



Improving lives

AGRIFOOD MARKET SURVEY

LEBANESE AGRIFOOD MARKET SURVEY 2021

Unveiling Challenges, Opportunities,
and Trends

2021

PREPARED BY Fair Trade Lebanon

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List of Acronyms

AB	Agriculture Biologique
CPF	Country Programming Framework
FTL	Fair Trade Lebanon
FAO	Food and Agriculture Organization of the United Nations
GAP	Good Agricultural Practice
GDP	Gross Domestic Product
HACCP	Hazard Analysis and Critical Control Points
IDAL	Investment Development Authority of Lebanon
ISO	International Organization for Standardization
IFAD	International Fund for Agricultural Development
KII	Key Informant Interview
MoA	Ministry of Agriculture
NGO	Non-Governmental Organization
TVET	Technical and Vocational Education and Training
USAID	United States Agency for International Development
VC	Value Chain

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Executive Summary

The agricultural sector is one of the pillars of the Lebanese economy, contributing in USD 1.8 billion of the total Gross Domestic Product (GDP) and employing 4 percent of the Lebanese labor force in 2018, according to the International Fund for Agricultural Development (IFAD, 2019). Moreover, the sector is the backbone of Lebanon's agrifood sector, which in turn contributes to the growth of the national industrial sector. Although actual growth rates between 2010 and 2018 were relatively low (growth rate \approx 2 percent), a sustained agricultural growth is crucial to improving the quality of living as well as generating better revenues. The sector represents an important source of income in rural areas where it relies on basic practices and outdated techniques.

On a further note, the prolonged crisis in Lebanon has put the economic sector at stake, and specifically the agricultural sector, subject of this report. All players of the chains, including input suppliers, farmers, distributors and producers are facing major bottlenecks and challenges, and if these issues are not addressed holistically with structural approaches, the country would be jeopardizing not only its agrifood sector, industry and national GDP at large, but also and most importantly its food security. Consequently, the interest in agricultural sector and agrifood sector has increased whereby several initiatives are being held by local and international NGOs in Lebanon to study the needs of the different players of food chains in order to support them and develop them further. Among the initiatives to support the vital sector, the Food and Agriculture Organization of the United Nation in Lebanon (FAO) prepared the Country Programming Framework (CPF) 2016-2019 document defining the development priorities for its collaboration with the government of Lebanon in the fields of agriculture, food security and natural resources. In alignment with the CPF, FAO contracted Fair Trade Lebanon (FTL) to conduct a study that identifies the major bottlenecks and challenges in the agrifood sector in Lebanon and provide subsequently a series of recommendations that could be used as starting points for the organization's future interventions. Within the scope of this study, FTL, in collaboration with FAO and the Ministry of Agriculture (MoA), prioritized the 2 most affected agrifood sub-sectors and selected 2 Value Chains (VC) under each to be studied, namely the cow milk and poultry meat and eggs VCs under the animal production subsector, and the greenhouse vegetables and table grapes VCs.

As per the scope of work of this project, this study aims to offer an analysis of the challenges and obstacles of these markets and to propose recommendations for emergency and medium-term interventions to participate in the recovery of the agrifood sector. As such, a team of solicited experts accomplished the following key activities:

- I. Market assessment of 2 agrifood sub-sectors, namely Plant Production and Animal Production, with an emphasis of 2 VCs under each sub-sector.
 - A. Sub-Sector 1: Plant Production
 - VC1: Greenhouse Crops

- VC2: Table Grapes
- B. Sub-Sector 2: Animal Production
- VC1: Poultry
 - VC2: Cow Milk
- II. Analyze major bottlenecks and challenges
- III. Analyze trends, price patterns, market interventions, and consumer behaviors

Desk Review

Market assessments of agricultural products VCs in Lebanon remain few, rarely updated and with varying focuses. The context of the current crisis played a major role in shedding light on the importance of assessing and analyzing these above-mentioned VCs, in an attempt to empower rural population on one hand but also to provide the Lebanese economy with immunity, albeit partial, by improving the food security in the country on the other hand.

The Cow Milk VC

The selection of the cow milk VC is due to the fact that cow milk represents the largest share of milk production (95 percent), while goat and sheep milk represent respectively 3 percent and 2 percent of the total production. Furthermore, goat and sheep milk production are seasonal (November to June) unlike cow milk production which is permanent (IFAD, 2017).

Additionally, Lebanon's exports of dairy products were valued at a mere \$772,000 in 2019, while imports were measured at more than \$280 million. MoA & FAO (2016) estimated the national production for the fresh (milk) component for nearly \$206 million (USAID, 2020). This highlights the major trade deficit that needs to be reduced in any strategy or policy to be adopted in the future.

This VC in particular has a high potential for development: according to IFAD (2017), dairy cattle production systems are largely landless and vary in size, with smallholder systems owning 2 to 10 cows, medium size units with 11 to 30 animals, but also large and modern units integrated to industrial processing units (Table 1). The Lebanese dairy herd is entirely composed of exotic animals which are raised in zero grazing intensive system.

