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HONEY VALUE CHAIN IMPACT ASSESSMENT
SEPTEMBER 2017

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Acronyms

AOAD Arab Organization for Agricultural Development

AVSI Association of Volunteers for International Service

CCD Colony Collapse Disorder

CCIAT Chamber of Commerce of Tripoli

ECHO European Commission Humanitarian Aid Department

EU European Union

ESIAM Ecole Supérieure d'Ingénieurs d'Agronomie Méditerranéenne

FAO Food and Agriculture Organization of the United Nations

FT-NIR Fourier Transform Near-Infrared Spectroscopy (FT-NIR)

GCC Gulf Cooperation Council

HMF Hydroxymethylfurfural

IDAL Investment Development Authority of Lebanon

IRI Industrial Research Institute

ISO International Organization for Standardization

LARI Lebanese Agriculture Research Institute

LIBNOR Lebanese Standards Institution

LIVCD Lebanon Industry Value Chain Development

MoA Ministry of Agriculture

MT Metric Tons Equal to 1000 kilogram. Also called Ton

NGO Non-Governmental Organization

TOT Training of Trainers

UL Lebanese University

UNDP United Nations Development Programme

UNIFIL United Nations Interim Force in Lebanon

US United States

USAID United States Agency for International Development

USEK Holy Spirit University of Kaslik

USJ Saint-Joseph University

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Overview of the Honey Value Chain

At present, Lebanon produces 3,500 tons of honey per year. Despite these relatively small market values, the value chain engages large numbers of poor rural Lebanese households that can participate in honey production as initial investment costs are low and farmers do not need to own or lease land for the bees. Cooperative labor sharing arrangements among rural households at harvesting season further reduce barriers to entry to beekeeping, which provides income to over 7,500 rural households.

Since 2014, the sales volume of Lebanese branded honey has increased following market penetration into domestic retail distribution networks. Honey exports to high-value Gulf Cooperation Council (GCC) markets are also increasing. Likewise, honey exports to Canada and USA are growing, although export levels into these two markets remain small. Investments in better quality testing facilities as well as growing consumer confidence in Lebanese brands have also played a role in the increasing sales volumes of branded honey. In another positive development, the Government of Lebanon has updated policies to promote higher product standards and specifications in the honey market.

Over the last two years, the private sector has made investments to improve product quality and to achieve International Organization for Standardization (ISO) certification. The private sector has also invested in marketing and laboratories, which has increased access to both the export and the local Lebanese retail markets. Another significant development has been the establishment of the first artificial insemination center for queen bees in the Arab world, which opened in September 2016.

MAJOR CHALLENGES

- **At the production level**
 - Lack of understanding of modern beekeeping techniques and lack of information and technical skills for treating diseases affecting bees and honey, such as the Varoa mite, American foulbrood disease, Colony Collapse Disorder (CCD), and others
 - Need for extensive training and counseling for new beekeepers during the first year of production; need for advanced follow-up training for established beekeepers
 - Very limited access to queen bees of good quality
 - Lack of understanding of pesticide usage in agriculture

- **At the aggregation level**
 - Limited access to professional extraction, wax recycling, and bottling services

- **At the market level**
 - Lack of trust in the quality of branded honey
 - Limited access to accredited lab tests required for export, mainly for pesticide residues and Antibiotics tests
 - Competition on the local market with imported brands and poor quality “artificial” honey

- Limited implementation of the new regulations issued by the Ministry of Agriculture and the Lebanese Standards Institution (LIBNOR)
- Need for stronger market linkages for producers with more than 50 hives
- Limited resources and competencies for brand development for smaller brand owners
- Consumer perception that unbranded honey purchased directly from beekeepers is of a higher quality and more authentic than branded honey
- Limited access to export markets due to the high cost of marketing to enter these markets
- Stringent conditions and requirements imposed by markets in the European Union (EU) and prohibitive cost of testing required for exports

AREAS OF INTERVENTION

- **Access to markets**
 - Marketing support to Lebanese honey to increase sales on both the domestic and export markets
- **Aggregation and processing**
 - Support improved honey extraction, aggregation, and processing
- **Sustain and increase the production of honey**
 - Support to increase the number of beehives across Lebanon
 - Sustain and increase beehive productivity through training
 - Enhance quality of queen bees

Honey Production

PRODUCTION TRENDS

Based on data by the Ministry of Agriculture, honey production in Lebanon increased by 75% between 2011 and 2016, reaching a market value of \$65 million in 2016. Between 2011 and 2016, the number of beehive increased by 114%, from 168,214 to 360,179 – rounded to 360,000 for the purpose of simplification (Annex 1). According to the same Ministry data, productivity per hive decreased from 11 kg/hive to 9 kg/hive during 2016. Interviews with some of the largest beekeepers in Lebanon, however, have revealed slightly different figures than the more conservative data of the Ministry of Agriculture (MoA). According to the private sector, the minimum average production for beekeepers in 2016 stood at 12 kg/hive (Figure 1).

FIGURE 1- HONEY PRODUCTION KEY FIGURES

Year/Honey VC Data	# of Beekeepers		# of Hives		Productivity/hive(Kg/hive)		Honey Production in Tons		Market Size Value in USD Million		Avg farm Gate price USD
	MoA	Private Sector	MoA	Private Sector	MoA	Private Sector	MoA	Private Sector	MoA	Private Sector	
2011	5,230	5,500	168,214	190,000	11	14	1,850	2,355	\$27,755	\$35,325	\$15
2012	5,230	5,700	198,000	198,000	11	14	2,178	2,772	\$32,670	\$41,580	\$15
2013	6,100	6,100	227,000	227,000	11	14	2,497	3,178	\$37,455	\$47,670	\$15
2014	6,200	6,200	257,000	257,000	11	14	2,827	3,598	\$45,232	\$57,568	\$16
2015	6,500	6,500	328,832	300,000	8	8	2,631	2,400	\$52,613	\$48,000	\$20
2016	7,500	7,500	360,000	320,000	9	12	3,240	3,840	\$64,800	\$76,800	\$20

SOURCE: MINISTRY OF AGRICULTURE AND PRIVATE SECTOR DATA

Based on data available from both public and private sources, LIVCD estimates the following average numbers for the years 2011 and 2016 (Figure 2):

FIGURE 2- VOLUME AND VALUE OF HONEY

Estimated Numbers	2011	2016	Growth
Volume of Honey (MT)	2,280,000	3,520,000	54%
Value of Honey (\$ million)	34,200,000	70,400,000	106%
Number of Beehives	190,000	320,000	68%
Number of Beekeepers	5,500	7,500	36%
Productivity per hive in kg/hive	12	11	-8%
Farm gate Price \$/kg	15	20	33%

SOURCE: ESTIMATED NUMBERS BASED ON MINISTRY OF AGRICULTURE AND PRIVATE SECTOR DATA

In 2015 and 2016, adverse weather conditions in Lebanon negatively affected the beekeeping sector. They were particularly devastating to beekeepers relying on the oak season.

- In 2015, cold temperatures and rain in late April and early May washed away the aphids that produce the secretion responsible for the production of oak honey. As a result, no oak honey was produced.
- In late August and early September 2015, a sand storm hit Lebanon, affecting the production of wild flower honey.

The decline in productivity per hive in 2015 and 2016, however, was compensated by an increase in the total number of beehives, partly as a result of the LIVCD honey distribution program, which introduced almost 6,500 beehives through co-investment with beekeepers. In addition, beekeepers swarmed their beehives (the process of using splitting existing beehives into two or several beehives) to create additional beehives to compensate for loss of productivity. Swarmed beehives have a minimum market value of \$125/hive, increasing both volumes and values of the honey sector

Medium to large beekeepers, who move their hives to different climatic zones within Lebanon during the year, typically harvest two seasons: The orange blossom and wild flower seasons. In 2015, the high-value oak honey season, which represents almost 25% to 30% of the total production of Lebanese honey, was lost, as mentioned above. Consequently, there was a reduction in productivity per hive and a drop in the production of honey on the national level (Figure 1). As mentioned earlier, however, this drop was compensated by the increase in the total number of beehives, which explains the overall rise in the volumes of honey.

Under optimal conditions, productivity per hive should be 14 kg/hive

- In 2015, the total market value was projected to reach \$84 million, compared to an actual value of \$52 million
- In 2016, the total market value was projected to reach \$90 million, compared to an actual value of \$70 million

Actual market volume of the honey sector is detailed in (Figure 1).

HONEY HARVESTING AND SEASONALITY

Honey production in Lebanon depends on seasons and altitude. Honey can be mountainous or coastal, oak, poly-floral, or orange blossom. Mountain honey is produced at high altitudes, where bees forage on a diversity of flora. Mountain honey achieves a high market price thanks to its purity and distinctive flavor. Both small and large beekeepers produce mountain honey. Orange blossom honey is produced in citrus groves, usually at lower altitudes along the coast, during winter and spring, when orange trees blossom.

Professional beekeeping is based on a vertical transhumance, i.e. moving hives across high and low altitudes, depending on temperature variations and the blossoming season of various flowers. Beehives can be moved from the coast during spring to medium altitude then to a higher altitude during the summer months, alternating harvesting between orchards, wild flowers, and forests. (Annex 3) offers more details on production seasonality.

Because of Lebanon's diverse topography, every region of the country can produce honey. The North and Mount Lebanon have the highest number of beehives, followed by Nabatieh, the Bekaa, and the South. The highest number of beehives is in Donnieh, followed by Jbeil. (Annex 1) offers details on beehive distribution.

COST OF PRODUCTION AND MARGINS

In 2016, the average farm gate price of honey increased by 33% compared to 2011 (Figure3) due to an undersupply on the domestic market and lower production levels resulting from adverse weather conditions.

FIGURE 3- FARM GATE HONEY PRICES

Year	Average farm Gate price (\$/kg)
2011	15
2012	15
2013	15
2014	16
2015	20
2016	20

SOURCE: INTERVIEWS WITH THE PRIVATE SECTOR

The cost of producing honey ranges from \$10/kg for small and medium beekeepers having a maximum of 50 hives to \$8/kg for large professional beekeepers having more than 350 beehives (Figure 4).

FIGURE 4- COST OF PRODUCTION BY SIZE OF BEEKEEPER

	Large Beekeeper	Small & Medium Beekeeper
Honey Margins	A	C
Number of beehives	More than 350 hives	50
Honey cost of production (\$/kg)	8	10
Farm Gate Prices (\$)	18	25
Margins per kg (\$)	10	15

SOURCE: INTERVIEWS WITH THE PRIVATE SECTOR

Market Opportunities

LEBANESE EXPORT MARKET ANALYSIS

Lebanon exports relatively small volumes of honey to a diverse set of trade partners around the world. Lebanese honey exports do not represent a significant market share in any of its destination markets. Generally, Lebanese honey is among the most expensive on the world marketplace, competing with other expensive honey from New Zealand and the European Union (EU). The majority of Lebanese honey exports are branded jars of honey sold by commercial processors to retail markets. However, unlike other agricultural value chains in Lebanon, small quantities of unbranded honey are commonly exported throughout the region via family and social networks (it is difficult to establish estimates for this activity with any degree of accuracy).

Lebanon exported 17 MT of honey in 2007. Exports peaked at 34 MT in 2010, before dropping to 26 MT in 2011. During this period, the average sales price of honey rose from \$9.59/kg in 2007 to \$12.85/kg in 2011. In 2011, Middle Eastern markets represented 82% of Lebanese honey exports by value, while the American, Canadian, and Australian markets represented 11%, African markets 5%, and European markets only 2% (including Switzerland, the largest European market for Lebanese honey, and which is not a member of the EU). In 2011, Saudi Arabia accounted for the largest share of Lebanese honey exports, at 51% of the total value of exports, with the UAE accounting for 24%.

In 2012, LIVCD launched its intervention program to increase volumes of exported honey. LIVCD's interventions had a clear impact on honey exports at the national level. LIVCD supported a leading honey brand in organizing a promotion at the Carrefour Chain in the UAE. This initiative opened the door to the first large export into the UAE in November 2013, which is clearly reflected in a spike in exports data at the Lebanese Customs Authorities as per (Annex 4) and (Figure 5).

