual facilities and practices. This type of unethical practice undermines the value and control of the certification, and has the potential to damage the reputation of Lebanese olive oil internationally if defects or inaccuracies in plant certifications or in product quality specifications are discovered.

UNCLEAR PRODUCT STANDARDS AND LACK OF FAMILIARITY WITH INTERNATIONAL NORMS The lack of application of the LINBOR standards means that actors throughout the industry are mostly unable to say what quality of product they have for sale (or more specifically, they are unable to classify their product according to LIBNOR's norms). Traders, mills, and farmers also often have quality orientations governed by locally determined norms that make it hard for them to be effective suppliers of bottlers/exporters trying to adhere to international product standards. "Extra virgin olive oil" for instance has very little meaning when farmers really believe that all their stock is of extra virgin quality despite it having been milled and stored under conditions that make it impossible to meet the actual product standards for extra virgin oil. Enforcing product standards in a supply chain that involves mixing of different producer's oil presents problems on many levels.

LACK OF SOPHISTICATED MARKETING STRATEGIES: Broadly, Lebanese exporters can be classified in to two categories. First, there are a small number of high volume exporters,[8] who have reliable importers with well-established markets. These higher volume exporters need to be price competitive and meet the volume requirements of their importers. Most oil exported by these exporters is either sold under private labels or through the larger ethnic market importers/distributors that carry a wide range of products. The other category of exporter are low volume exporters who use a combination of personal contacts, family connections and smaller specialized importers or specialty foods distributors to export their product—often on a "one-off" basis. Exporters of the first type have little need for marketing advice, as their product strategy is mature and they enjoy multiple contacts in the markets they are serving. However, exporters of the second type generally need to attain a higher level of professionalism. They need to invest in product promotion strategies to develop market access on a stable basis and move off of a one-off mode of operation. Most of the exporters/bottlers/millers with strategies based on higher quality are of the second type.

A LACK OF VOLUMES OF HIGH-QUALITY OIL: Another major constraint of accessing high value and high quality export markets is the overall small volume of production in Lebanon and of high quality production in particular. A few of the larger bottlers and olive oil brands in Lebanon reported to the LIVCD team that they have been offered large contracts with exporters, but could not enter an agreement because they could not achieve consistent quality or meet the volume targets to fill these orders. Lebanese production is relatively small, it has high costs of production, and while imports from Syria are currently abundant in the Lebanese market, it is unclear if these flows will continue into the future.

2. OPPORTUNITY TO INCREASE INCENTIVES FOR DOMESTIC CONSUMPTION OF HIGH QUALITY LEBANESE OLIVE THROUGH INCREASED CONSUMER AWARENESS OF OLIVE OIL QUALITY AND ORIGIN.

Despite the recent adoption of LIBNOR norms, few Lebanese consumers understand the technical parameters governing the distinction between extra virgin, virgin, and pure olive oil. Nor do they even associate these categories with any hierarchy of product quality. They are also largely unaware of differences in how geographic origin may be presented on different types of labels and whether or not these are clear, reliable indicators of the origin of the oil. Because of this low level of consumer awareness of (or confidence in) quality standards and origin presentation, they have a natural compensating tendency to rely on personal relationships to guide their purchasing habits. This, in turn, stifles the emergence of clear market signals in favor of higher quality production and the greater use of Lebanese-origin oil, since there is no transparency in the value chain governing quality levels and actors are able to present a wide range of quality and origin mixes with no objective definitions that would be recognizable to consumers or verifiable to regulators. If there were credible quality and origin labeling systems, backed by needed verification procedures and accompanied by consumer educational campaigns to simply inform consumers of the technical and gustative distinction between extra virgin, virgin and pure olive oil, this would help consumers make informed product choices that would create price incentives that would flow down through the entire value chain. By increasing consumer awareness of international standards and origin and their confidence that Lebanese product using the appropriate labeling does meet the required standards, it should be possible to improve the economic returns to actors able to provide the qualities of oil with the source origins

[8] Maalouf and Saifin are the leading ones.

most demanded by consumers. The emergence of more sophisticated and informed consumers has the potential to catalyze improvements throughout the value chain- both in terms of increasing demand for quality oil and for helping Lebanese producers to compete with imports from Syria.

There are a few noteworthy constraints to this opportunity:

LIMITED TRACEABILITY SYSTEMS OR LABELING TO CERTIFY ORIGIN OF OIL: The Lebanese olive oil value chain is not configured to ensure traceability back to the producer level. It is likely that in the case of larger bottlers this is not all together unwanted since it allows a certain ambiguity to exist about the actual degree to which they use unreported Syrian imports. With consumers being basically unaware of the origin of the oil content in the bottled market segment, there is little reason for bottlers not to use cheaper good quality Syrian oil. This situation could be reversed, however, if a trusted origin label existed that would make it clear what product is truly of Lebanese origin and if consumers became aware that not all bottles were equally "Lebanese." But the existence of such a label with the needed back-up to ensure actual compliance faces many obstacles, not the least of which is likely opposition from some bottlers in the value chain. Currently the MoA has developed a concept for labeling that would include origin, but it is not at all clear how or even if this would be put into effect.