Specie	Cattle			
	Region	Farms	Heads	Av per farm
North		1,524	6,693	4.39
Akkar		4,482	11,150	2.49
Baalbek & Hermel		1,261	10,874	8.62
Bekka		913	18,761	20.55
South		569	4,839	8.50
Nabatieh		956	7,360	7.70
Mont Liban		705	8,891	12.61
Total		10,410	59,677	5.73

Table 1 – Geographic Distribution of Cattle in Lebanon (Source: IFAD, 2017)

There are four categories of players involved in the cow milk VC in Lebanon (Figure 1), in addition to the external stakeholders: i) farmers ii) collectors iii) processors and iv) retailers and distributors. (LACTIMED, 2014).

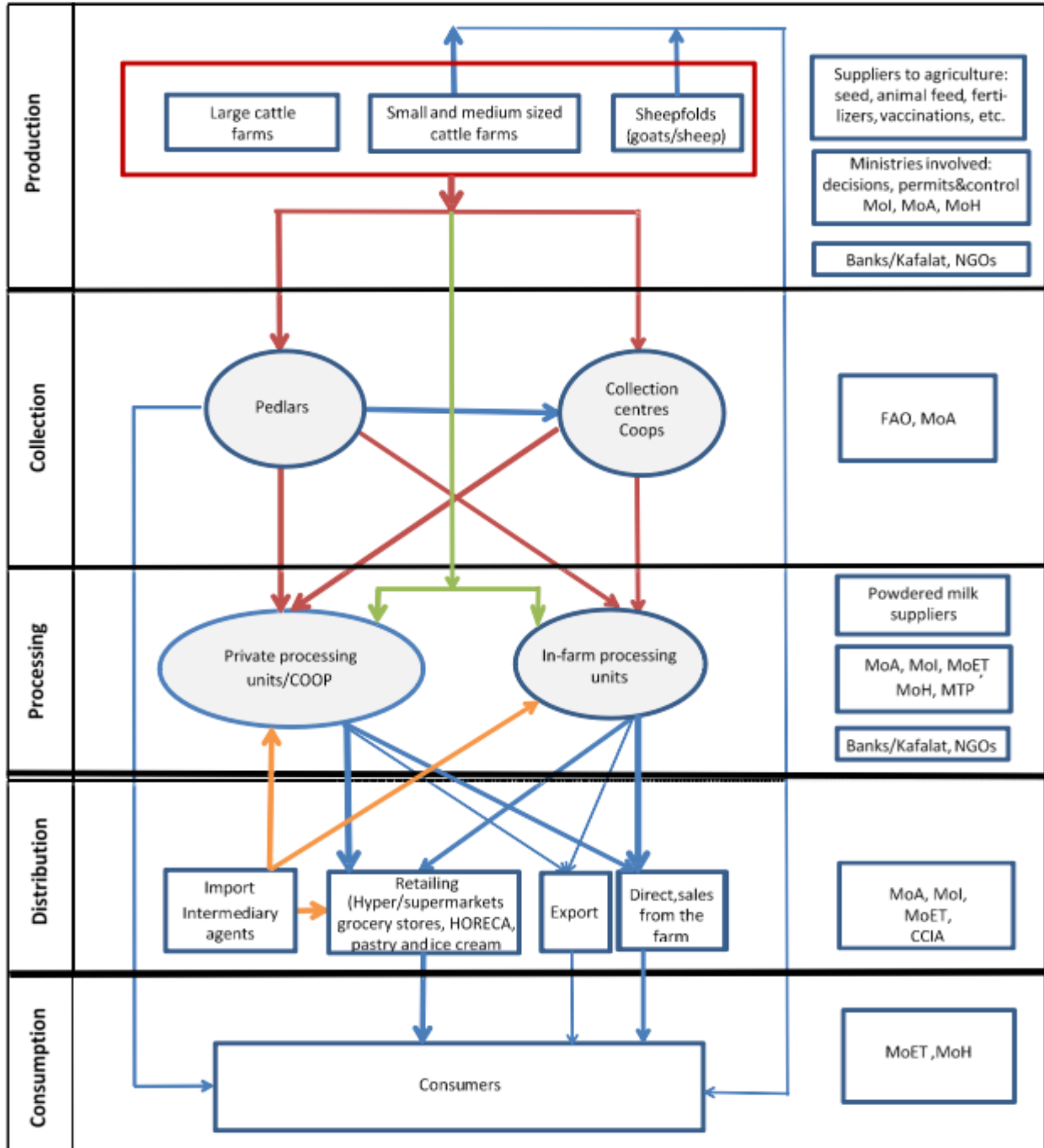


Figure 1 - Main Actors in the Cow Milk VC in Lebanon (Source: LACTIMED, 2014)

Since the beginning of the crisis, there has been shortage in cow milk for commercial dairy production. As milk prices have risen, smaller milk producers have opted to withhold their milk from the market either to satisfy household needs or to process the milk directly (USAID, 2020).

The Meat Poultry and Eggs VC

The poultry VC in Lebanon constituted in 2003 one of the major components in the Lebanese agricultural production with a significant working force employed in the sector (MOA, 2003). In 2016, around 2,000 chicken farms were found throughout the nation, including more than 10 major poultry producers. Four poultry fully-integrated producers together control more than half of the Lebanese poultry market, namely Hawa Chicken, Wilco, Shuman and Tanmia. (BlomInvest Bank, 2016).