FIGURE 5-LEBANESE HONEY EXPORT MARKET TRENDS

Honey Export	2011	2012	2013	2014	2015	2016
Volume in (Tons)	26	28	44	50	49	57
Value in (USD)	\$335,000	\$323,000	\$598,000	\$629,000	\$680,000	\$680,000

SOURCE: LEBANESE CUSTOMS DATA (WWW.CUSTOMS.GOV.LB)

DOMESTIC HONEY MARKET ANALYSIS

Lebanon produced around 1,800 MT of honey in 2011, and imported 203 MT and 229 MT in 2010 and 2011, respectively. By 2016, Lebanon's honey production capacity had increased to an average of 3,500 MT per year, while imports had increased to 343 MT of honey in 2016 (Figure 6). The increase in imports reflects the increase in consumer demand for honey. It is interesting to note that the ratio of imports to local production decreased from 12.7% in 2011 to 9% in 2016.

FIGURE 6- HONEY IMPORT TRENDS BY VALUE

Honey Imports	2013	2014	2015	2016
Volume (Tons)				
MT	232	254	245	343
Value (USD)	\$2,183,000	\$2,451,000	\$1,744,000	\$2,649,000

SOURCE: LEBANESE CUSTOMS DATA (WWW.CUSTOMS.GOV.LB)

Domestic consumers prefer to buy unbranded honey directly from beekeepers, for which they are willing to pay a significant market premium. Direct sales from beekeepers to consumers represent around 67% of the total honey production at a price of around \$25/kg. On the other hand, branded bottled honey found on retail markets, which would be more expensive in many countries, sells at about 25% less.

On the domestic honey market, restaurants and juice shops “artificial” honey produced from sugar syrup. Recently, however, the volume of this “fake” honey has dropped, thanks to the enforcement of new regulations for stricter standards in honey.

The detection of honey adulteration is now possible thanks to LIVCD, which has equipped the lab of Ecole Supérieure d'Ingénieurs d'Agronomie Méditerranéenne (ESIAM) with a first-of-its-kind Fourier Transform Near-Infrared Spectroscopy (FT-NIR) spectrophotometer. This high-tech piece of equipment tests for the quality and purity of honey by detecting honey adulteration and botanical origin. Launched in May 2017, this service will work along with existing laboratories in supporting the value chain by detecting fraud and honey adulteration.

The increase in local production and in imports is insufficient to meet both national consumption and demand for export markets. FAO estimates per capita consumption of honey in Lebanon at 0.7 kg. With a total population of around 5 million Lebanese, in addition to refugees willing and able to buy honey, the local annual consumption of honey would be equivalent to a minimum of 4,000 MT (Figure 7).

In reality, the volume of non-declared, exported honey is much greater than the figures recorded by Lebanese Customs Authorities. To address the increase in demand for honey on both the export and local markets, companies source higher quantities of honey from local beekeepers, creating an interest in expanding existing and establishing new apiaries to meet market demand.

FIGURE 7-HONEY CONSUMPTION ON DOMESTIC MARKET

Honey in Local market in MT	2011	2016
Lebanese Honey production	2000	3500
Trade Balance in MT	195	286
Total Honey in the Lebanese Market	2195	3786
Consumption in Lebanon (700g.per capita)	3500	4000
Difference between supply and consumption	-1305	-214

SOURCE: INTERVIEWS WITH THE PRIVATE SECTOR

IMPORT AND EXPORT PRICES

In response to the increasing demand for honey on the local market, the prices of imported honey increased by 18% between 2011 and 2016. On the other hand, during that same period, prices of exported honey recorded a slight drop (6%) to compete and win export market shares (Figure 8).

FIGURE 8-QUANTITY AND PRICE OF IMPORTED AND EXPORTED HONEY

Year	Tons		Value (\$)		Average Price (\$/kg)	
	2011	2016	2011	2016	2011	2016
Honey Exports	26	57	334,000	680,000	12.8	12
Honey Imports	229	343	1,500,000	2,600,000	6.5	7.6

SOURCE: LEBANESE CUSTOMS DATA (WWW.CUSTOMS.GOV.LB)

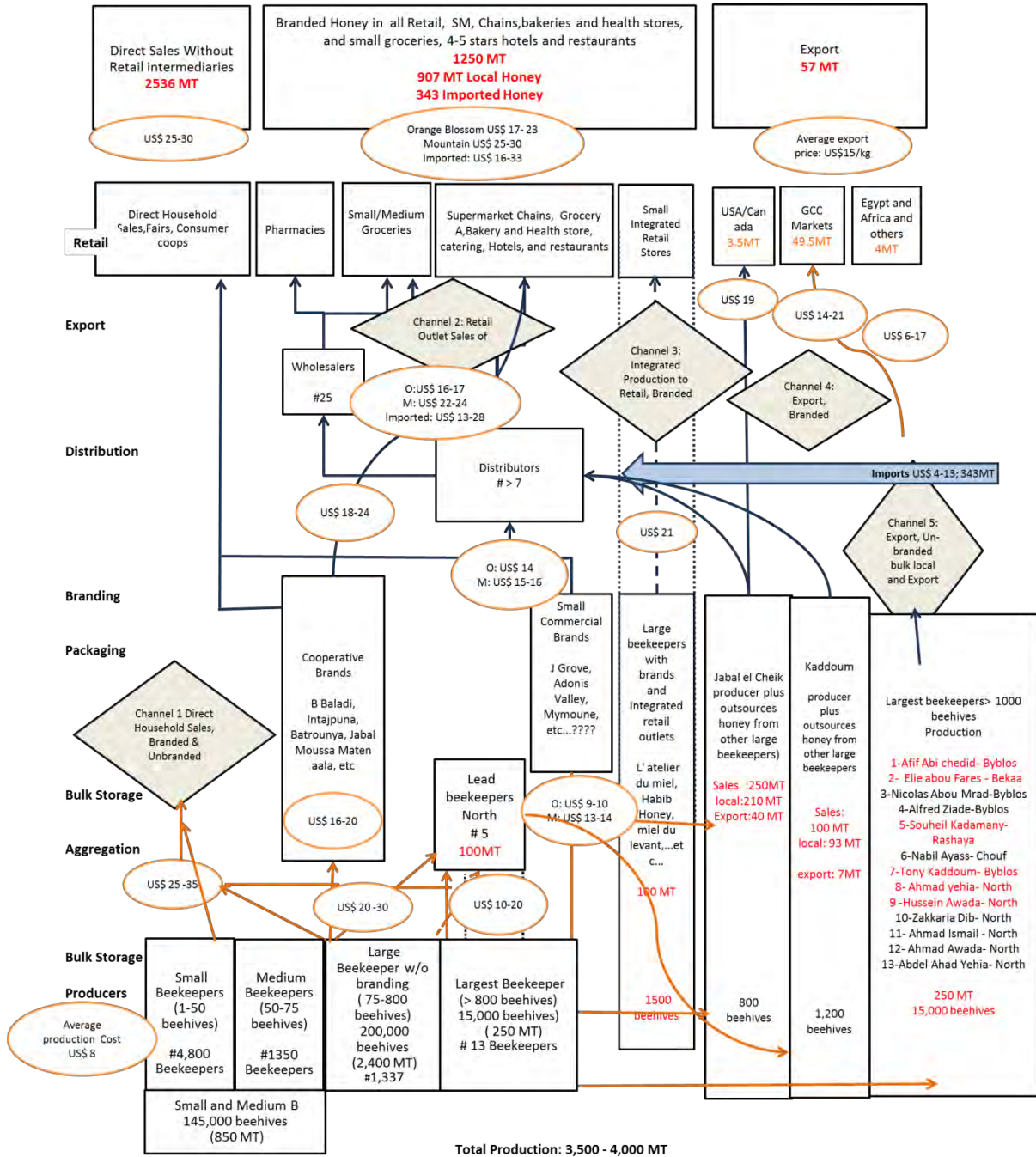
Honey Value Chain Stakeholder Analysis

A value chain stakeholder map is a description of the main actors at each functional level. (Figure 9) shows the structure of the honey value chain for the year 2016. This map shows the main functions, volumes of product flow, and prices per kg at different levels in the value chain. The number of actors at each functional level has changed slightly between 2011 and 2016. These changes are described below to explain how the value chain functions led to the current situation.

LIVCD obtained information on the number of beekeepers in 2016 from the Beekeeping Department at the Ministry of Agriculture. As directed by the Ministry of Agriculture, LIVCD applied the same proportions of 2011 to the 2016 totals to obtain the share of small, medium, and larger beekeepers.

In general, beekeepers across all categories (Figure 9) place their hives on privately and publicly owned land in Lebanon. As there are no systems for structured, formal rental payments, common practice is for the beekeeper to provide some honey as a return gift to the land owner, who generally provides no services other than accepting that the hives be placed on his/her property. The beekeeper is the sole person responsible for the upkeep and management of the hives (including harvesting).

FIGURE 9-HONEY VALUE CHAIN STAKEHOLDER MAP 2016



SOURCE: LIVCD

BEEKEEPERS

The number of beekeepers has increased since 2011, totaling 10,057 registered beekeepers in 2016, compared to 5,230 beekeepers in 2011, as per MoA data (Annex 2). However, data also shows that some new beekeepers will lose their hives in the first year they enter the market. Therefore, LIVCD shall consider the number of effectively active beekeepers in 2016 to be 7,500 (Figure 1).

As per (Annex 1) and (Annex 2), the major concentration of beekeepers and beehives is in North Lebanon, which can be attributed to the more pronounced need for additional sources of income, due to the poor economic situation in this part of the country.

The LIVCD intervention map (Annex 5) shows the areas in which LIVCD was active. The areas of intervention coincide with the areas which show an increase in the number of hives, namely Baalbek, Rashaya, Sour, the South, Jbeil, Batroun, Chouf, and Mount Lebanon.

The different categories of beekeepers in (Figure 9) include the following:

SMALL BEEKEEPERS: In general, small beekeepers own no more than 50 hives. A family with 25 hives in full production with one harvesting season per year can, in general, expect to harvest 200 kg of honey per year to provide revenue of \$5,000 under standard beekeeping practices. Honey sales thus provide important supplemental revenues to low-income households. In 2016, the number of small beekeepers reached 4,800, thanks to an intensive hive distribution and training program, which incorporated a large number of new beekeepers into the value chain. Today, small beekeepers represent 64% of total beekeepers in Lebanon.

MEDIUM-SIZED BEEKEEPERS: The number of medium-sized beekeepers, owning between 50 and 75 beehives, has also increased. At this level, beekeepers are mostly operating as microenterprises with an objective of profit maximization, while using mainly non-remunerated family labor. Around 50% of beekeepers at this level collect two harvests per year by moving beehives between the intermediate mountain zones and the coastal areas to take advantage of the differing harvest periods. With two harvests, a beekeeper with 50 hives can produce 900 kg of honey per year for revenues of around \$18,000 against a required fixed investment of \$10,986. With these volumes, it can be difficult for medium-sized beekeepers to sell all of their honey solely through personal networks. They therefore need to find other sales outlets, including cooperatively marketed honey and commercial buyers of honey. MoA figures list 1,350 medium-sized beekeepers in Lebanon.

A total of combined 6,150 small and medium-sized beekeepers contribute to 24% of the total honey production in Lebanon. With a market price ranging from \$25 to \$35/kg, they represent around 29% of the total value of the sector.

- LIVCD provided training and cost-shared hives to 4,030 out of the 6,150 beekeepers, thus reaching 65% of the small and medium-sized beekeepers, impacting 16% of the total volume and 18% of the total value of the sector.

LARGE BEEKEEPERS WITHOUT BRANDS: Beekeepers at this level own more than 75 hives. All large beekeepers practice hive migration to collect at least two harvests per year. A majority of large beekeepers migrate hives between all three production zones (high-mountain, intermediate mountain, and coastal areas) to get three harvests per year. There are about 13 beekeepers in Lebanon with over 800 hives and only one beekeeper with more than 2,000 hives (Afif Abi Chedid). Only two large beekeepers with more than 800 hives have their own brands (these are described below in the section on branded honey actors). In general, a large beekeeper with 100 hives practicing annual hive migration and collecting three harvests per year can earn \$36,000 in annual revenue from 2,000 kg of honey.