CONSUMER TASTES ARE BASED ON PERCEPTIONS OF QUALITY, WHICH ARE NOT LINKED TO INTERNATIONAL STANDARDS FOR OLIVE OIL: Lebanese consumers have an affinity for turbid, "sweet" olive oil that is produced using traditional milling practices. Quality testing is not customary in the direct bulk sales channel, and customers instead trust farmers or millers who ensure the quality of oil. The overwhelming majority of farmers interviewed by LIVCD confidently asserted that olive oil from their olives or their village is extra virgin, is "the best" in Lebanon, or in some cases, in the world. Farmers made this assertion whether or not their oil had been tested, and regardless of test results. When oil is tested, over 80 percent is considered virgin or lower quality, and after being improperly stored in farmers houses, many oils have defects. In many instances, consumers do not like or want the peppery flavor that is associated with high quality extra virgin oil made with the modern milling technology. Thus, while the normal quality hierarchy would privilege extra-virgin over virgin over pure olive oil, it is not necessarily certain that this will be the case in Lebanon, even after a consumer education campaign that informs consumers of the precise LIBNOR product definitions. The degree to which increased consumer sophistication really would lead to increased preferences for quality extra virgin olive oil that would drive widespread upgrading in the value chain is an unknown. While increased transparency and consumer confidence are desirable outcomes in any case, the multiplier effect in terms of this driving increased private investment in new technology mills, in stainless steel storage, and in secure production channels linking farmers to processors largely depends on how Lebanese consumers respond to the new norms and clear disclosure of origins.

LACK OF ACCESS TO THE BRANDED BOTTLED MARKET CHANNELS FOR SMALLER BOTTLERS: Currently, to access the best distributor retail networks, bottlers need to provide minimal turnover of around $1 million. Many cooperatives and smaller bottlers are unable to attain the volumes needed to meet this requirement. Furthermore, significant promotional and marketing expenses are required to promote a brand, which few bottlers are able or willing to do- especially the smaller ones with a focus on higher quality oil with more Lebanese content. These factors create a number of scale barriers that make it hard to launch new products in the branded bottled market channel.

9. UPGRADING STRATEGY

LIVCD's intervention in the olive oil value chain aims to: (1) expand the sales of branded and bottled Lebanese olive oil in the domestic and export markets (Channels 3 and 4), and (2) provide support for improved production to olive growers linked by supply relationships to specific exporters/bottlers/millers who are driving the sales increase in branded and bottled oil. Interventions in these specific branches of the value chain will help to facilitate actual implementation of the Government's general strategy of promoting improved quality standards and promoting oil of Lebanese origin. These changes will yield a stronger, more modern sector with improved linkages between growers and processors yielding improved and more stable incomes for all. To foster these changes, LIVCD will work through the three targeted upgrading axes described below.

AXIS ONE: CREATE NEW MARKET INCENTIVES IN FAVOR OF LEBANESE OLIVE OIL THROUGH THE USE OF ORIGIN LABELING AND/OR QUALITY STANDARDS LABELING.

Activities under this axis will be designed to guide value chain actors and public authorities through a participatory process of considering various labeling and certification options to define one or more schemes that can be used to spur demand for Lebanese origin olive oil that is able to meet international quality standards with clear accurate labeling according to the type and origin of the oil. Specific activities include:

HOLD STAKEHOLDER CONSULTATIONS TO CREATE CONSENSUS ON A LABELING STRATEGY: LIVCD will facilitate meetings and workshops with appropriate public sector actors and selected key stakeholders listed in the VC map to agree on a unified vision for possible olive oil labeling and certification. LIVCD will also facilitate regulatory measures from the public sector to support these certifications. Approaches to be considered will include: mandatory labeling requirements set by regulatory authorities; voluntary labeling and verification agreements led by a sub-set of selected exporters/bottlers/millers and or/cooperatives; hybrid arrangements with part-regulatory and part-voluntary components; and pure private brand-related approaches linked to the use of a specific brand with associated rules and standards. LIVCD will provide options papers and technical assistance from international experts in origin labeling schemes and work with value chain actors to set the limits of this exercise and define a specific timeline and outcome resolution. This activity will begin with an examination of existing labeling arrangements that are not currently used (the "l'Olio Del Lebano" logo, and the "Cedars Excellence Seal") or are being used only on a very small scale. The focus of this activity will be to create general labeling initiatives that all or some actors in the value chain will support as a common standard—not to develop individual commercial labels linked to only one value chain actor. Such activities will help define the characteristics and function of the label that will generate increased market access and prices for oil.

LAUNCH A PROMOTION CAMPAIGN IN KEY MARKETS OVERSEAS AND IN LEBANON TO RAISE AWARENESS ABOUT THE NEW LABELING SYSTEM OR SYSTEMS: The objective behind this intervention is to develop a publicity campaign to accompany the launch of the label that will target Lebanese communities in potential export markets such as the U.S., Australia, and the GCC as well as inside of Lebanon. Since the design of the scheme will benefit private exporters/bottles/millers, it will be expected that companies which stand to benefit from the success of the labeling campaign will contribute to the needed publicity. LIVCD will also coordinate with other donors and the public sector to

mobilize co-financing and use its own resources only for strategic financing or design support where it can complement other sources of funding. The campaign will raise awareness among consumers that they cannot be certain that oil is of Lebanese origin (or possibly regional origins inside of Lebanon) unless the agreed upon label is attached. Quality parameters as determined by LIBNOR may also be associated with this scheme and used to increase consumer awareness of the differences between oil according to the standard international grades.