Despite having the ability to meet the whole domestic demand, Lebanese poultry farmers were requesting more stringent protectionist measures to safeguard them against overseas rivalry. In order to satisfy the local demand, Lebanon also produced fresh poultry meat, and imported chilled and frozen chicken.

The working force involved in the sector can be classified as follows:

- Suppliers of major feed ingredients and suppliers of micro ingredients and veterinary products
- Companies that import and rear parents' stocks for production of day-old chicks. These companies are usually fully-integrated business involved in meat and egg production
- Small farmers involved in meat and egg production

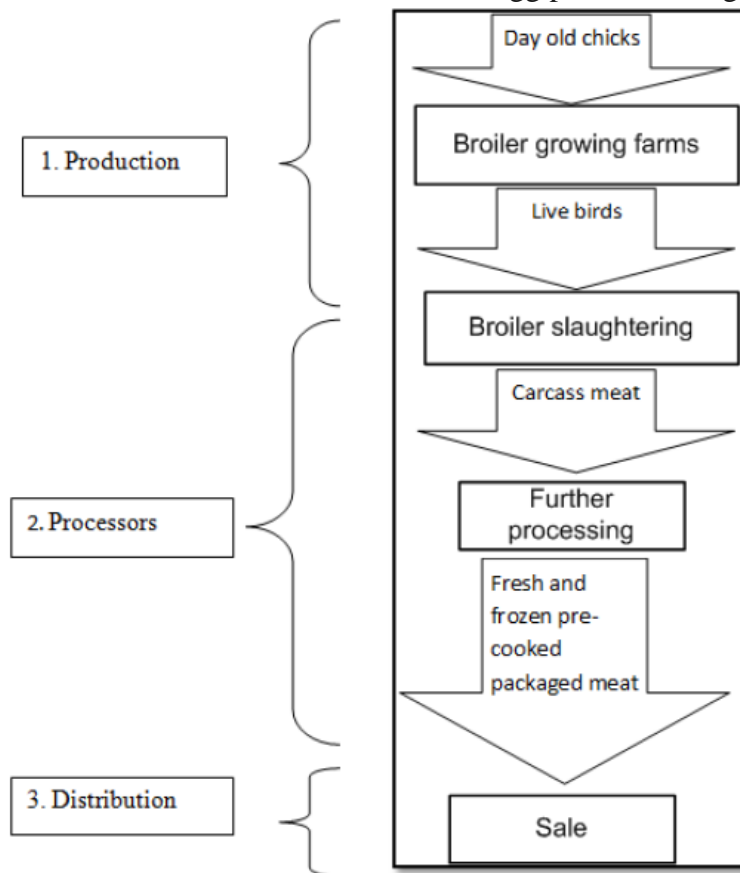


Figure 2 - Main Actors in The Poultry Meat & Eggs VC in Lebanon (Source: Balaa & Tannouri, 2014)

The poultry production is spread over most of the Lebanese territory, with a significant capacity for traditional production in Mount Lebanon despite the high urbanization level in the area (MoA, 2003). Most of the production in the sector is destined for the Lebanese market. A very small part of the production (frozen meat) is exported around the Middle East. Lebanese poultry cannot compete on nearby foreign markets such as the Gulf Cooperation Council (GCC) market because it doesn't have a price-advantage over Brazilian products. The size of the local market hovers around \$350 million while imports average \$17 million per year. Locally, Lebanon produces around 150 million kilograms of broilers (chickens destined for meat consumption) and consumes 30 kg of chicken per capita per year.

Some information is worth mentioning in regards to the poultry meat and eggs VC:

- The quality and quantity of production in the sector is highly sensitive to the quality of the feed.
- The cost of feed represents 70 to 80 percent of the total cost in poultry production (KII 2) most of which is imported.
- Poultry in Lebanon is fed 95 percent grains and the meals are free of antibiotics.
- Most of the grains imported by Lebanon are destined for animal feed (Blominvest Bank, 2016).
- Middlemen play a major role in the price determination and regulation in the live animals and eggs chains, and corner the biggest profit in the industry (MoA, 2003).

The Greenhouse Crops and Tables Grapes VCs

Lebanon has 6 main crop production regions. Vegetables are produced mainly in four regions: coastal area, North Lebanon/Akkar plain/upper Mount Lebanon, Bekaa valley and the Mountain regions. The Mediterranean and moderate climate in Lebanon, the soil fertility and availability and quality of water are favorable for fresh vegetable production. Specifically, the Bekaa and North Lebanon (Akkar) have a good soil texture and provide a great potential for field crop and intensive cultivation (Ruijs, 2017).

Unfortunately, no reliable statistics of crop production area of vegetable crops are available. MoA's agricultural census of 2010 shows that the total crop area is about 126,000 ha: 44 percent with temporary crops (about 102,500 ha) and 2 percent is covered with greenhouses (about 3,800 ha). Vegetables are the second largest category within the temporary crops with almost 37,000 ha. The Bekaa valley has the largest vegetable production area (about 37 percent), followed by the regions Baalbeck-Hermel and Akkar (Ruijs, 2017).