Large beekeepers need to have specific sales strategies to sell their production. In addition to using their networks of personal contact as all beekeepers do, they follow three broad types of sales strategies:

- Personal relationships through family or contacts in foreign markets. Exports of this type go mainly to communities of the Lebanese diaspora in Africa, as well as to Egypt and the Persian Gulf countries
- Collectors of local honey production, who are essentially intermediaries for one of the commercially branded honey producers, for sales on the domestic market (see lead beekeeper section on aggregation below)
- Through a cooperative

Among large beekeepers, the 13 beekeepers with more than 800 beehives each represent 7% of the volume and 5% of the total value of the sector. The majority are located in North Lebanon. The largest beekeepers are: Afif Abi Chedid, Tony Kaddoum, Alfred Ziadeh, Nicholas Abou Mrad, Souheil Kadamani, Ahmed Yehia, Hussein Awada, Zakaria Dib, Ahmed Ismail, Ahmed Awada, and Abdel Ahad Yehia.

There are around 1,350 large beekeepers in Lebanon, representing 76% of the volume and 71% of the value of the sector.

- LIVCD worked with 131 large beekeepers, which represent 10% of the total number, impacting 7% of the total national volume and 8% of the total value.

In summary, LIVCD's intervention and impact on the honey sector is estimated to be 24% of the total value of the sector. With a total sector value at \$70 million, LIVCD's impact stands at around \$16.8 million.

LARGE BEEKEEPERS WITH BRANDS AND INTEGRATED RETAIL SALES OUTLETS: This category of large beekeepers has invested in creating their own specialized retail outlets in Beirut and other urban centers, reaching consumers in urban areas in addition to participating in fairs and exhibitions, where stalls are manned by the beekeepers' direct employees or family members. The main players in this category have between 300 and 700 beehives each and include brands such as L'Atelier du Miel, Habib Honey, Miel du Levant, and others. LIVCD has worked with the main players in this category, including L'Atelier du Miel.

LARGE BRANDED BEEKEEPERS/EXPORTERS: As shown in (Figure 9), there are two main players in this category of actors: Jabal el Sheikh Honey and Kaddoum Honey. LIVCD has co-invested with both. The Project invested with Jabal el Sheikh Honey on establishing sustainable market access to beekeepers through joint product promotions in export markets. In addition, LIVCD partnered with Kaddoum honey on upgrading the brand image through developing new packaging and new labels, creating a presence online and on social media, and implementing in-store marketing to be able to compete with imported brands and to reach a wider range of customers.

LEAD BEEKEEPERS: These actors play an important role, particularly in Jabal el Sheikh's procurement system. The LIVCD team identified five lead beekeepers in the Minnieh-Donnieh region in northern Lebanon, who buy tins of honey from other medium-sized and large beekeepers and sell them mainly

to Jabal el Sheikh, but also to other, small honey brands. Lead beekeepers buy honey from other beekeepers in 25 gallon containers and store them for no longer than one month before sending them to Jabal el Sheikh. The Minnieh-Donnieh region produces a large volume of honey, but because of its remote location and poor road infrastructure, it lacks access to markets. Thus, lead beekeepers are able to buy honey at a considerably lower price: \$9/kg for orange blossom honey compared to \$20/kg when sold directly to consumers. This practice optimizes costs for commercial buyers by consolidating honey shipments before transportation. The relationship between lead beekeepers and their suppliers of honey (medium and large beekeepers) seems very strong, as about 95% of the sales volume of medium and large beekeepers goes through this channel.

These relations are governed by written contracts with set terms of volume, price, and payment conditions. Due to the high demand for honey during the past three years, aggregators now have the upper hand in negotiating trade terms. As a result, contracts are no longer signed in advance; rather, volume and prices are determined by supply and demand. Lead beekeepers commonly take a mark-up of \$1 to \$2/kg for handling other producers' honey. Before buying, they send samples of the honey to the laboratory facility at the Chamber of Commerce in Tripoli for testing.¹ Over 100 tons of honey per year transit through this aggregation method.

COOPERATIVE HONEY BRANDS

A number of donor projects have driven the formation of marketing cooperatives. This practice needs to be differentiated from beekeeper cooperatives promoted by the Ministry of Agriculture, which limit their interventions to facilitating input supply and beekeeper extension.

NGO-supported cooperatives include B.Balady in Jezzine, supported by WRF/USAID, Intajouna, supported by Caritas, and Batrouniyat, supported by the Italian Government. The B.Balady Jezzine Cooperative follows a standard cooperative model, in which members contribute honey to a common marketing unit, staffed by cooperative employees.

The margin between an initially established beekeeper price and the eventual sales price after deducting all marketing and processing costs pays for the cost of the cooperative's employees. Any leftover earnings after all costs are paid are then available for rebates to members. Caritas and Batrouniyat follow the same model but source their honey from beekeepers, whose membership is not mandatory.

To date, such marketing cooperatives have failed to capture anything but a residual share of the retail market, mainly because members prefer to market honey directly to consumers at higher prices (up to \$30 to \$35/kg compared to \$20/kg obtained by such cooperatives as B.Baladi). New cooperatives in 2016 include Maten el Aala Honey, which was supported by LIVCD and has entered supermarkets for the first time with a brand in 2016. Several other smaller brands belong to cooperatives that sell on the local market, such as Jabal Moussa. LIVCD partnered with Jabal Moussa to increase its production and broaden its access to market.

Few beekeeping cooperatives have proven to be successful and play a role as service centers, providing services such as honey extraction, wax recycling, training and field coaching, and facilitating market access.

SMALL BRANDS

These are small brands that source honey from beekeepers and have their own small production. Through a concerted effort, they have established their own brand name. These actors developed brand equity as "Natural" products and offer an assortment of products. Small brands, such as

¹ This testing is a condition required by Jabal el Sheik in order to be sure of meeting export market specifications on all the parameters requested by the US market.

J.Grove, Adonis Valley, Miel du Levant, etc., are attracting an increasingly wider share of consumers because of their young, natural, and organic approach, which aligns with new market trends. Small brands lack the volumes required by major distributors and generally work through smaller distributors with retailer clients, but are continuously looking for large beekeepers to supply them with honey. LIVCD has worked with two main players in this category, J. Grove and Adonis Valley.

WHOLESALERS

Wholesalers of honey are second-level players, who enter into exclusive agreements with individual distributors to store and deliver honey to retail outlets in areas too remote for distributors to reach directly from their own warehouses. They procure honey only through distributors and cannot be approached directly by honey producers.

A separate category of wholesalers of pharmaceutical products serves pharmacies.

DISTRIBUTION/IMPORTING

The wholesale trade segment of the honey value chain is relatively small. It is limited mainly to the branded segment of the domestic market.

The key actors within this category include the following:

DISTRIBUTORS/IMPORTERS: These actors are divided into two broad types.

The largest distributors (Transmed, Fattal, Obegi, and Massoud) have well-developed networks of retail clients, to whom they supply large varieties of domestic and imported products. These larger distributors have significant leverage with major supermarkets and retail chains. They also act as importers of honey, with Bocti importing the Lagnese brand (German) and Fattal importing the Al-Shifa brand (repackaged in Saudi Arabia). These two brands are the largest sellers in terms of volume on the local market, ahead of the main local brands (Kaddoum and Jabal el Sheikh, which are distributed by Massoud and Transmed, respectively). Large distributors, which are able to place products on retail shelves throughout Lebanon, require a minimum product value of \$1 million per year, and are thus only accessible to the largest Lebanese producers, such as Kaddoum and Jabal el Sheikh.

Below this category are smaller distributors with less important client networks. All the producers of branded Lebanese honey (with the exception of the three large producers, who have their own retailed outlets) are required to sell through distributors if they want to access large numbers of retailers. Al Wadi el Akhdar, a Lebanese brand selling German honey, has entered the market at a competitive level.

RETAILERS: As shown in the honey value chain map (Figure 9), a large variety of retail outlets sell domestic and imported branded honey. These include small to medium neighborhood groceries, pharmacies (that sell honey as a “health” product), and groups of larger clients, such as hotels, restaurants, and caterers (HORECA), supermarkets and the largest grocery stores.

LIVCD facilitated market linkages between beekeepers owning over 25 hives and commercial honey brands that can absorb surplus honey production not sold directly to households. LIVCD also established links with brands that are well established on local markets but that do not have new honey products to add to their product portfolios. As these commercial brands become increasingly sophisticated and profitable, beekeepers will see higher demand and more opportunities for diversification. In addition, the high cost of marketing has made joint product promotion in local and export markets necessary to increase market shares of Lebanese honey on supermarket shelves.

Business Development Service Providers

The honey value chain includes a number of key service providers, as follows:

Beekeeping equipment and hive sellers: Numerous stores in different areas of Lebanon stock the most common equipment required by beekeepers (Annex 6), such as suits, hives, feeders, stainless steel storage tanks, extractors, and beeswax.

However, two attempts at establishing Lebanese bee selection centers (Safadi Foundation in the Akkar and the Chakara Center) failed. Until recently, there were no certified sources for queen bees from domestic selection centers. Most beekeepers, therefore, either sourced queen bees from their neighbors or used queens imported mainly from Argentina and Egypt.

To address this need, LIVCD has worked with two entities on producing high-quality queen bees and has introduced the first center for the artificial insemination of queen bees in the Middle East. The center, while still under testing, has sold 14 artificially inseminated queen bees since it began its work in mid-2016.

The local supply of antibiotics and Varoa pesticide treatments is also somewhat problematic. Thanks to training on proper management of beehive diseases, beekeepers are more aware of the proper usage of treatments, when needed.

Low quality beeswax, which contained paraffin harmful to both bees and humans, was also a major problem for the value chain. In an attempt to redress the issue, LIVCD has co-invested with HOSCO Agri to set up the most advanced wax production unit in Lebanon.

To reduce transportation costs, and based on the demand of beekeepers in rural areas, LIVCD co-invested with cooperatives and companies to purchase equipment, such as extractors, wax melting and sterilizing equipment, foundation molds, candy making machines, queen-bee breeding equipment, storage tanks, labeling machines, bench uncapping machines, and much more from input suppliers on the Lebanese market, who have either sourced them from local manufacturers or imported them from abroad.

New input suppliers in beekeeping equipment have entered the market due to the increase in demand for such equipment during the past two years.

HONEY-TESTING LABORATORIES

In 2011, only three labs had the know-how and capacity to test honey in Lebanon: Industrial Research Institute (IRI), Lebanese Agriculture Research Institute (LARI), and the facilities at the Chamber of Commerce of Tripoli (CCIAT). Today, there are six main laboratories testing honey, namely IRI, LARI, CCIAT, Multilab, ATL, and Kfarshima Lab.

LIVCD supported ESIAM to invest in a FT-NIR spectrophotometer, which tests, in a very short period of time, the botanical origin of honey and all the other variables, from sugar adulterations to acidity levels. By the end of 2017, the machine will be fully calibrated to provide accurate results. This need to focus on laboratories arises from the new honey regulations issued by LIBNOR in March 2016, which protect Lebanese honey from low-quality imported honey. This new measure has regulated the influx of low-quality honey, safeguarding the rights of Lebanese beekeepers.

Fortunately, LARI, a governmental entity, officially introduced beekeeping as one of its activities in March 2017. It has lab facilities that test honey to be exported. Not all labs, however, are certified. In the Recommendations Section, we propose that the certification of these labs is an important factor in the development of the sector.

BEEKEEPING COOPERATIVES

Over the past several years, the Ministry of Agriculture has encouraged the formation of farmer cooperatives to help with honey production issues. Cooperatives mainly help organize input supply and provide farmer-based extension services at the local level.

There are 62 honey cooperatives in Lebanon, distributed across Mount Lebanon (17), Bekaa (9), North Lebanon (20), and South and Nabatieh (16). The most active cooperatives have between 100 and 300 beekeepers. Most of these cooperatives offer paid honey extraction services with centrifugal extractors and, at least in theory, cooperative marketing services for the production of their members. However, volumes of cooperatively marketed honey are quite small and are mainly the fruit of the three cooperatives mentioned above under “cooperative honey brands.”