AXIS TWO: FACILITATE INCREASED INVESTMENTS AND IMPROVEMENTS IN QUALITY OF OLIVE OIL THROUGH IMPROVED STANDARDIZATION OF OLIVE MILLING AND STORAGE.

As LIVCD works with different value chain actors in Axis One, we anticipate that a number of key quality-focused exporters/bottlers/millers will emerge in support of the labeling concept. LIVCD will enter into Public-Private Partnerships (PPPs) with these actors that will be designed to support improvements in their supply chain, linking them mainly to small and medium farmers and wood damans through olive mills or cooperatives where this would be feasible. Improvements made under this Axis will be designed both to increase the supply of good quality (essentially extra virgin) oil and establish systems to ensure product traceability measures that verifies conformity with the origin labeling scheme that is adopted as a result of Axis One interventions.

Specific activities that will be implemented jointly within the framework of the PPPs will include:

SUPPORT FOR IMPROVEMENTS IN PROCESSING AT MILLS: LIVCD will develop and provide standard technical and financial models of improved technology mills to help potential investors (including PPP partners) assess investment opportunities and obtain financing. Given the anticipated profitability of improved olive oil milling and the past investments of donors in olive oil mills, it is not anticipated that LIVCD will actually fund equipment or facilities upgrading, as private financing should be available for these purposes. Rather, we will provide needed packaging and help with technical designs to aid investors implement their own projects. This will include assistance with training on good management practices and facility certifications, such as ISO and HACCP.

ESTABLISH CENTERS FOR IMPROVED OLIVE OIL STORAGE AND COLLECTION: Stored olive oil deteriorates between harvest and the summer months. Much of the deterioration is a result of poor storage practices. Exporters/bottlers/millers, which are focused on quality and Lebanese origin will face a shortage of supply unless they have a network of improved olive oil storage centers that control product quality on entry and have appropriate stainless steel storage tanks. LIVCD will work with its PPP partners to set-up such centers according to specific parameters determined by the PPP partner. The exact locations and management models for the centers will vary according to local conditions. Possibilities include private storage centers located at upgraded service mills, farmer cooperative storage schemes (which often have storage equipment that is not being used), private traders linked under contract to the exporter/bottler/miller, or even informal lead-farmer arrangements with well-respected community members. LIVCD will work with whatever model is appropriate to set up needed control procedures so that farmers will have confidence in the quality standards and willing to mix their product and ensure that the system meets origin labeling requirements. This idea rests on the

assumption that the exporter/bottler/miller who is the lead PPP partner with LIVCD will be able to negotiate terms of purchase for olive oil that incentivize the storage facility managers/owners and farmers to work within the rules of the system. The market demand created through the support for the labeling scheme under Axis One should provide the needed incentives to make this possible.

AXIS THREE: IMPROVE OLIVE TREE PRODUCTIVITY

Improving production systems to lower unit costs of olive oil production is another essential component of LIVCD's strategy. We will intervene at this level in zones where collection centers under Axis Two have been established to support increases in farmer production and product quality. Production support activities will build on previous projects' experience in improving olive tree productivity and orchard management. The intent will be to focus productivity-related actions on zones of production where PPP partners have entered into supply agreements, particularly with the establishment of pricing incentives built around the collection centers in Axis Two.

Specific activity envisaged are listed below,

ESTABLISH LOCAL PRODUCTION SERVICE CENTERS. Similar to our approach with improved storage, we will work to identify local partners in key locations that supply the exporter/bottler/millers with whom PPPs are signed who will intervene to promote improved production practices and offer actual services on a for-fee basis to olive farmers and wood damans. These may be municipalities, informal producers groups, cooperatives, NGOs or private companies or partnerships. Service centers will have the mission to increase olive tree productivity by achieving economies of scale and propagating new and appropriate agriculture practices. Those service centers need to be financially self-sustainable through the services they are offering that may be part or all of the below:

- Spraying service
- Weeding service
- Harvesting service
- Collective purchase of inputs (fertilizers, compost, or pesticides)
- Collective purchase of new olive trees varieties
- Extension service on appropriate agriculture practice
- Accounting and financial assistance to farmers
- Advocate for collective crop insurance
- Collective oil distribution to households or HoReCa

LIVCD will facilitate a participatory process between users and the potential management entity to establish the type and structure of those centers. The centers will also help in making linkages to markets and to integrate the production into the bottlers' supply strategy in order to ensure good compatibility between the supply and demand of olive oil.

LINK THE SERVICE CENTERS WITH UNIVERSITY OR AGRICULTURAL TRAINING SCHOOLS TO OFFER PRACTICAL TRAINING IN OLIVE PRODUCTION TO STUDENTS. Service centers will provide a fertile ground for training, research, and demonstration. LIVCD will facilitate linkages between the service centers and university and research centers to maximize student learning opportunities that are practical and have real world relevance for Lebanese agricultural development. Some University and training programs that will be targeted include: the École supérieure d'ingénieurs d'agronomie méditerranéenne at Saint

Joseph University, the American University of Beirut faculty of Agriculture and Food Sciences, the Faculty of Agricultural and Veterinary Sciences at the Lebanese University, and other programs. The centers could also provide internships and opportunities for students to coordinate dissertation projects with long term research objectives of the Centers.