According to a report published in 2020 by the Investment Development Authority of Lebanon (IDAL), Lebanon's total agricultural production in 2018 was 1,340,443 tons, the top produces were potatoes, tomatoes, cucumbers and gherkins and the top exports in 2019 were potatoes, lettuce and dried leguminous vegetables (Figure 3). And the top export destination countries for Lebanese agriculture products are the GCC (Figure 4).

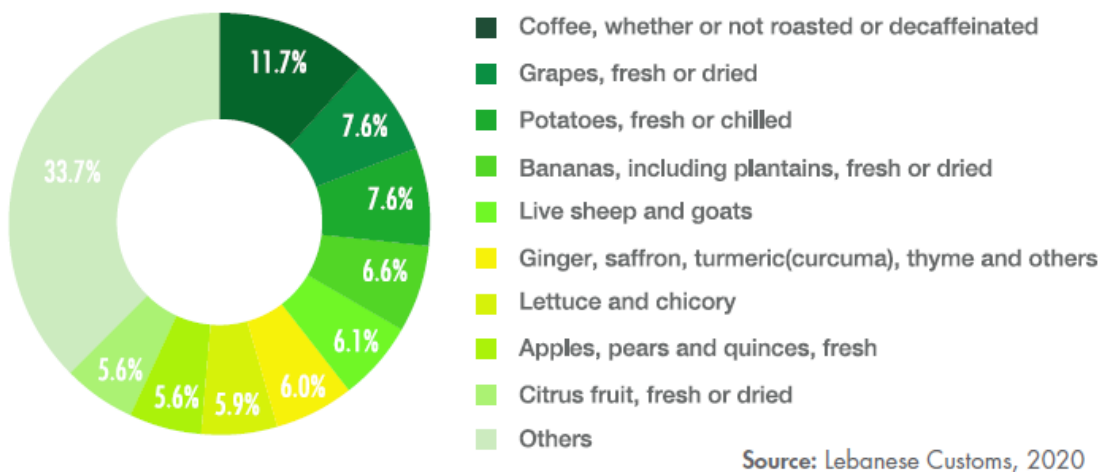


Figure 3 - Lebanon's Top Agricultural Exports (Source: IDAL, 2020)

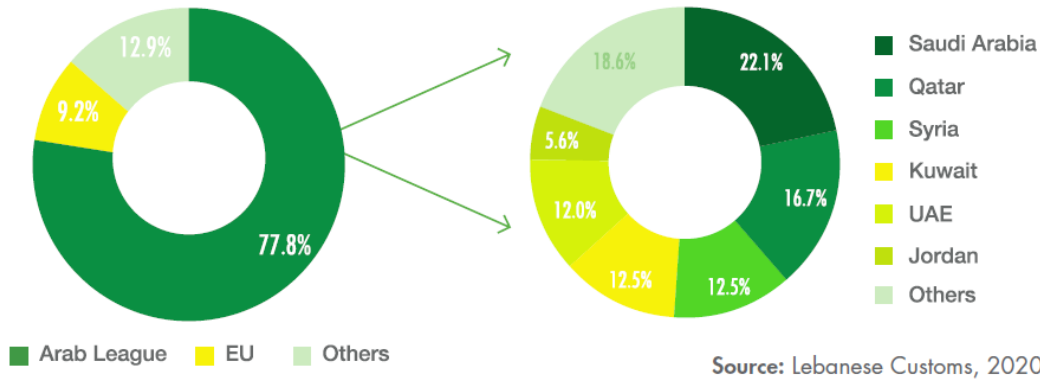


Figure 4 - Lebanon's Top Agriculture Products Export Destinations (Source: IDAL, 2020)

Concerning greenhouses, they are mostly located in the governorates of Akkar (1,574 ha), the South (628 ha), Mount Lebanon (525 ha) and the North (477 ha). In the Bekaa valley, only a small area of greenhouses is found (86 ha), because of the sharp increase in temperature during the summer season. Almost all greenhouses in Lebanon are used for vegetable production. In 2017, the area of greenhouses was estimated at 3,900 ha (Ruijs, 2017).

Vegetable crops cultivated in greenhouse are tomato, cucumber, pepper, eggplant, lettuce and iceberg. Under greenhouses, year-round production is possible, except for the Bekaa governorate, due to the heat reason mentioned above.

The main export products of greenhouse vegetables are cabbage lettuce, tomato, cucumber and gherkins and eggplants. The exports of Lebanese vegetable products mainly go to the Gulf region. Typical greenhouse vegetables like tomatoes, lettuce, cucumbers and eggplants are also imported, but in limited quantities (Ruijs, 2017).