Thus, the main function of beekeeping cooperatives in Lebanon is not as marketers or sellers of honey, but as providers of production and production-related services to member beekeepers. Common services provided include: Input ordering, honey extraction, bottling, honey humidity reduction, wax recycling, distribution of anti-Varoa treatments from MoA, and extension services. Few cooperatives are financially sustainable, and membership fees often do not cover the cost of operations, which include rent, maintenance of machinery, and other expenses. Despite these obvious shortcomings, the majority of large beekeepers are members of cooperatives.

During its four-year life, LIVCD has worked directly with 32 cooperatives to support the honey value chain. The main intervention with cooperatives focused on increasing the productivity of beekeepers to address the increase in the demand for honey by Lebanese consumers and the export market. LIVCD provided beekeepers with equipment that aimed at improving productivity, decreasing production costs, and accelerating production. Many of the 32 cooperatives with which LIVCD worked were highly professional and benefited the beekeepers they serviced.

Maten el Aala Cooperative, for instance, is an example of a leading cooperative, which worked closely with its members to become a successful model of a beekeeping cooperative. The cooperative has provided training on beekeeping in more than 20 colleges and schools and was a leader in the honey training program, taking training initiatives independently from LIVCD. The cooperative is also providing technical supervision to beekeepers using new equipment.

(Annex 9) provides information on a few representative cooperatives from different production regions of Lebanon. The chart lists the cooperatives with which LIVCD has worked. All these cooperatives could be reference locations for beekeepers in their regions.

Value Chain Channels and Governance

As indicated in the Value Chain Map (Figure 9), the honey value chain comprises five sub-segments, which present the below characteristics.

CHANNEL 1: DIRECT HOUSEHOLD SALES

In this channel, honey producers sell directly to households. This is by far the largest value chain segment in terms of overall volume (estimated at around 67% of total domestic market sales). The vast majority of flows in this segment are from small, medium, and large individual producers to consumers. In this channel, consumers ensure the quality of the honey purchased. Purchase decisions are governed mainly by personal relationships and contacts between the buyer and seller and the perceived “authenticity” of farm-produced honey. Prices in this segment are very high, at \$25 to \$30/kg.

Channel 2: SALES OF BRANDED HONEY THROUGH RETAIL STORES

This market channel carries approximately 30% of total domestic market sales. It is dominated by the commercial sellers of branded honey, but includes many other key actors, such as distributors and retailers. Prices to the consumer are roughly equivalent to Channel 1. However, prices drop considerably at the lower rungs of the value chain, reflecting the number of intermediary actors between the beekeepers and the end consumer.

This highlights a key difference with Channel 1: Farm-level prices are much lower for producers, who sell into this channel as opposed to Channel 1. Thus, in practice, producers (small, medium and large beekeepers) will usually sell the output from their first 20 hives into Channel 1 and the output from any subsequent hives to the cooperative and commercial buyers that dominate Channel 2. This explains the low level of cooperative sales in Channel 2, since cooperatives have tended to focus mainly on small farmers, who prefer to sell on their own into Channel 1, gaining the full price paid by the consumer.

Honey going into Channel 2 thus comes mainly from medium-sized and large producers and from commercial processors that own in-house beehives with “excess production” that cannot be sold through personal networks. Therefore, transactions at the bottom of the value chain map in Channel 2 tend to take place at lower prices (\$10 to \$13/kg) and in larger volumes than in Channel 1.

Governance systems in this channel have become more visible and better established since 2011. Two commercial honey producers, Jabal el Sheikh and Kaddoum, are leading the commercial honey production. The role of retail distributors is quite important in this channel, since they control access to retail outlets for sellers of branded honey.

CHANNEL 3: INTEGRATED PRODUCER-RETAIL SALES

This is a relatively small channel, with sales amounting to a mere 3% of the total domestic honey market. The main actors in this channel are L'Atelier du Miel, Habib Honey, and Miel du Levant, although other commercial honey processors have plans to expand into their own retail outlets.

The business model in this channel reflects the desire of commercial, branded honey producers to develop their own retail outlets, without having to go through distributors. In this way they can own the chain, from production to retail, without having to engage in market transactions. Actors in this channel are good potential candidates for future assistance to improve the quality and increase the production levels of honey. As a selection requirement, however, they would have to adapt their supply strategy to include outsourcing honey from medium-sized and large farmers.

Channel 4: EXPORT SALES OF BRANDED HONEY

This channel is largely an extension of Channel 2 onto the export markets. The two largest branded honey producers, Jabal el Sheikh and Kaddoum, provide the bulk of supply. Their contribution to exports has caused the 102% increase in the overall export indicator of 2016 compared to 2011. In addition to the marketing support provided by LIVCD to Jabal el Sheikh and Kaddoum have received marketing support by LIVCD. However, each of these actors has also independently developed a network of importers through personal marketing efforts in the GCC countries and Africa, where they have contacts among the Lebanese diaspora.

This channel has significant expansion potential due the potential appeal of a product in both ethnic and specialty markets. Furthermore, Lebanese honey exporters still have limited experience. As they gain experience, exports of Lebanese honey will certainly grow.

CHANNEL 5: EXPORT SALES OF UNBRANDED HONEY

A small volume of export sales to regional markets consists of unbranded honey sent directly by larger farmers to personal contacts mainly in Arab Gulf countries. This channel is essentially an extension of Channel 1.

As with Channel 1, this relatively informal channel has little growth potential, both because of the generally high prices of honey and because of the importance of personal connections in providing an overall governance structure.

Business-Enabling Environment

Historically, Lebanon's agricultural policy has not particularly focused on honey production. This is now changing as policy makers increasingly recognize the potential of honey production as an important supplementary source of income to poorer, rural households. More importantly, this change is a direct result of the concentrated effort and leveraged investment in the sector that have drastically shifted the value chain upward, attracting investors and newcomers into the sector.

PRODUCT TRACEABILITY AND HEALTH REGULATIONS

In March 2016, the Lebanese Standards Institution (LIBNOR) issued a new regulation defining a minimum quality of honey and requiring all honey produced in Lebanon to be traceable to the producing farm/beekeeper. This new initiative was mainly due to the combined interest of Lebanese beekeepers to fight imports of low-quality honey, which is ruining the reputation of Lebanese honey and unfairly competing with commercial honey, and an effort to register cooperatives that accompanied MoA's campaign in fighting diseases and distributing medicine. As only registered beekeepers and cooperatives could receive Ministry support, registration levels have nearly reached 100%.

Additionally, because large volumes of Lebanese honey are marketed directly from the farmer to the consumer, the majority of honey is easily traceable. As consumers pay a premium for honey bought directly from the farmer or cooperative, farmers have an advantage to keep their labels simple, stating just their name, region, and type of honey. Still, compliance with the new measure is largely voluntary, as no effective control mechanism was put into place. As part of its national honey awareness campaign, the Syndicate of Lebanese Dietician signed agreements with producers of branded honey to ensure the quality of marketed honey.

Prior to 2013, honey sold in Lebanon was solely required to meet LIBNOR norms, which regulated purity and freshness through eight simple chemical tests.

LIBNOR honey standards have been challenged since they apply a lower threshold for the acceptable limit on hydroxymethylfurfural (HMF) than the Codex Alimentarius of the Food and Agriculture Organization of the United Nations (FAO), which sets commonly accepted international standards. As of 2016, LIBNOR published a revised honey standard, which sets lower HMF and moisture levels. A decree issued by the Ministry of Agriculture specifies acceptable levels of pesticides and antibiotics (Annex 7). Several modifications were made in 2016 on the different parameters of honey quality (Annex 8).

EXPORT MARKET QUALITY REQUIREMENTS

All export shipments of honey must be tested by one of the three main laboratories with capacities for honey testing (LARI, IRI, and the QCC Laboratory in Tripoli). Exported honey must comply with

limits on pesticide residues as specified by each export market. ESIAM's new FT-NIR machine will begin testing for botanical origin and honey adulteration at the end of 2017.

EXTENSION SERVICES AND NGO SUPPORT PROGRAMS

The vast majority of extension services to the honey value chain originates from private donors and NGOs, and have predominately focused on the technical aspects of production. Since 2000, over 17 different programs have provided support to the honey value chain, mainly to groups of beekeepers belonging to cooperatives. These programs have focused mainly on the South, where 11 out of the 17 programs were implemented, against four that had national coverage, and only two that serviced the North.

- **2006:** Following the 2006 war, the United Nations Development Programme (UNDP) and a fund allocated by the European Commission Humanitarian Aid Department (ECHO) launched an initiative called "Restoration and Preservation of Lives and Livelihoods." The initiative provided support to around 1,200 beekeepers registered with the cooperative across different villages in the South, by providing access to a modern center for honey extraction, pre-filtering and processing, then packaging and labeling of the final product. The project supported the cooperative by providing equipment covering the entire honey production process, from honey extraction, drying and pressure filtering, pre-filtering, filtering and processing, filling, to packaging and labeling. Around 50,000 beehives were distributed in South Lebanon and Nabatieh Governorates
- **2009-2010:** Through a project entitled "Sharing and Exchanging Information about Key Aspects of Beekeeping," the UNDP-ART GOLD Lebanon offered support to more than 3,000 beekeepers in North Lebanon, South Lebanon, and the Bekaa.
- **2011:** FAO supported a honey production project in Kesserwan District. It built honey production centers in the villages of Baskinta and Ain el-Abou by providing honey extraction equipment and some beehives to cooperatives. The project is also intended to support agricultural coops in the region by providing local beekeepers with a range of beekeeping equipment. The project aims to contribute to raise local income levels and improve food security.

Today, several programs and projects are under way:

- Recently, UNDP had minor activities, such as training and distribution of some tools to Palestinians living in Tyre.
- AVSI Foundation, an international NGO, has been present in Lebanon since 1996, and has implemented more than 50 projects targeting agriculture and water, education, humanitarian aid, and emergency situations. In 2016, AVSI distributed two beehives to every beekeeper in Lebanon and provided training in beekeeping with the collaboration of experts in the field. The foundation also provided six-day training courses in beekeeping to the local youth.
- In 2016, the Capacity-building project implemented by the Civil Affairs Office of the United Nations Interim Force in Lebanon (UNIFIL) in collaboration with the Bint Jbeil Union of Municipalities targeted 200 beekeepers in the districts of Bint Jbeil and Marjayoun. To support the local community, UNIFIL also donated apiary equipment to the Tiri Agriculture Services Centre, which implemented the project by training and developing the beekeeping

field. The project took place between April and October 2016. (<https://unifil.unmissions.org/hive-activity-unifil-beekeeping-workshop>)

- The beekeeping unit at the Ministry of Agriculture is very active, holding workshops, providing training, keeping records and data related to the beekeeping sector, managing the distribution of Varoa disease treatment, in addition to developing and implementing a strategic plan for pest management.
- In 2016, The Arab Organization for Agricultural Development (AOAD) distributed 350 beehives to 70 women. Each woman received five beehives, wax blocks, containers, and beekeeping suits. However, no training accompanied the hive distribution.

Impact of LIVCD on Honey Value Chain

Lebanon has witnessed a shift in its honey value chain as a result of the different interventions that have taken place since the launching of LIVCD in 2012. Over its five years of life, LIVCD successfully addressed the weaknesses and threats of the honey value chain that it had assessed in 2012.

CURRENT TRENDS

The recent increase in the value of honey, the increased activity of commercial honey stakeholders in Lebanon, and greater governmental support have generated two dynamic trends.

Increasing Sales of Branded Honey on the Domestic Market: Before 2006, the only honey available in mainstream Lebanese retail outlets was imported predominantly from Saudi Arabia and the EU. Since 2006, however, when domestic commercial producers first accessed retail markets, these channels (Channels 2 and 3 in the Value Chain Map) have expanded drastically to capture 23% of the domestic honey market. As of 2008, large brands, such as Jabal el Sheikh and Kaddoum, had penetrated the main distribution networks. Today, they are established in mainstream retail circuits. Throughout 2016, these large honey producers continued to increase their market shares.