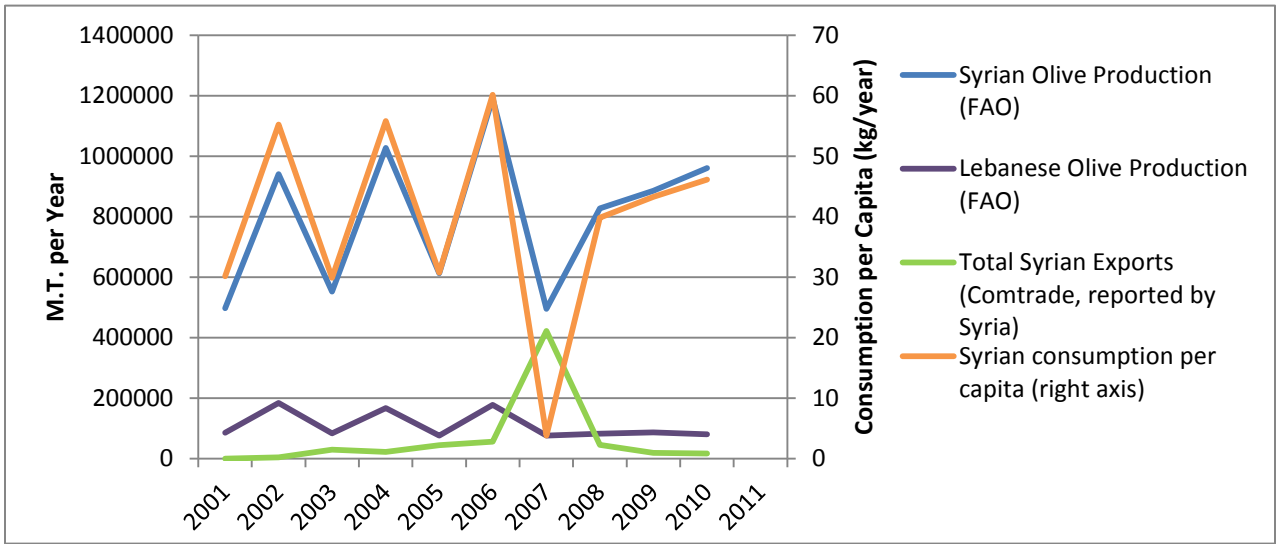
ANNEX 1: ADDITIONAL ANALYSIS OF SYRIAN OIL TRADE WITH LEBANON

The LIVCD team received multiple, conflicting reports regarding the true volume of olive oil being imported to Lebanon from Syria. Stakeholders report consistent, high levels of Syrian oil flowing into the Lebanese value chain with a significant increase in volume since the onset of the Syrian crisis in 2010. Meanwhile, Comtrade data (which is based on figures received from Lebanese and Syrian customs authorities) reports relatively low volumes of imports, with significant variability between direct data from the importing country and mirror data from the exporting country. Since the beginning of the crisis official figures from Syria show a decline in volume, while official figures from Lebanon show constant low levels of imports with normal volatility.

The narrative below uses trade data from Comtrade and production data from FAOStat to explain why the LIVCD assessment team estimates that the actual volume of oil flows from Syria is significantly higher than reported by official sources, with an estimate of around 4,000 mt of imports from Syria in the Value Chain Map for this analysis.

Figure 1 presents production, exports, and consumption per capita for Syrian olives and olive oil. Lebanese olive production is also presented to show the difference in scale of production between the two countries. In 2010, Syria was the 6th largest producer by value and volume of olives in the world, while Lebanon was the 17th largest (FAO). As seen in Figure 1, Syrian exports of olives (green line) increase by over 650 percent in 2007 and drops back down to a normal level in 2008. Meanwhile, Syrian consumption per capita (orange line- right vertical axis) suggests per capita levels of consumption that are very high, between 30 and 60 kg per person in all years except 2007. These figures are significantly higher than per capita consumption in other large scale producers such as Italy, Spain, and Greece, which consume 10-20 kg per capita, and Lebanon, which consumes on average 4.3 kg per capita (FAO). In 2007, however, when Syria reports exceptionally high exports, its per capita consumption falls to 5 kg, which seems slightly low, though still more reasonable that previously reported high numbers. Syrian exports occur through official and unofficial channels. Using per capita consumption, we can deduce that actual (official plus unofficial) Syrian exports are closer to the figure reported in 2007 than the figures reported in other years. The LIVCD team was not able to discern what event triggered higher volumes of exports or more likely a more accurate reporting in 2007.