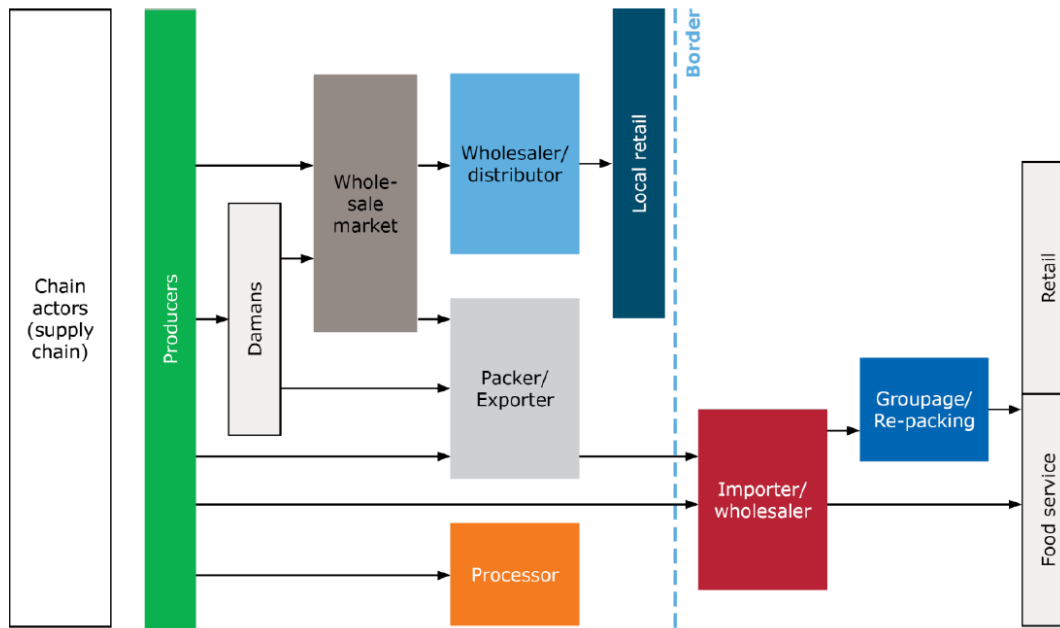


Figure 5 - Main Actors in the Greenhouse Crops VC in Lebanon (Source: Ruijs, 2017)

When it comes to table grapes, Lebanon’s exports were valued at nearly \$10.7 million in 2019, as compared to imports of only \$1.7 million (ITC, 2020). In 2016, the estimate of national production for the grape value chain (including table and wine grapes) was nearly more than \$76 million (Fig. 6) (MoA & FAO, 2016 in USAID, 2020).

Lebanon produces multiple varieties of table grapes, including local varieties (Baytamouni, Tfeifihi) and international varieties (Red Globe, Black Pearl, Crimson Seedless, Superior). As of 2016, the majority of cultivated areas were planted with local Baytamouni and Red Globe (USAID, 2020). Farmers producing table grapes can be divided into small-, medium-, and large-scale farmers. Small-scale farmers producing on average less than 1.5 ha represent some 80 percent of table grapes farmers by number. Medium-scale farmers cultivate lands >1.5-7.0 ha, and account for 17 percent of table grapes producers; these farmers dominate the local market for table grapes, supplying 80 percent of table grapes to the local wholesale market. Large-scale farmers (>7.0 ha) represent a minor share of producers but control the majority of the area cultivated. Large-scale farmers often play the role of aggregator, buying grapes from smaller farmers for sale on the wholesale market. Some large-scale farmers have integrated post-harvest operations to include packing and exporting to international markets, notably the GCC. Regardless of production scale, Lebanon’s table grapes VC is generally marked by low-technology production. Traditional and unsophisticated materials are used, notably in mechanization and irrigation (USAID, 2020).