Given the weaknesses in honey cooperatives, it is likely that this segment will continue to be driven by private commercial brands. Future trends may also include new product development, building on the fact that a few types of honey are associated with medicinal properties and can be found in pharmacies.

Expansion of Sales in the Gulf Market: Other Lebanese brands are increasing their connections with the Gulf market and will seal agreements for new market opportunities in 2017.

SUMMARY OF LIVCD INTERVENTIONS

LIVCD Interventions

LIVCD interventions reached 4,030 beekeepers, impacting 24% of the total value of the sector, equivalent to \$16.8 million

Trained 3,600 beekeepers on best practices, through Training of Trainers (TOT) with 70 local experts. Developed a new Curriculum on Beekeeping, 5 tutorial videos and a 5-chapter training manual in collaboration with beekeeping experts

Launched a cost-share program with honey cooperatives that assisted beekeepers to purchase hives. LIVCD co-invested in 6,238 hives with 1,497 beekeepers

Co-invested with the private sector to establish the first center for artificial insemination of queen bees in the Arab world and supported the development of a professional center for natural queen breeding

Co-invested with the private sector to establish the first professional wax sterilizing and recycling center in Lebanon

Improved honey processing services through leveraged investments in extraction, storage, packaging, and wax recycling equipment

Supported brands in strategic marketing activities, labeling, and branding

Provided technical assistance to existing honey brands, Jabal el Sheikh and Kaddoum, by improving access to local and export markets

Implemented a national multimedia honey awareness campaign in partnership with the Syndicate of Lebanese dieticians and the private sector aiming at encouraging the consumption of natural honey from Lebanese origin

Introduced high-tech spectroscopy capabilities to test the quality, purity, and botanical origin of honey through equipping the laboratory of ESIAM with a first-of-its-kind FT-NIR spectrophotometer which detects honey adulteration and botanical origin. This service was launched in May 2017

Collaborated with LIBNOR, the Ministry of Agriculture, and the private sector to issue a new regulation that protects the quality of Lebanese honey by establishing high quality standards

Collaborated with Saint-Joseph University (USJ), Holy Spirit University of Kaslik (USEK), and Lebanese University (UL) on improving the testing standards of honey. Through this project, ESIAM coordinated with USEK and UL to provide accurate tests as prerequisites to the FT-NIR spectrophotometry. In addition, LIVCD collaborated with the Dean of Veterinary Sciences at the Lebanese University to develop a honey training manual. The manual will be distributed to several universities and honey cooperatives across Lebanon and will serve as a basis for a curriculum on beekeeping

LIVCD supported several students from different universities in acquiring their degrees due to their positive additions and mutual benefit to the honey value chain. With LIVCD's support in linkages and honey data and the student's technical expertise, four students have completed or are working on their Master's and PhD degrees. In December 2014, the honey value chain at the LIVCD Project supported a Master's degree student at Institut Polytechnique LaSalle Beauvais in France with all the material required to work on his thesis, which focused on honey quality and food security. In early 2016, the honey value chain supported an architecture student at ALBA University in developing a model in Ammiq, Bekaa to promote a new modern approach in beekeeping and rural tourism

SUMMARY OF LIVCD RESULTS

Results of LIVCD Interventions

Honey production is estimated to have increased by over 54% between 2011 and 2016 to reach 3,500 MT in 2016, with an estimated market value of \$70 million

The number of beekeepers increased by 36% from end of 2011 to 2016 to reach 7,500 Beekeepers in 2016

The number of hives increased by more than 70% to reach 320,000 in 2016

Exports of Lebanese honey witnessed a growth of 102% between 2011 and 2016 to reach \$680,000 in 2016

LIVCD partners from the private sector invested more than \$2 million on improving quality, acquiring ISO certification, establishing an artificial insemination center, marketing, setting up laboratories, and more than \$0.5 million in new hives

LIVCD's co-investment in hives will yield approximately \$4.48 million in honey sales. Based on current LIVCD Monitoring and Evaluation real data collection from 920 out of 1,497 beekeepers, total sales until August 2017 stand at \$3 million

Value Chain Upgrading: Strategy and Intervention

LIVCD tailored its interventions in the honey value chain to boost the competitiveness of Lebanese honey in both domestic and export markets. Increased competitiveness of branded commercial honey in the upper segment of the value honey increased the demand for honey from rural honey producers.

The strategy differed from previous honey support projects because it emphasized vertical linkages between private commercial brands and smaller beekeepers with less than 100 hives, rather than seeking to build cooperative marketing structures that lacked the financial strength and incentive to invest in brand development. LIVCD played a key facilitator role in ensuring that the two ends of the chain continue to work together while building each actor's capacities and in arranging required third-party support services. Below is a summary of LIVCD interventions:

Axis One: Facilitate Access to Market

Supporting Lebanese honey exports

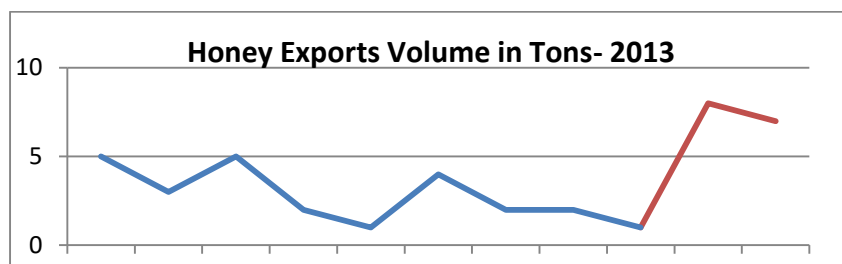
Lebanese brand owners lack the skills and financial means to back their brands on the export markets. Many honey exporters to GCC markets lack a professional marketing and sales department that can navigate the wholesale and retail markets. In general, in-house marketing functions are under-staffed and lack computer-based communication skills. Costs of market entry, especially in the GCC, can be prohibitively high. Without an adequate marketing and branding plan, Lebanese honey brands risk failure in GCC markets and the loss of significant investments.

The challenges of marketing in the US are even more important. Breaking into the US market will usually require either identifying new importers/distributors specialized in ethnic markets, who are willing to place Lebanese brands on shop shelves (and not use them as ingredients in their own brands) or going through mainstream distributors of specialty products with a marketing campaign that is specifically designed for the target market segment.

LIVCD worked with exporters to introduce or increase the share of Lebanese honey on foreign markets. LIVCD partnered with the two largest honey producers and exporters on rebranding and marketing activities to promote Lebanese honey on the local and export markets and to displace imported honey from the Lebanese market. The project invested with Jabal el Sheikh Honey on establishing sustainable market access to beekeepers through joint product promotions in UAE. LIVCD worked with Kaddoum Honey to rebrand and upgrade its image to increase its share of the Lebanese and export markets. LIVCD also helped Kaddoum increase its exposure abroad, especially in Qatar and the Gulf countries.

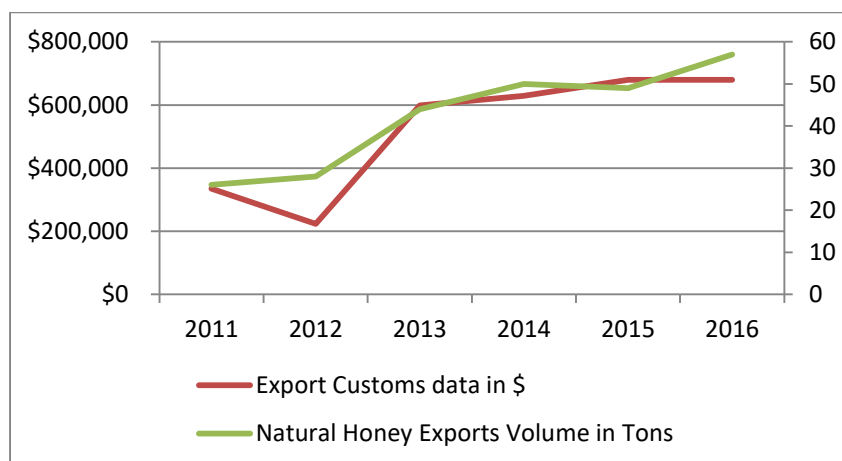
- Honey exports were dropping since 2011
- In 2013, honey exports stayed on a declining trend until November 2013 (Figure 10), when a boost in exports to UAE, driven mainly by Jabal el Sheikh reversed the curb
- The technical and financial support provided to Jabal el Sheikh had an immediate positive impact on total Lebanese honey exports, as reflected in export figures at the Lebanese Customs Authorities. November 2013, date of the first shipment of Jabal el Sheikh honey to UAE, coincides with the inflection in the downward export trend. The result was an 84% growth vs. 2012. The growth trend was sustained in 2014, 2015, and 2016 (Figure 11)

FIGURE 10- HONEY EXPORT TREND IN 2013 BY MONTH



SOURCE WWW.CUSTOMS.GOV.LB

FIGURE 11- HONEY EXPORT TREND BETWEEN 2011 AND 2016



SOURCE WWW.CUSTOMS.GOV.LB

Supporting Lebanese honey in domestic markets

With a range of local partners, LIVCD spearheaded interventions to improve equity, branding, and labeling of honey brands, as part of its aim to increase market shares of Lebanese honey on the local market. LIVCD supported cooperatives with no honey brands, such as Maten el Aala Honey, to create one and to start selling to supermarkets. LIVCD partnered with Kaddoum Honey to rebrand and upgrade their image by developing new packaging, labels, online and social media presence, and in-store marketing plans and strategies that allowed the brand to compete with imported brands and to reach a wider range of customers. Kaddoum’s rebranding helped the company successfully to re-launch its products on the local market.

LIVCD played a key role in increasing the volumes of Lebanese honey sold on the local market. LIVCD partnered with the Syndicate of Dieticians in Lebanon to launch the national honey awareness campaign between January and March 2017. This campaign came on the heel of the new regulation on the quality of Lebanese and imported honey brands. The regulation is being implemented in stores by the Ministry of Economy, thus ensuring that no local brand of honey is below the required standards of quality.

LIVCD facilitated market linkages between beekeepers with over 25 hives and commercial honey brands, such as J.Grove, Jabal el Sheikh, Kaddoum, Maten el Aala Honey, B.Balady, and L’Atelier du Miel, as these large brands can absorb surplus honey production that is not sold directly to consumers.

AXIS TWO: STRENGTHEN KEY ACTORS IN THE DOMESTIC BRANDED HONEY MARKET

The honey value chain encompasses a large number of rural Lebanese households. Investments in new equipment to support rural beekeeping practices, such as honey extraction, aggregation, and processing, improves the living conditions of local communities and reduces migration to the city in search of an alternate source of income. New technologies and adequate equipment are essential to ensure high-quality honey and production efficiency, which in turn increase productivity and competitiveness.

- LIVCD co-invested with cooperatives and private companies all over Lebanon in the purchase of advanced equipment in extraction, packaging, and wax processing to develop honey processing services and improve aggregation and processing facilities. These cooperatives, laboratories, and companies function as service centers put their equipment and testing facilities at the service of beekeepers nationwide (Annex 9).
- LIVCD supported laboratories to develop the required testing capacity. LIVCD equipped ESIAM laboratory with a first-of-its-kind FT-NIR spectrophotometer that tests honey for botanical origin and adulterations. ESIAM will allow traders and exporters to test their honey at affordable prices to ensure that they meet export market requirements.
- LIVCD partnered with the private sector to establish the first professional wax sterilizing and recycling center at HOSCO Agri in Mount Lebanon. Good quality wax sheets in beehives are essential to the production of good quality honey, but these were difficult to find in Lebanon. The center thus has attracted beekeepers seeking high quality wax production and recycling.
- LIVCD co-invested with Jabal Amel Cooperative in setting up the first artificial insemination center for the breeding of queen bees, the Golden Queen Center. The center works on protecting and proliferating selected, local queen bees.