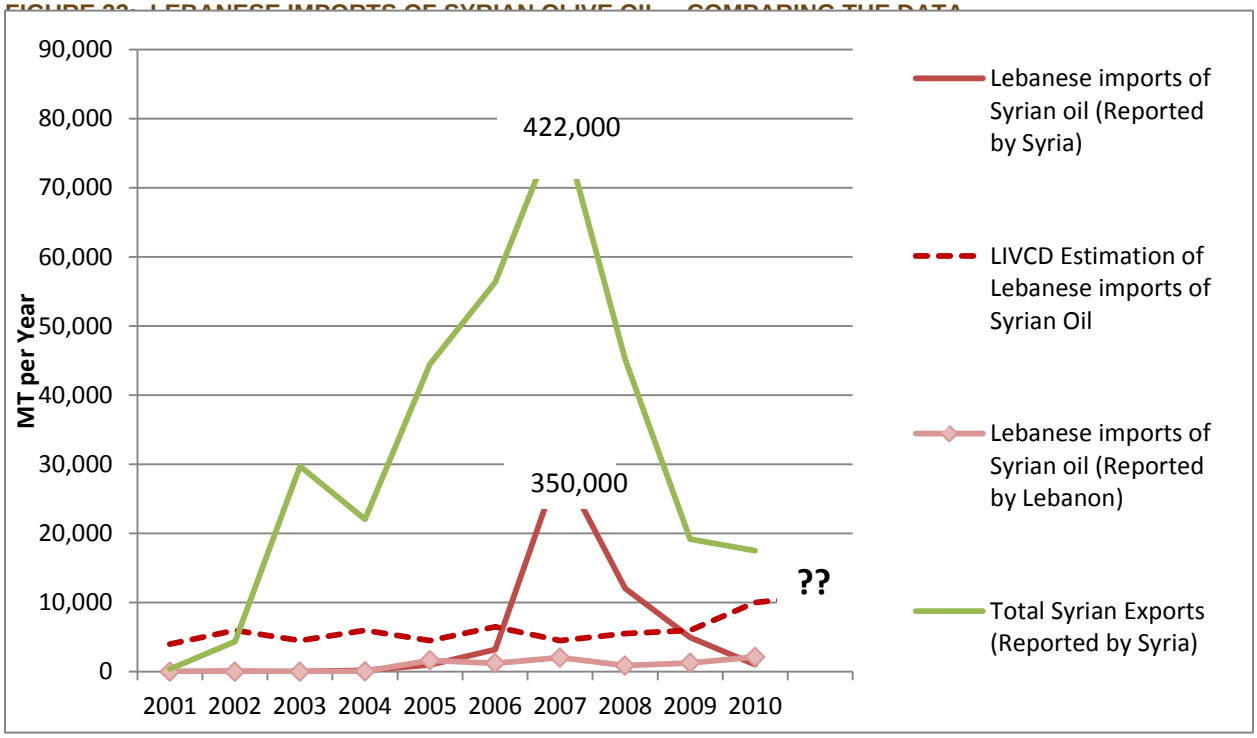
FIGURE 22: PRODUCTION, EXPORTS, AND CONSUMPTION PER CAPITA OF SYRIAN OLIVE OIL



Source: Comtrade and FAOStat

Figure 2 presents trade information on total Syrian exports of olive oil and Syrian exports of olive oil to Lebanon. Official numbers reported by Syria show that exports of olive oil peaked in 2007 with total exports that were 650 percent above 2006 levels, and exports to Lebanon that were 10,000 percent above the 2006 quantities. (The 2007 peaks are too high to be illustrated specifically in Figure 2). Official data reported by Lebanon on imports of olive oil from Syria (pink line) do not show any increase in 2007. As explained above, the LIVCD Assessment team estimated that Syrian export figures as reported in 2007 may be closer to actual exports (accounting for unreported flows) than other years.

Thus, the LIVCD team estimates that actual exports of olive oil from Syria to Lebanon are significantly higher than volumes reported by Lebanon and Syria with the exception of 2007. This estimate (red dashed line) reconciles the disparity between stakeholder reports, official trade data, seasonality of production in Syria, and a volume that the Lebanese value chain could reasonably absorb. It puts imports of oil from Syria at between 3,000 and 6,000 tons per year before the Syrian crisis, and between 6,000 and 10,000 tons after the onset of the Syrian crisis. These numbers reflect a hypothesis; they should be interpreted with wide error margins. In the interest of conservatism, we have used the figure of 4,000 tons in our value chain analysis; although in reality the figure in 2012 was probably higher than this. The 4,000 ton estimate should be considered as a minimum.



Source: Comtrade, FAOStat, and LIVCD Estimates

Changes in the unit values of Syrian olive oil have also impacted olive oil market dynamics between Syria and Lebanon. Until 2007, Syrian olive oil was significantly less expensive than Lebanese olive oil. This encouraged Lebanese bottlers to import Syrian oil as a way to reduce the overall cost of olive oil bottling. Between 2007 and 2010 however, the average value of Syrian oil exports rose to the same level as Lebanese oil. This increase was due to a combination of factors including improved oil quality reflecting investments made by European olive oil companies, greater market demand for Syrian oil, and new trade partners. At this time, Lebanese bottlers had fewer incentives to import Syrian oil. Even though Syrian production over this period goes up, Lebanese imports (according to LIVCD estimates) remain proportional to production and hold at fairly stable levels. Since the onset of the Syrian crisis in 2010, the price of Syrian oil has fallen precipitously. Disruption of trade routes to many traditional trading partners has caused a surplus of Syrian oil with limited outlets. Syrian oil can still be transported to Lebanon, where it is available in abundance and sold at very low prices. Since 2010, Lebanese bottlers have been taking advantage of this inexpensive oil to reduce overall cost of bottling.

There is a high level of uncertainty around the timeline and outcome of the Syrian crisis and its impact on the Syrian olive oil value chain going forward. Conflict has led to labor scarcities, increased costs of diesel, limited availability of agricultural inputs, and physical destruction of infrastructure, which contributes to lower productivity and raises the cost of Syrian olive oil production. On the other hand, if other trade routes continue to be blocked, it does not take much Syrian olive oil to overwhelm the relatively small Lebanese market, which could keep prices low as long as the conflict continues. Although it is impossible to postulate if their market predictions are accurate, Lebanese value chain actors report that people are purchasing large quantities of Syrian oil to store because they anticipate that prices will rise in the near future.