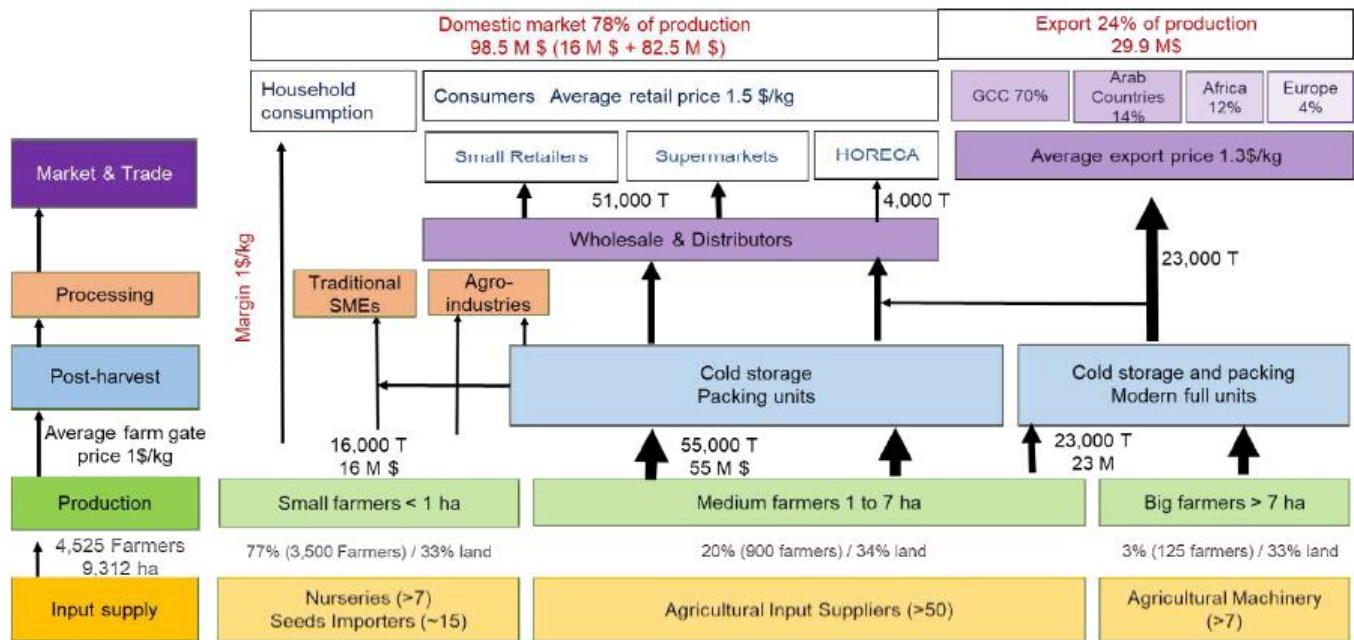


Figure 6 - Table Grapes Value Chain in Lebanon (Source: USAID, 2020)

Methodology

To reach the objective of identifying major bottlenecks and challenges in the 4 selected VCs through a thorough market study to be able to propose recommendations for development and improvement, the following methodology has been adopted (Figure 7):

- I. Research Methodology Design and Questionnaire Building
- II. Data Collection Process
- III. Data Monitoring and Cleaning
- IV. Data Analysis to Identify Bottlenecks and Opportunities

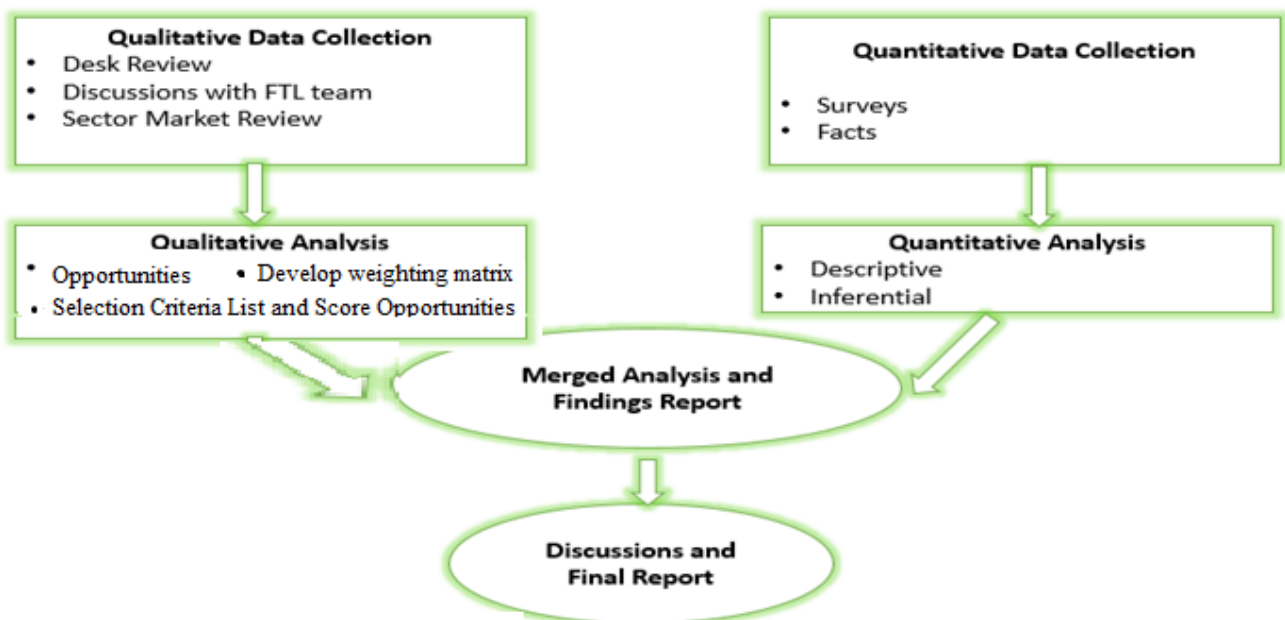


Figure 7 - Methodology of the 4 Adopted Phases

I. Research Methodology and Questionnaire Building

This phase is constituted of three main components:

- A. Desk Review and Ideation Discussions
 - ❖ Review of the available data and information
 - ❖ Preliminary Sector Market Review
 - ❖ Discussions with FAO

- B. Research Method and Tools

This stage involves the blueprint to conduct the data analysis and tools. First, the sub main goals are determined and accordingly the questions are built. Questionnaires were built online to ensure

quality of the collected data and allowing daily and automatic monitoring of the mapping and data collection process.

C. Mapping and Sampling

This stage involves determining targeted key informants/chain players/stakeholders for the survey and preparing the guides for the surveys and Key Informant Interviews (KIIs).