AXIS THREE: SUSTAIN AND INCREASE HONEY PRODUCTION LEVELS

The major constraints to honey production included:

- **A lack of understanding of modern beekeeping techniques and principals.** Beekeeping requires a certain amount of technical knowledge that is difficult to attain without some theoretical training and practical experience.
- **Diseases affecting honeybees.** Diseases include the American foulbrood disease, the Varoa mite, and Colony Collapse Disorder (CCD). Poor management of beehives and the introduction of low quality beehives and queen bees into the country have created diseases and behavioral patterns that local beekeepers were unable to manage.
- **Scarcity of high quality queen bees.** Lebanese beekeepers face a dilemma in sourcing certified queen bees. Importing foreign-bred queens is expensive, and oversea transport often results in weakened queens, a risk many beekeepers are not willing to take. Still, because of the lack of good-quality queen bees on the local market, beekeepers import approximately 15,000 queen bees every year.

To address the above constraints, LIVCD co-invested in 6,238 hives distributed to 1,497 beekeepers, trained 3,600 beekeepers, and invested in breeding centers to increase honey production in Lebanon.

LIVCD interventions to increase production included the following:

I- Expanding the number of hives in production owned by small and medium beekeepers.

The condition for beekeepers to benefit from a co-investment in beehives was that they attend training on the application of improved practices. 1,497 beekeepers co-invested in a total of 6,238 beehives. This promoted the entry of new beekeepers that had less than 25 hives into the honey value chain.

LIVCD provided three beehives against at least one beehive purchased by beekeepers. Beekeepers co-invested in a total of about 2,000 hives. Through this initiative, LIVCD directly contributed to increasing the number of hives in Lebanon by a minimum of 8,000 hives between 2014 and 2016.

The impact of investing in beehives is directly related to production levels. LIVCD's co-investment in beehives will lead to an increase in production by:

- 40,000 kg / \$0.8 million for the first year, based on a productivity of 5 kg/hive
- 64,000 kg / \$1.28 million for the second year, based on a productivity of 8 kg/hive
- 120,000 kg / \$2.4 million for the third year, based on a productivity of 15 kg/hive

LIVCD's co-investment in beehives will yield approximately \$4.48 million in sales. Based on current LIVCD Monitoring and Evaluation real data collection from 920 out of 1,497 beekeepers, a sales value of \$3 million was achieved to date (August 2017).

Year 1	\$800,000
Year 2	\$1,280,000
Year 3	\$2,400,000
Total Value	\$4,480,000

2- Sustaining and increasing the production per beehive through training.

LIVCD facilitated technical assistance and training to beekeepers through extension-service providers and value-chain actors. More than 3,600 beekeepers (48% of total beekeepers) were trained on hive management and the treatment of bee diseases. It was vital to the industry to improve awareness of proper beehive management. LIVCD established a beekeeping training program, which had several positive impacts on the volume and quality of production.

In collaboration with beekeeping experts, LIVCD developed a new curriculum on beekeeping, covering five topics: Hive management, diseases, queen breeding, new technologies in beekeeping,

and increase in honey production. A tutorial video encompassing the five chapters accompanied the manual.

NGOs, cooperatives, and university faculty members underwent the Training of Trainers (TOT) in the above five topics. In total, 70 experts received training on proper educational methods for beekeeping training and improvement of beekeeping practices. The objective of the TOT program was to create a critical mass of trainers in each region with the basic knowledge, skills, and experience to provide training to beekeepers across Lebanon, using the LIVDC curriculum.

LIVCD took advantage of the training to address bee disease issues with a strategy to regulate chemical and pesticide use, which would ensure that beekeepers are compliant with the new standards established by the Ministry of Agriculture. The training also addressed ways of using wax from old and damaged combs, thus providing beekeepers with an additional source of income.

The LIVCD honey training program had an impact both on production and income. The volume of honey produced increased by a minimum of 30%, with some beekeepers reporting an increase in productivity from 8 kg/bee hive to an impressive 15 kg/bee hive, an increase of nearly 90%. Additionally, a representative sample of trained beekeepers reported a 5% drop in the cost of production when they started applying best management practices and an increase of 66% in total value of sales when they started practicing swarming, thus increasing the number of honey-producing bees.

Before LIVCD closes, it will identify and launch beekeeping schools to ensure the sustainability of the training program.

3- Improving the Quality of Queen Bees.

In 2016, the first artificial insemination center for the breeding of queen bees in the Arab world, the Golden Queen Center, was established with LIVCD's support to promote the artificial insemination of superior queen bees and to limit the import of low quality queen bees.

The project began with ten VSH (Varroa-Sensitive Hygiene) Ligustica pedigree bees, acquired from the US Department of Agriculture (USDA) Bee Breeding Lab. These engineered queen bees are highly resistant to diseases (Varroa mites, American Foulbrood, and Chalkbrood), and have a strong defense against wax moths and small hive beetles. They are also highly productive, producing an average of 30 kg/hive against the national average of 12 kg/hive with the local queen bees.

The Golden Queen Center produced 2,200 VSH queen bees through artificial insemination, improving queen bee quality, increasing average productivity per hive, reducing the need for pesticides and antibiotics, and ultimately reducing the cost of beekeeping.

In addition, LIVCD co-invested with Jabal Amel Cooperative on protecting and reproducing selected local queen bees.

The most popular type of queen bee in Lebanon is the local *apis mellifera syriaca* bee. Although it is less productive than the Italian *ligustica* bee, it is slightly more aggressive, and is highly adaptable to the Lebanese environment. Despite its higher productivity, the gentle Italian *apis mellifera ligustica* is a less popular alternative.

Only professional and knowledgeable beekeepers produce their own queen bees, as the technique requires a high level of expertise. Small-scale beekeepers rely on purchasing queen bees from the local cooperative and professional beekeepers, or from input suppliers that import queen bees. Prior to LIVCD intervention, there were no artificial insemination queen breeding centers in Lebanon and the rest of the Arab world. Yearly, Lebanon imports around 15,000 queen bees, which sell at around \$25 per queen bee. This high cost and the complicated importation logistics often make imported queen bees inaccessible to Lebanese beekeepers.

LIVCD Finding 1: In 2016, the potential market for queen bees in Lebanon was around 275,000 queen bees. A conservative estimate for the market potential for queen bees in Lebanon would be around 100,000 queen bees annually, because the market is untested and an undetermined number of beekeepers in Lebanon are stationary, leaving their hives in one location from year to year. Beekeepers should replace the queen bee of stationary hives every two years to retain high productivity.

LIVCD Finding 2: As 15,000 queen bees are imported and sold annually, the current market size is at least 15,000 queen bees.

LIVCD Finding 3: Lebanon's unique climate and geography allows for the production of queen bees from February through August in different regions of the country. In South Lebanon, queen bees can be produced from February through July. In Ouyoun El Siman, queen bees can be produced from March through July. In Rashaya El Wadi, queen bees can be produced from April through August.

LIVCD Finding 4: Lebanon's unique climate and geography allow beekeepers to transport their hives within the country during most of the year. At most, hives are transported five times a year. Frequent transportation tires the queen bee, requiring an annual replacement of queen bees per hive.

Value Chain Opportunities and Recommendations

OPPORTUNITY #1: CAPITALIZE ON LINKAGES BETWEEN MEDIUM & LARGE PRODUCERS TO SUSTAIN & EXPAND PRODUCTION

Once producers reach the 25 hive threshold, they need to be assisted with market linkages to buyers. The model applied with Jabal el Sheikh should be replicated with producers with smaller brands. The model is based on agreements between beekeepers and the trader to access high-volume market channels, either in the domestic branded segment or in the export market. As demand for honey is increasing, more and more companies are growing their honey production capacities and are opening retail shops to market their honey, such as L'Atelier du Miel.

Recommendation #1: Continue supporting linkages between young beekeepers and honey companies to ensure sustainability of brands and jobs of beekeepers.

OPPORTUNITY #2: LIMIT THE ENTRY OF LOW-QUALITY QUEEN BEES & BEEHIVES

Beekeeping has suffered from the entry of low-quality queen bees and beehives to Lebanon, with a visible change in the performance of bees and their productivity. The import of queen bees without proper regulations has introduced new diseases that were previously unknown in the Lebanese ecosystem. Enforcing a rule to protect and regulate the entry of queen bees and beehives to Lebanon is a crucial step to protect the future biodiversity of beekeeping and the environment in Lebanon.

Studies and demo plots carried out with LARI, universities, and the private sector should be carried out over the next five years to observe the differences between local and imported queen bees. Reports and conclusions should then be shared with MoA as a prerequisite to any regulation. Adequate regulation and validation of the quality of produced and imported queen bees should be put in place and enforced to protect the local bee population from low-quality imported bees

(Egyptian) that are corrupting and decreasing the quantity and quality of the species in Lebanon. Universities, laboratories, the private sector, and governmental bodies should collaborate to achieve the necessary protective measures.

Recommendation #2: Support the development of an additional professional center for the reproduction of queen bees. Jabal Sheikh - Rashaya could be a potential area.

OPPORTUNITY #3: ESTABLISH PROFESSIONAL BEEKEEPING SCHOOLS

One of LIVCD's priorities was to establish and strengthen the beekeeping training centers it has established to ensure the continuity of the four-year training program, which trained 3,600 beekeepers around Lebanon. To that end, LIVCD developed and printed a beekeeping manual and tutorial DVDs, which serve as educational tools to beekeepers. A few cooperatives and companies proved their success in co-managing the honey training program.

The need and high demand for ongoing professional training programs makes it necessary to continue to support the established honey training program. Consequently, investing in the creation and support of professional beekeeping schools in every governorate and providing them with all the material created and printed by LIVCD will be a breakthrough in the sustainability of the beekeeping value chain in Lebanon.

Four schools could potentially lead this opportunity: HOSCO Agri, Maten el Aala Cooperative, Afif Beekeeping School, and LARI extension centers.

Recommendation #3: Continue the implementation of the training program developed by LIVCD with the diverse partners.

OPPORTUNITY #4: CERTIFY NEW HONEY-TESTING LABS

Every export market has its own regulations on the quality of imported honey. Exporters must offer proof of compliance with these regulations to be allowed entry into these markets. Traditionally, Lebanese exporters suffered from the lack of accredited labs that could test honey and issue a full report on its physiochemical and nutritional qualities.

With ESIAM Laboratory, beekeepers now have quick and cheap access to tests for the botanical origin of honey in addition to regular tests, such as the level of acidity, sugars, HMF, moisture, etc. More labs need to be certified to meet the needs of all exporters of honey. LARI Lab should thus work with other donor projects on helping existing labs obtain certification to facilitate access to export markets to traders.

Recommendation #4: Continue working with ESIAM and USEK to develop an accurate National Library for Lebanese honey.

OPPORTUNITY #5: INCREASE PASTURE LAND

The limited wild land that supports a bio-diverse ecosystem is a major constraint to beekeeping in developed countries. Replanting large areas with wildflowers brings back the bees, which are necessary to balance the ecosystem: By increasing pollination, bees increase plant diversity. Beekeeping can then remain a healthy and productive practice.

In Lebanon, local municipalities and the national government should replant pollinating trees rather than ornamental trees to counter deforestation. They should also increase pasture fields, as this will increase the yield of beehives.

Recommendation #5: Continue working on increasing honey production by increasing pasture land through the preservation of existing land and cultivating arid areas.

OPPORTUNITY #6: RESEARCH PLANTS WITH HIGH HONEY YIELDS

Partnering with universities is essential to publish studies on the most suitable plants for pollination in Lebanon. Past studies regarding pollinating plants, wild flowers, and trees are already documented. However, there are no practical studies with measurable results and publications on how beekeeping link to plants. Such research should be further developed to support the sector and change the strategy and choices of new types of plants introduced by Municipalities.

Recommendation #6: Carry out studies with universities or other partners to define plants that increase honey productivity.

OPPORTUNITY #7: INCREASE LOCAL MARKET SHARE FOR LOCAL BRANDED HONEY VS. IMPORTED HONEY

Strengthening and implementing the new honey regulation issued by LIBNOR on imported honey is a step toward limiting the entry of the low-quality honey that competes with Lebanese honey. Imported mixed honey marketed as “honey” and sold at lower prices is eating away market shares from local honey.