ANNEX 2: DETAILED PER DUNUM COSTS OF PRODUCTION

		Small Olive Grower (5 dunums)				Medium Olive Grower (50 dunums)				Large Olive Grower (100 dunums)			
		Cost of production per dunum (1000 m²)				Cost of production per dunum (1000 m²)				Cost of production per dunum (1000 m²)			
Action	**Unit**	**Notes**	**Qty. per year**	**Cost per unit $**	**Total cost $**	**Notes**	**Qty. per year**	**Cost per unit $**	**Total cost $**	**Notes**	**Qty. per year**	**Cost per unit $**	**Total cost $**
Pruning	Worker	Pruning is done once every 3 years, 1 trained worker to prune 1 dunums as the trees need to	0.33333	33	11	Pruning is done once every 2 years,1 trained worker to prune 2 dunums as the trees need less	0.25	33	8.25	Pruning is done once every 2 years, 1 trained worker to prune 2 dunums as the trees need less	0.25	33	8.25
Fertilizer application - Manure	worker	1 worker for manure distribution once every 3 years who does 5 dunums per day (paid daily)	0.06667	20	1.33333	1 worker for manure distribution once every 2 years, who covers 10 dunums per day	0.05	20	1	1 worker for manure distribution once every 2 years who covers 10 dunums per day	0.05	20	1
Fertilizer application - Chemical	Worker	Not Applied	0	0	0	Applied once every 2 years. 1 worker for fertilizer distribution who covers 10 dunums per day	0.05	20	1	Applied once every 2 years. 1 worker for fertilizer distribution who covers 10 dunums per day	0.05	20	1
Weeding	Worker	No weeding usually use tillage	0	0	0	The weeding is done during the tillage	0	0	0	The weeding is done during the tillage	0	0	0
Tillage	Tractor Hour	Renting a tractor service. Tillage 2 times per season (Autumn and spring), about 1 hour per dunum	2	20	40	Tillage 2 times per season (Autumn and spring), about 1 hour per dunum	2	17	34	Tillage 2 times per season (Autumn and spring), about 1 hour per dunum. Using his own tractor: cost of fuel and consumption per hour: $5/ dunum. Driver for tractor fee $50, working 10 hours per day equal to 10 dunums per day. Cost of driver: $5 per dunums.	2	10	20
Irrigation		No irrigation	0	0	0	No irrigation	0	0	0	No irrigation	0	0	0
Harvesting	Worker	Manual harvesting, 5 workers harvest 2 dunums	2.5	25	62.5	3 workers with small harvesting machine can harvest about 500 kg/day or about 2 dunums. 3 workers/2 dunums = 1.5	1.5	20	30	5 workers with large harvesting machine can harvest about 4 dunum. 5 workers/4 dunums= 1.25	1.25	20	25
Harvester machine	Day/ Work	Not Used	0	0	0	Cost of fuel and machine consumption. Small machine can harvest 2 dunums per day	0.5	10	5	Cost of fuel and machine consumption. Large machine can harvest 4 dunums per day	0.25	15	3.75
Transportation to mill		Usually a small farmer uses his own car (Less than 5 km), so the cost is based on fuel consumption	1	2	2	Rent a pickup. Transportation of olive harvested occurs every 2 days (1000 kg). Average production per dunum is 250 kg. 250/1000= 0.25	0.25	20	5	Use owned pickup. Driver + fuel + pick up consumption = $15 per tripl. One trip every 2 days (2400 kg) equal to 8 dunums production. Average 1 dunums production is 300 kg. 300/2400= 0.125	0.125	15	1.875
Pesticide spraying (insecticide + fungicide)	Worker	Usually no spraying	0	0	0	2 workers for pesticide spraying cover about 20 dunums per day. Spraying done 2 times per season (2 x 2 = 4 workers for 20 dunums. 4/20 = 0.2)	0.2	30	6	2 workers for pesticide spraying cover about 20 dunums per day. Spraying done 2 times per season (2 x 2 = 4 workers for 20 dunums. 4/20 = 0.2)	0.2	30	6
Organic matter cost (Animal manure)	Bag	About 30 bags per dunum each 3 years (the quantity divided per 3)	10	2	20	About 30 bags per dunum each 2 years (the quantity divided per 2)	15	1.9	28.5	About 30 bags per dunum each 2 years (the quantity divided per 2)	15	1.8	27
Fertilizers cost	Kg	Usually no fertilizers are used	0	0	0	Average cost of the chemical fertilizers $115 per dunum every other year.	0.5	115	57.5	Average cost of the chemical fertilizers $110 per dunum when purchased in bulk. Value divided by 2 as the fertilizers are added every other year.	0.5	110	55
Pesticides cost (insecticide + fungicide)	Kg	Not used	0	0	0	0.33 liters of insecticide per dunum equals $5. Fungicide needed for 1 dunum: 1 kg, which costs $17. Total:$22	1	22	22	0.33 liters of insecticide per dunum. costs $4 when purchased in bulk. Fungicide needed for 1 dunum: 1 kg at $16. Total: 20 $	1	20	20
Water	m³	Not used in almost all the olive growing region, except at the new plantation in Baalbek Hermel region	0	0	0	No irrigation	0	0	0	No Irrigation	0	0	0
Milling (Oil)	kg	Average fee: 1000 LBP for 1 kg of oil, Taking into consideration that average production of oil per dunum in this case is 30 Kg	30	0.67	20.1	Average fee: 1000 LBP for 1 kg of oil, Taking into consideration that average production of oil per dunum in this case is 50 Kg	50	0.67	33.5	Average fee: 1000 LBP for 1 kg of oil, Taking into consideration that average production of oil per dunum in this case is 60 Kg	60	0.67	40.2
			TOTAL		**156.933**		**TOTAL**		**231.75**		**TOTAL**		**209.075**