II. Data Collection Process

This phase is composed of two activities after determining the required samples in terms of numbers and categories. The suggested targeted sample ranges between 250 and 300 beneficiaries. A professional data collection's team of enumerators was trained for this task, and then the mapping and data collection process took place simultaneously. On a further note the data collection process, took into consideration COVID-19 safety measures, and was conducted via three methods;

- ❖ Phone calls
- ❖ Face to face
- ❖ Hybrid (phone calls & face to face)

Perceived limitations

The requested pricing and cost questions including details for each year from 2019 to 2022, from the farmers and the other chain players was challenging to collect from the end of the respondents due to poor bookkeeping among stakeholders and currency fluctuations.

III. Data Cleaning and Monitoring

FTL's Agricultural Expert and Market Analyst, alongside with Data Collector's field coordinator trained the enumerators on the survey to enable them to understand the scope and to clarify the questions for the respondents

Sampling

By adopting statistical calculations of Cochran’s sampling formula, the target sample was 384 surveys. This formula is highly recognized across different types of research, quantitative and qualitative, recommending a sample size of 384. According to Cochran (1977), “one method of determining sample size is to specify margins of error for the items that are regarded as most vital to the survey.”¹ The margin of error generally reflects the risk that the researcher may take on considering the changes in the sample population. By convention, the confidence level is 95 percent and the margin of error is at 5 percent.² In addition, there are software and online websites that allow a feasible calculation of the sample size, by just designating the confidence level and error margin, as well as the population size. The primary desk review showed the distribution of the chain players over the eight governorates in Lebanon with a concentration of the Key players (input suppliers, farmers and processors) in Beqaa, North, Mount Lebanon and South. As such, the data collection covered all areas with the focus on the highly concentrated locations (Table 2).

Chain	Source	Production in \$	% Per Sub Sector	Targetted Sample	Input suppliers [10%]	Farmers /Process ors [50%]	Collectors/ Distributors /Wholesellers [15%]	Retailers [25%]	Attained Sample	Input suppliers [10%]	Farmers /Processors [50%]	Collectors/ Distributors /Wholesellers [15%]	Retailers [25%]
Cow milk	Ministry of Agri and FOA, 2016	206,000,000	0.26	105	10	52	16	26	115	10	56	20	29
Poultry meat	Blom Invest 2016	350,000,000	0.44	178	18	89	27	44	30	4	14	1	11
Greenhouse crops	Ministry of Agri and FOA, 2016	155,000,000	0.20	79	8	39	12	20	84	9	42	12	21
Table grapes	Ministry of Agri and FOA, 2016	76,000,000	0.10	39	4	19	6	10	37	5	20	1	11
Totals		787,000,000	1	400	40	200	60	100	266	28	132	34	72

Table 2 - Sampling Distribution per Chain Player

List of targeted entities for KIIs:

- MoA (Directorate of Plant Resources)
- MoA (Directorate of Animal Resources)
- Chamber of commerce
- Microfinance Institutions
- IDAL
- Exporters
- Syndicates
- Cooperatives

IV. Data Analysis to Identify Bottlenecks and Opportunities

After the completion of the surveys and KIIs, the agricultural expert at FTL embarked on the analysis phase, whereby valuable inputs were provided from the qualitative and quantitative collected data, in addition to the desk research. The following sections will dedicate one chapter

¹ Cochran, W. G. (1977). *Sampling techniques* (3rd ed.). New York: John Wiley & Sons.

² Turner, H. and Bernard, R. (2006). Contemporary Issues In Communication Science And Disorders. Volume 33. 42–55. https://pubs.asha.org/doi/pdf/10.1044/cicsd_33_S_42

for each VC, in which a detailed analysis includes major findings, trends, bottlenecks, challenges, recommendations and opportunities.

I. Cow Milk VC

A total of 115 players (input suppliers, farmers, distributors, and retailers) and 6 experts, professionals and government representatives in this chain participated to this study.

A. Cow Milk Input Suppliers

Challenges and Bottlenecks

Survey participants were all Lebanese males, aged between 29 and 64 but mostly (60 percent of the participants) between 51 and 64. The majority of the input suppliers depends on small scale businesses, they all have to pay in fresh USD and rely on self-financing. The average cost of their purchased input material increased by 20 percent during the crisis as well their selling prices. Consequently, their profit margin shrank to less than 5 percent.

Major challenges faced were due to the importing hurdles, primarily due to the Lebanese currency depreciation. The top materials in shortage were fuel and electricity (90 percent), grains (70 percent), animal feed and mixtures (70 percent), packing material (40 percent), equipment and tools (40 percent). However, very few reported a shortage in vaccines and veterinary inputs (10 percent).

The input suppliers purchase their material from local wholesalers (80 percent) while the remaining 30 percent import their material from a foreign supplier. The participants who import their products used to purchase them before the crisis from Ukraine and Russia. They currently had to shift towards new sources of supply such as China, Romania and Latin America. In parallel, their main customers are farmers (90 percent) and distributors (10 percent). Locally their suppliers and clients are spread over the 8 governorates.