A strict implementation of the LIBNOR regulation will allow Lebanese honey to grow its market share, thus increasing the sourcing of honey from local beekeepers.

Recommendation #7: Continue to promote Lebanese honey by providing producers, local brands, and exporters with technical support to increase their sales on the domestic and export markets.

OPPORTUNITY #8: INCREASE EXPORT MARKET SHARE OF LEBANESE BRANDED HONEY

The growing demand for honey at home and abroad has led companies to source higher quantities of honey from local beekeepers. Thus, there is an increased interest in expanding existing apiaries and creating new ones to meet demand.

As more and more beekeepers are investing in honey production, the increase in production in the upcoming years should be supported by adequate marketing. In particular, Lebanese honey must become more competitive on export markets. Existing entities, such as the Investment Development Authority of Lebanon (IDAL), can play a role in supporting exports of Lebanese honey products to

high-potential markets. The GCC countries should be a priority for Lebanese honey exports. At a later stage, the US and Canada could offer market opportunities, thanks to their large Lebanese expatriate community and more straightforward regulations than those imposed by EU standards.

Recommendation #8: Continue to support exports led by the private sector by increasing investments and marketing activities in GCC the prime export market for Lebanese honey, and by introducing new brands into other potential export markets (USA and Canada).

Honey Value Chain Annexes

ANNEX 1: DISTRIBUTION OF BEEHIVES BY REGION

MOA	Caza	Total 2011	Total 2016	Growth 2016-2011
Bekaa	Zahle	4,021	7,055	75%
	Baalbak	8,325	19,322	132%
	West bekaa	4,833	7,500	55%
	Hermel	4,653	9,160	97%
	Rashaya	3,219	6,900	114%
	Total Bekaa	25,051	49,937	99%
	% Bekaa of Total	15%	14%	
South	Sour	8,446	25,123	197%
	Saida	6,323	20,330	222%
	Jezzine	3,283	7,253	121%
	Total South	18,052	52,706	192%
	% South	11%	15%	
North	Tripoli	790	1,603	103%
	Zgharta	1,454	3,401	134%
	Koura	1,860	3,345	80%
	Bchari	721	1,800	150%
	Batroun	2,092	6,347	203%
	Minye-Doniye	34,522	57,445	66%
	Aakar	14,622	23,735	62%
	Total North	56,061	97,676	74%
	% North of Total	33%	27%	
Mount Lebanon	Keserwan	7,262	14,732	103%
	Jbeil	15,231	41,242	171%
	Metn	4,536	11,377	151%
	Babda	3,882	6,851	76%
	Chouf	6,966	23,434	236%
	Aley	3,813	8,235	116%
	Total M.L	41,690	105,871	154%
	% M.L of Total	25%	29%	
Nabatiye	Nabatiye	9,475	18,600	96%
	Bent Jbeil	7,387	11,336	53%
	Marjyoun	5,802	12,987	124%
	Hasbaya	4,538	11,066	144%
	Total Nabatiye	27,202	53,989	98%
	% Nabatiye of Total	16%	15%	
Total Lebanon		168,056	360,179	114%

ANNEX 2: REGIONAL DISTRIBUTION OF BEEKEEPERS

MOA	Caza	Total 2011	Total 2016
Bekaa	Zahle	106	203
	Baalbak	358	745
	West bekaa	187	282
	Hermel	134	318
	Total Bekaa	785	1,548
	% Bekaa	14%	15%
South	Sour	342	878
	Saida	251	564
	Jezzine	124	263
	Total South	717	1,705
	% South	13%	17%
North	Tripoli	14	44
	Zgharta	43	45
	Koura	48	116
	Bchari	28	30
	Batroun	54	146
	Minye-Doniye	610	677
	Akkar	659	894
	Total North	1,456	1,952
	% North	26%	19%
Mount Lebanon	Keserwan	168	301
	Jbeil	296	700
	Metn	93	255
	Babda	158	262
	chouf	235	661
	alai	169	297
	Total M.L.	1,119	2,476
	% M.L.	20%	25%
Nabatiye	Nabatiye	450	770
	Bent Jbeil	369	481
	Marjiyoun	503	772
	Hasbaya	146	353
	Total Nabatiye	1,468	2,376
	% Nabatiye	26%	24%
Total Lebanon		5,545	10,057

SOURCE: MINISTRY OF AGRICULTURE, BEEKEEPING UNIT

ANNEX 3: SEASONALITY

	Honey Type	Region of Production	Harvesting Period	Characteristics
1	Citrus blossom Honey	Coastal area especially in Saida and Tyre region	April	<ul style="list-style-type: none"> - The volume of production is highly dependent on climatic conditions. - In citrus orchards beehives suffer from pesticide spraying - Sometime this honey contains pesticide residues - This honey crystallizes early (after 5 months)
2	Multiple-flowers honey	Central region, elevation from 400 till 850 m.	July - August	From different kinds of flowering plants and trees. The quality and the characteristics change from one region to another.
3	Honeydew honey	Central region: at elevation from 400 till 850 m. especially in Pine and oak forests area	June	This honey is dark in color and rich in minerals
4	Mountain Honey (Jerdi)	The high mountain in Lebanon at elevation 850 m and above	September	Good quality honey in high demand and sold at higher price.

SOURCE: LIVCD

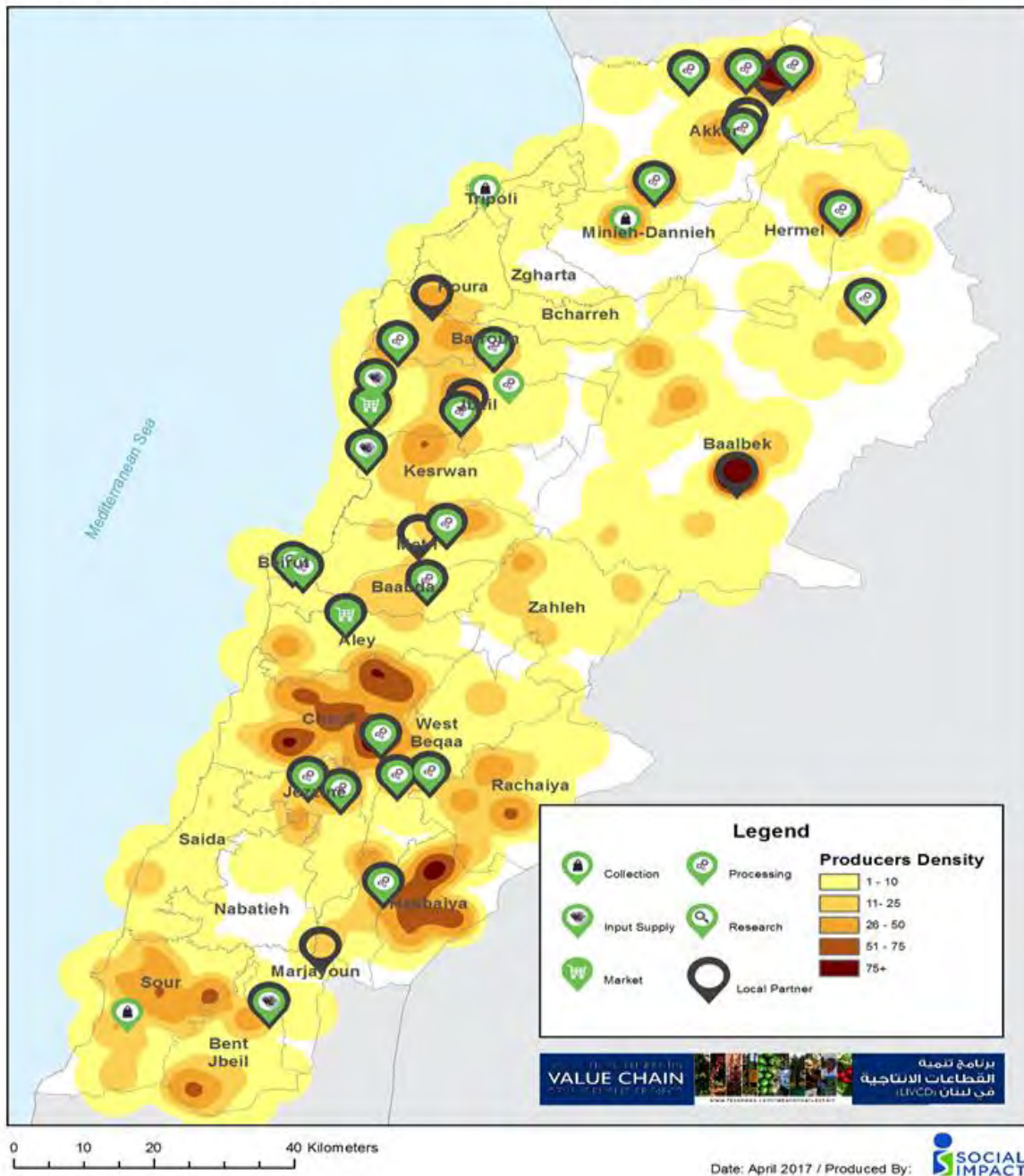
ANNEX 4: LEBANESE HONEY EXPORTS IN 2016

Importing Countries 2016	Volume of Honey Exports (MT)	Value of Honey Export/Country (Thousand USD)	% of Export per Country
Canada	4	6	1%
Congo	2	7	1%
Gabon	0	2	0%
Germany	0	3	0%
Guinea	1	3	0%
Hong Kong	0	4	1%
Jordan	1	21	3%
Kuwait	0	7	1%
Nigeria	0	4	1%
Qatar	6	78	11%
Saudi Arabia	13	214	31%
United Arab Emirates	24	294	43%
United States	2	31	5%
Zambia	1	2	0%
Total	57	680	100%

SOURCE: WWW.CUSTOMS.GOV.LB

ANNEX 5: LIVCD INTERVENTION MAP

Honey Value Chain
Density of Beneficiaries



SOURCE: LIVCD

ANNEX 6: KEY SERVICE PROVIDERS-INPUT SUPPLIERS

Input Suppliers
<input type="checkbox"/> Api Shop Jawad - Ghaziyeh, Saida
<input type="checkbox"/> Ellek- Nabatiyeh
<input type="checkbox"/> Abi Sleyman – Jbeil
<input type="checkbox"/> Eefel – Naeemeh, Chouf
<input type="checkbox"/> Tarhineh – Toul, Nabatiyeh
<input type="checkbox"/> Mamlaket Al-Nahel – Baakleen
<input type="checkbox"/> Al Hayek – Ghaziyeh, Saida
<input type="checkbox"/> Milor – Mansouriyeh, Maten
<input type="checkbox"/> Mamlaket Al-Nahel – Kfar Akka, Kourah
<input type="checkbox"/> Societe Saade
<input type="checkbox"/> Hussein Awada - North
<input type="checkbox"/> Yehia Hamad- North
<input type="checkbox"/> Liban Sol
<input type="checkbox"/> Nehme est. Batroun
<input type="checkbox"/> HOSCO Agri- OKAYBE
<input type="checkbox"/> GOLDEN QUEEN CENTER- HOSRAYEL

SOURCE: LIVCD

ANNEX 7: MINISTRY OF AGRICULTURE – HONEY DECREE

جمهورية اللبنانية
وزارة الزراعة
بيروت

مديرية الشؤون الحيوانية
رقم: ١٤٠٠/١٤٠٠
تاريخه: ١٤٠٠/١٤٠٠
مطلوبات تداول منتج العسل

إن وزير الزراعة،
بناء على المرسوم ١١٢١٧ تاريخ ٢٠١٤/٢/١٥ (تشكيل الحكومة)،
بناء على المرسوم الاشتراعي رقم ٣١ تاريخ ١٩٥٥/١/١٨ وتعديلاته (تحديد مهام وزارة الزراعة)،
بناء على المرسوم الاشتراعي رقم ٩٧ تاريخ ١٩٨٣/٩/١٦ وتعديلاته (دمج مؤسسات عامة بوزارة الزراعة وإعادة تنظيم الوزارة)،
بناء على المرسوم رقم ٥٢٤٦ تاريخ ١٩٩٤/٦/٢٠ وتعديلاته (تنظيم وزارة الزراعة)،
وجرساً على حماية المزارع وتحقيقاً لمصلحة الاقتصاد الوطني وسلامة العلاقات التجارية الدولية،

يقرر ما يأتي:

المادة الأولى: يخضع جميع أنواع العسل المستورد أو المنتج محلياً للفحوصات المخبرية الخاصة بتحليل ترسبات المضادات الحيوية والمبيدات الواردة في الجدول رقم ١ المرفق بهذا القرار.