ANNEX 3: MAJOR DONOR PROJECTS IN THE OLIVE SECTOR SINCE 2002

Project name	Implementers	Donors	Budget	Geographical areas	Result achieved on Olive sector
Projet de soutien à la réhabilitation agricole du Liban Sud. 2001 - 2004	ICU - MoA	EU	Total budget 3.5 M €	Bent Jbeil, Marjeoun and Hasbaya	- Creation of 3 agricultural center (Olive Mill, bottling, storage); - Extension; - Assistance for marketing;
SMART Program 2004 - 2007	YMCA	USAID	-	Hasbaya	- Extension; - Marketing;
Expanding economic opportunities in Lebanon 2004 - 2007	SRI International, INMA	USAID	-	North, South	- Extension; - Assistance for Marketing
Expanding Economic Opportunities II. 2004 - 2007	Mercy Corps	USAID	-	Hasbaya, Marjeoun, Nabatiyeh	- Extension; - Olive mill rehabilitation; - Equipment distribution for Coops;
CEDARSplus program - Enhancement of the Olive Oil Sector in Lebanon project 2006 – 2008	RMF - CHF	USAID	-	South and North Lebanon, Chouf	- Extension; - Rehabilitation of 5 olive mills; - New olive mill establishment in Kfifan - Batroun; - Creation an olive oil storage facility in Zogharta, - Capacity Building for olive millers; - Equipment distribution for Coops;
Sustainable Agribusiness Initiative for Lebanon (SABIL) -2005-2008	World Vision	USAID	USD 8 M	South-North -Bekaa	Development of organic olive oil production. Leverage high volumes of olive oil from small scale farmers who do not typically spray trees with chemicals, help them obtain organic certification, and identify niche markets that would pay a price premium for organic oils.

Emergency project for the rehabilitation of olive oil sector in the regions damaged by the war in South Lebanon" - Ross Program 2007 – 2009	ICU	Italian cooperation	0.6 M €	Marjeoun, Bent Jbeilm Tyre, Nabatiyeh	- Extension; - Rehabilitation and modernization of 4 olive mills and creation of 2 new modern olive mills; - Equipment distribution for Coops;
Integrated Waste Management for the Olive Oil Pressing Industries in Lebanon, Syria & Jordan. 2005 – 2008	UNDP - MoE	EU	1.7 M $	All Lebanon	- studies about waste management; - extension; - Review legislations; - Financial incentives for the adoption of cleaner production
Centre pilote d'appui a l'oléiculture dans le bassin de Naher El-Awali	ILDES – AIDA	AECID (Spanish Agency	-	Chouf and Saida	- Creation of an agricultural center (Olive Mill, bottling, storage) in Bessri – saida; - Extension;
Projet de Développement Oléicole dans le Sud Liban" 2008 - 2010	ICU	AFD (Agence Française de Développement).	0.7 M €	Bent Jbeil	- Extension; - creation of 4 modern olive mills;
Improving Farming Agriculture in South Lebanon project - Rural Development in the South of Litani. 2009 – 2011	RMF - FPSC	AECID	-	Marjeoun, Hasbaya, Bent Jebil and Tyre	- Extension; - Olive mill establishment in Yarin; - Equipment distribution for Coops;
Social and economic support for the families of producers in olive-growing marginal regions in Lebanon - l'Olio del Libano Project – Phase 1. 2009 – 2012	IAMB – MoA ICU	Italian Cooperation	3.3 M €	North: Akkar, Minieh, Zogharta; South: Nabatiyeh, Marjeoun, Hasbaya, Bent Jebil and Tyre; Bekaa: Hermel, Bekaa west and Rachaya	- Extension; - Equipment distribution for Coops; - Assistance for marketing; - create national Map for Olive trees distribution - Olive varietal characterization
Development of Olive sector in Akkar 2009 – 2010	ICU	Italian Cooperation	230.000 €	Akkar	- Extension; - Olive mill establishment in Abde LARI Center (Akkar);

					- Assistance for olive nursery in LARI station and olive varieties assessment;
The National Program of the Improvement of the Olive Oil's Quality and Actions Against the Diffusion of Stone Fruit Phytoplasma -- l'Olio del Libano Project – Phase 2. 2012 - 2013	MoA – ICU IAMB	Italian Cooperation	0.6 M €	Batroun, Kourah, Chouf and Baalbeck region.	- Extension; - Equipment distribution for Coops; - Rehabilitation of the national laboratory for olive oil;
Community strengthening and improvement of living conditions in Lebanon 2010 – 2012	ICU - UNIDO	Italian cooperation	0.4 M $	Akkar, Tyre	- Extension; - Creation of 2 modern olive mill in Chadra (Akkar) and Deir Kanoun Al-Naher (Tyre);
Conflict Prevention & Peace Building in North Lebanon 2009 – 2012	UNDP-FAO-ILO	-	-	Akkar	- Creation of olive mill in Akkar; - Extension; - Creation of olive production cooperative in the region;

ANNEX 4: LIST OF PERSONS MET

Name	Position	Location	Phone Number
Antoine Lakkis	Large miller, exporter	Zghorta	
Youssef Fares	Integrated Producer-Olive Trade	Baino, Akkar	
Toni Maroun	Brand owner of Zeit Boulos, GM of Atyab SAL	Jounieh	
Ibrahim Maalouf	Large bottler, miller	Koura	
Group of growers in Jezzine	Small- medium growers	Bkasssine- Jezzine	
Al Me'taz mill	Owner is producer + mill owner	Benwate- Jezzine	
Elie Fares	Owner of modern mill	Leb'a	03-961150
Roland Andary	Board member of Der Bechtar Olive oil coops	DAI office	03-590920
Georges Abi Rizk	Economic development specialist, World Vision	DAI office	
Georges Saifan	Bottler, Exporter and distributor, GM of Saifan brand	Amyoun, Koura	
Joseph Khoury	Integrated Producer-Willani Co.	Bechennine, Zghorta	03 228849
Paul Khoury	Small mill owner	Arjis, Zghorta	03 281117
Jamil El Ghazzi	Grower and Head of Deir Mimas Coop	Deir Mimas, Marjayoun	76 463213
Anwar Naafour	Organic Grower and Mill owner	Deir Mimas, Marjayoun	70 886467
Joseph El Gharib	Owner of Lebolive	Group meeting in Kawkaba, Hasbayya	03-486417
Rachid Zouaihed	Head of coop + mill owner		03-499361
Alameddine Badaoui	Hasbayya Farms		71-518609
Ghayth Maalouf	Head of coop + grower		03-750470
Assaad Matta	Mill owner		03-542767
Joseph Mrad	Grower - Rachaya El Foukhar		71-785272
Nouhad Obeid	Mill owner		70-845110
Chahine Elias	Head of coop + grower		03-816164
Hussein Derbieh	Mill owner (modern)		03-180641
Badih Abou Nakoul	Grower+nursery		07-845075
Elias Matta	Grower (Kawkaba)		03-311669
Ezzat Badawi	Bottler (Badawi Oil)		70-942268
Amin Esper	Medium Farmer	Bechmezine, Koura	03 341582
Wafaa Greig	Small Farmer	Anfeh, Koura	03 605043
Bahzad Sarhan	Large Farmer	Bterram, Koura	03 539883
Zaki Oubeid	Medium Farmer	Kfarhazir, Koura	03 629092
George Barakat	Farmer and Head of Amyoun Municipality	Amyoun, Koura	03 458450
Moussa Ghantous	Farmer and Mill Owner	Amyoun, Koura	03 328360
Youssef Fares	Integrated Producer-Olive Trade	DAI office	03 283724

ANNEX 5: SWOT ANALYSIS

The following table provides a brief summary of the strengths, weaknesses, opportunities, and threats to the olive value chain as communicated by the LIVCD assessment team in this value chain assessment.

Strengths • Olive production is spread all over Lebanon, up to 1,000 meter altitude • Olives are resistant and low input trees • Olive varieties used in Lebanon have high organoleptic and commercial potential when milled • Increasing numbers of modern mills and investments and upgrades in traditional mills that can absorb a much larger production without requiring additional relevant investments • Some mills have reached high quality standards and production levels • Increasing private investments in production of high quality olive oil for niche export markets and domestically	**Weaknesses** • Fragmentation of olive orchards, vast majority is below 5 dunums • High production cost of olives lead to high farm gate prices • Low production quality of olives especially in the North due to poor agricultural and orchard management practices • Lack of incentives for growers to improve productivity and production quality because of low market prices achieved of olives and oil • Growers store unsold oil during harvest season poorly in containers that reduce the quality of the oil • Unavailability of marketing channels and outlets is pushing growers to sell at below production cost to olive traders and bottlers • Lack of customer awareness about product quality and specifications of high quality versus low quality oil • High quality "Extra Virgin Olive Oil" represents a low percentage of oil production • Most olive cultivars do not have official varietal identification leading to mixed orchards.
Opportunities • MoA is giving increasing attention to the Olive Oil subsector that has also been of great interest to international development programs • Lebanese olive oil has an appealing quality in the region and export countries with high concentration of Lebanese diaspora especially in the GCC and North America • Quality of Lebanese olive oil allows it to target specific niche and specialty export markets (for blending and unblended) • Global demand and consumption of olive oil is increasing • Increase olive oil consumption per capita that is at 4 kg to reach higher levels reached in other Mediterranean countries • Lebanese customers prefer domestic oils to imported ones	**Threats** • Competition with cheaper Syrian oil that floods the market • Lack of adequate monitoring and enforcement of quality standards and regulation at the field, milling and bottling levels where adulteration cannot be controlled. • High production in European countries could flood the Lebanese market with cheaper oil • Bad economic situation and low purchasing power leads to decrease purchase of high quality olive oil

ANNEX 6: BUSINESS ENABLING ENVIRONMENT MAP