المادة الثانية: يخضع العسل المصدر لجميع الفحوصات المخبرية التي تتناسب مع المواصفات الإلزامية المفروضة في البلد المصدر إليه.

المادة الثالثة: يخضع العسل المصدر إلى أوروبا لفحوصات مخبرية تتعلق بتحليل الترسبات الكيميائية المتصوص عليها في الجدول رقم ٢ المرفق بهذا القرار والتي تتناسب مع المواصفة الأوروبية الإلزامية.

تجرى التحاليل المخبرية المنصوص عليها في الجدول رقم ٢ في مختبرات معتمدة ومعترف بها رسمياً.

المادة الرابعة: يستثنى عسل النحل من ذكر تاريخ الصلاحية على البطاقة البيانية على أن يذكر تاريخ الإنتاج بالشهر والسنة شرط أن لا يتعدى الخمس سنوات.

المادة الخامسة: تُنقى جميع النصوص السابقة التي تتعارض مع هذا القرار.

المادة السادسة: ينشر هذا القرار ويبلغ من يلزم ويعمل به بعد ستة اشهر من تاريخ نشره في الجريدة الرسمية.

تبلغ نسخة إلى:
رئاسة مجلس الوزراء
التفتيش المركزي
وزارة الاقتصاد والتجارة
المجلس الاعلى للجمارك
المديرية العامة للجمارك
مؤسسة المقاييس والمواصفات اللبنانية
اللجنة الوطنية لمتابعة مواضيع سلامة الغذاء
اللجنة العليا لقطاع النحل
اتحاد غرف التجارة والصناعة والزراعة في لبنان
نقابات وجمعيات مربّي النحل
جمعية الصنّاع اللبنانيين
نقابة اصحاب الصناعات الغذائية
الجريدة الرسمية (للتفصل بالنشر)
المديريات المركزية - المصالح الاقليمية
المحفوظات
١٤٠٠/١٤٠٠

بيروت، في ١٤٠٠ - ٢ - ١٤٠٠
وزير الزراعة
مدير الشؤون الحيوانية
١٤٠٠/١٤٠٠
١٤٠٠/١٤٠٠

- ١ -

SOURCE: MINISTRY OF AGRICULTURE, BEEKEEPING UNIT

ANNEX 8: 2016 MODIFICATIONS ON HONEY QUALITY PARAMETERS

Parameters of Honey Quality	Modifications made in 2016
<p>HMF Regulations (The higher the HMF value, the lower the quality of the honey is considered to be. Consumer protection is obligatory; the presence of potentially toxic compounds in food has been attracting more attention (Spano et al., 2009). While HMF might be metabolized by humans to potentially carcinogenic compound (Capuano and Fogliano, 2011), the concentration in natural honey is found to be several magnitudes lower than many thermally processed foods. Food industry has taken the levels of HMF in honey as a quality measure. Elevated concentrations of HMF in honey (HMF is almost absent in fresh extracted honey) provide an indication of overheating, stored in poor conditions, higher age of the honey or possible adulteration with sugars and syrup.)</p>	<p>Recommendation was made for LIBNOR in 2012 mainly by importing company to increase HMF to 40 mg/kg – 80mg/kg to meet codex standards, LIVCD invested in studies and lab tests and in collaboration with private sectors, HMF levels were kept to 20 mg/kg – 40mg/kg in the new regulation.</p>
<p>Humidity Regulations</p>	<p>In addition imported honey were fighting to get humidity levels increased to 20 to meet codex, while in the new regulation it was kept it to max 19 in favor of Lebanese honey</p>
<p>Sucrose Regulations</p>	<p>Level of Sucrose in the old regulation included higher levels up to 15g/100g that will only benefit imported honey, while in the new regulation it was made to 5g/100g, and it deleted all the varieties from other countries origin , this was made in favor of Lebanese Honey.</p>
<p>Regulations of Antibiotics in Honey (Generally antibiotics are widely used in Food Animals as growth promoters, to prevent or to treat infections. However in apiculture they are used essentially for treatment of bacterial diseases. Residues of antibiotics originate mostly from the environment and improper beekeeping practices.)</p> <p>Oxytetracycline is commonly used to treat European foulbrood disease and American foulbrood diseases caused by Paenibacillus (Bacillus) larvae and Streptococcus pluton bacteria, respectively.</p>	<p>The level of maximum residue levels (MRL) of three antibiotics (Oxytetracyclines, tetracyclines, and streptomycin) was increased from 5µg/kg to 50 µg/kg. Ministry of Agriculture have been distributing Tetracyclines for years and Lebanese beekeepers were using it and this is why we can find traces of tetracycline in the Lebanese Honey only, while Imported honey contains higher levels of Sulfamides, Sulfamides levels were kept to 0.5 µg/kg</p>
<p>Regulations of pesticides residues in honey</p>	<p>Pesticides are worldwide used in control of bee diseases and pests and in most instant their administration is uncontrolled and applied without approved protocols. In the new decree Amitraz levels were kept to 200 µg/kg.</p>

ANNEX 9: LIST OF ESTABLISHED OR LIVCD-SUPPORTED SERVICES

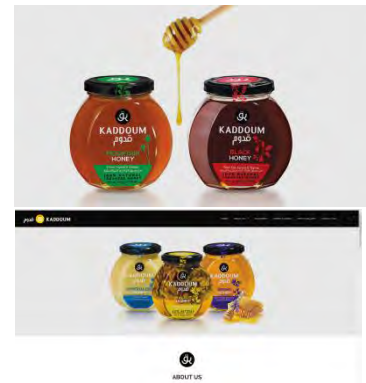
Regions	Cooperatives	List of Services offered in collaboration with LIVCD	LIVCD Cost Share
South	Jezzine Cooperative	Increase production	Beehives
	Caritas	Increase production	Beehives
	Development Cooperative of Jezzine- B.Balady	1. Honey Extraction and Wax Services, 2. Supplies for beekeeping	Wax production Unit and Honey Extractor Candy machine Beehives
	Deir Miness Cooperative	Increase production	Beehives
	JAZ	1. Honey Extraction and Storage Services	Uncapping Stands, Electric Knife, Reversible Honey Extractor (6 frames), Stainless Steel Containers
	Jabal Amel Beekeeping Cooperative	1.Natural Queen Rearing and Breeding Services 2. Selective Beehive Selling	Queen rearing kit, Frames for queen breeding, Incubator For Queen Bees, Nucleus Hives, Empty Wooden Beehives boxes, Beekeepers' tools
	Kfeir Beekeeping Cooperative	1.Increase production 2.Beehive Selling	Beehives
	Kawkaba Agriculture Cooperative	Increase production	Beehives
Bekaa	Karoun Beekeeping Cooperative	1. Honey Extraction and Storage services 2. Wax processing	Honey Extractor Stainless Steel Containers Wax sterilizers
	Zeghrine Beekeeping Cooperative	Increase production	Beehives
	Rif el Hermel Beekeeping Cooperative	1. Honey Extraction 2. Wax Sterilizing	Honey Extractor Wax sterilizer machine
	Hermel Beekeeping Cooperative	1. Honey Extraction 2. Wax Sterilizing	Honey Extractor Wax sterilizer machine
	Dar Tanit Association	1. Honey Extraction and Storage services	Beehives, Honey Extractor, Stainless steel containers (200l)
	Baalbeck and Zahle Cooperative for Beekeeping	Honey Extraction and Storage services	Beehives, Honey Extractor, Stainless steel containers
	North Bekaa Beekeeping Cooperative	Increase production	Beehives
	Cooperative Association for Marketing and Production of Beehives in Baalbeck	Honey Extraction and Storage services	Beehives, Honey Extractor (6 frames), Stainless steel containers
North	Association for Alternative Crops in Baalbeck ESIAM- USJ	Increase production Detection of Botanical Origin and Adulteration in Honey	Beehives FT-NIR Spectrophotometry
	Akkar el Atika Beekeeping Cooperative	Honey Extraction and Storage services	Beehives Wax melting and sterilizing Tank - 33 frames, Electric extractor (6 frames), Stainless steel container
	Kashlak Beekeeping and Honey Production Cooperative	Honey Extraction	Beehives, Honey Extractor
	Menjez Cooperative	Honey Extraction	Beehives, Honey Extractor
	Beekeeper cooperative association in Chadra	Honey Extraction	Beehives, Honey Extractor
	Cooperative Association in Douma	Honey Extraction and Storage Services	Beehives Honey bee extractor Stainless steel containers
	Cooperative Association for beekeepers in Ghouma	Honey Extraction Services	Beehives, Honey Extractor
	Aydamoun Cooperative Association	Increase production	Beehives
Kobayat Agricultural Cooperative	1.Honey Extraction and Storage Services 2. Thyme Distillation Practices	Beehives, Distillation unit for thyme, honey extractor, stainless steel containers	
Mount Lebanon	Kwayteh Beekeeping Cooperative	1. Honey Extraction and Storage Services 2. Wax Services 3. Candy Making Machine	Beehives, Wax sterilizer, wax foundation mold, candy making machine, stainless steel tank, wax rolling machine, honey heating machine
	Ehmej	Increase production	Beehives
	APJM	Increase production	Beehives
	Ain el Abou Cooperative	1. Extraction Services 2. Wax Services	Beehives, Extractor, wax processing equipment, Candy making machine
	Almet Cooperative	Honey Extraction and Storage Services	Beehives, Honey extractor, Stainless steel containers (50 kg), Stainless steel manual uncapping stand
	Mrsity	Wax Processing	Wax sterilizer, wax sheeting and embossing machine
	APIS	1. Extraction Services 2. Honey Mixing Services 3. Honey Bottling Services	Beehives, Fully automatic uncapping and extraction line, and Honey Mixer
	Jabal Moussa HOSCO Agri	Increase production Professional Wax Services, and Educational Services- Beekeeping School	Beehives Beeswax Foundation Fully Automatic Machine
Golden Queen Center- Afif Abi Chedid Ag and Trade Company	1.AI Center 2. Fully Equipped Conference Center 3. Training Services	Beehives, Artificial Insemination apparatus, Stereoscopes, microscopes, Queen Rearing Kits	
Maten el Aala Beekeeping Cooperative	1. Extraction Services 2. Wax services 3. Honey Marketing Support 4. Conference and meeting Room 5. Training Services	Beehives, Honey Extractors, Wax foundation molds, Wax sterilizer, accounting system, marketing and promotional material, and Educational support	

SOURCE: LIVCD

ANNEX 10: LIVCD MARKETING SUPPORT: BRANDING FOR HONEY COMPANIES

- **Kaddoum Honey : Rebranding one of the market leaders**

LIVCD provided support through a grant to create a new logo for the brand, a new label design with a modern image that can respond to the local and export consumers' expectations. In addition, the brand launched a new website, www.kaddoumhoney.com and a Facebook page to present its products and interact with consumers.



- **Matn el Aala Cooperative : Entering the market**



LIVCD provided technical assistance to the Matn el Aala Cooperative to create a new logo, label and promotional tools that helped the brand reinforcing its presence in supermarkets.

- **Le Miel de Nazih : Creating a new brand**

LIVCD provided technical assistance to develop a new logo, label, and visual identity for the brand.



- **Golden Queen Center and Honey new identity**



LIVCD provided assistance to Afif Abi Chedid to create a new logo for his Beekeeping Center and new labels for his honey products.

- **Hosco Agri Beekeeping Center new identity:**

LIVCD provided support to HOSCO Agri Wax recycling Center and Beekeeping School through a grant, to create a new logo and promotional tools including a brochure, stationary, a website, and social media (Facebook and /Instagram pages). This allowed reaching out to a large number of potential customers.