Concerning the market's adjustment to the crisis, the volume of sales decrease among all input suppliers, all while maintaining the same quality, indicating a decrease in input demands in the cow milk VC.

The main challenges encountered by the cow milk input suppliers were the lack of liquidity (lack of cash), low purchasing power, shrinking of the local markets (limited sales), high transportation cost, currency depreciation and inflation and lack of access to loans and financial support.

These VC actors endured the absence of regular maintenance in their fridges, some losses in their merchandise due to water and electricity shortages, and a decrease in the volume of sales; they were concerned to a lesser extent about the quality of their merchandise (caused by bad storage in the trucks, poor roads quality, and poor quality of input/raw material).

The main challenges that raised after the crisis were the lack of: local raw material (which obliged them to import them at higher costs), packing material, skilled workers, affordable machines and equipment.

Input suppliers didn't consider marketing, advertising, and direct access to market as essential tools to compete and sell their products, while they considered the government support (tariffs, subsidies, trade quotas, etc..) very helpful in relation to the protection of domestic products vis-à-vis imported ones.

Concerning the challenges related to the input suppliers' skills during and after the economic crisis, they didn't consider their lacked basic numeracy, financial and literacy skills, and knowledge on food safety standards as weaknesses. They were more concerned in their inability to bypass the role of middlemen (dammans, collectors, hallabs, etc.).

Coping Mechanisms:

The input suppliers adopted different coping mechanisms to survive the ongoing crisis in Lebanon. The main practice to cope with the new economic conditions in the country was downsizing. These VC actors relied widely on decreasing the volume of their purchases and merchandise, without losing in the quality of their products; some even introduced new products at inflated prices to fulfil the demand of some consumers.

Further coping mechanisms included increasing efficiency and reducing cost. Input suppliers modified their business models by reducing overhead costs, decreasing working hours which impacted the electricity bills and fuel costs, and in some cases reduced the numbers of employees. All these measures prevented them from going out of business and helped them adapt to the economic situation that was imposed on them.

An additional strategy to survive the crisis was to shift to other sources of supply or lower quality inputs. A considerable number of input suppliers were forced to adopt this strategy in order to cater to the market demand: farmers, veterinary centers and other consumers were still asking for certain input supplies, but the scarcity of liquidity obliged them to seek lower quality and hence lower prices of inputs.

Opportunities

Different opportunities can be considered to help cow milk input suppliers improve their businesses. The highest ranked opportunity is about to facilitate the imports of raw material and to help the input supplier in funding economies of scales projects funded by international donors: this includes subsidizing raw material and finding alternative markets to import input supplies at more competitive prices.

Input suppliers also considered certification as an essential tool that can boost consumer confidence in their products: by this, providing access to certifications and standards by relevant parties would play an important role in ensuring their sustainability and presence in the market.

These actors also could benefit from clustering, a practice that is not much adopted in Lebanese culture. The presence of coalitions and linkages between these chain players at a national level would help in the creation of structural approaches that would defend them from unpredicted events such as the crisis we are going through. This union would also form a pressure group that could lobby for laws and procedures that protect their businesses.

Other opportunities were highly perceived such as capacity building to enhance their skills and the use of developed methods and support in marketing and advertising strategies to boost their exposure to markets.

Also, input suppliers valued the presence of linkages and agreements to facilitate export: in many cases, input suppliers purchase local and imported raw material that are transformed into input supplies and then exported. Creating such agreements would widen their spectrum of potential export markets.

Another opportunity was mentioned, even though with less importance, is the reduction in costs of product transportation (such as special fridges, collaborative shipping from one area to another).

Efforts to support cow milk input suppliers could include cash assistance, fuel subsidizing, training/capacity building, incorporating new technology and equipment.

B. Cow Milk Producers/Farmers

Survey participants were Lebanese, 98 percent males and 2 percent females, with ages ranging between 18 and 64. The educational attainment levels of farmers was as follows: 16 percent are illiterate, 27 percent had university degrees, 46 percent attended school and 11 percent received vocational education. When asked about memberships and collaborations, 9 percent indicated they are part of a cooperative, and 9 percent are union members, 2 percent are part of local gathering. The remaining 80 percent work independently. The business nature ranged between small and medium businesses not exceeding 49 workers, with a majority of less than 10 workers (around 89 percent of the respondents have between 0 and 10 workers). It is worth mentioning that 71 percent of the surveyed farmers depend solely on this business, while 29 percent have a second source of income.

Three cow breeds exist in the Lebanese farms: The Holstein breed, the local “Baladi” breed and the “Baladi-Friesian” breed. Most of the farmers have Holstein cow breed on their farm (73 percent), 32 percent have “Baladi” breed and 21 percent “Baladi-Friesian” breed. The milking is mostly done automatically (68 percent), for 34 percent of the farmers the milking is done with small machines or small old milking units, and only 5 percent that the milking is done manually.

Trends / Price Patterns / Profit Margins / Consumer Behavior

The figure below shows that the heads of milking cows per farmer has been in declining trend since 2019. In 2022, 57 percent of the farmers have between 0 and 20 milking cows against a majority of 45 percent who had between 21 and 100 heads of milking cows in 2019 (Fig. 8).

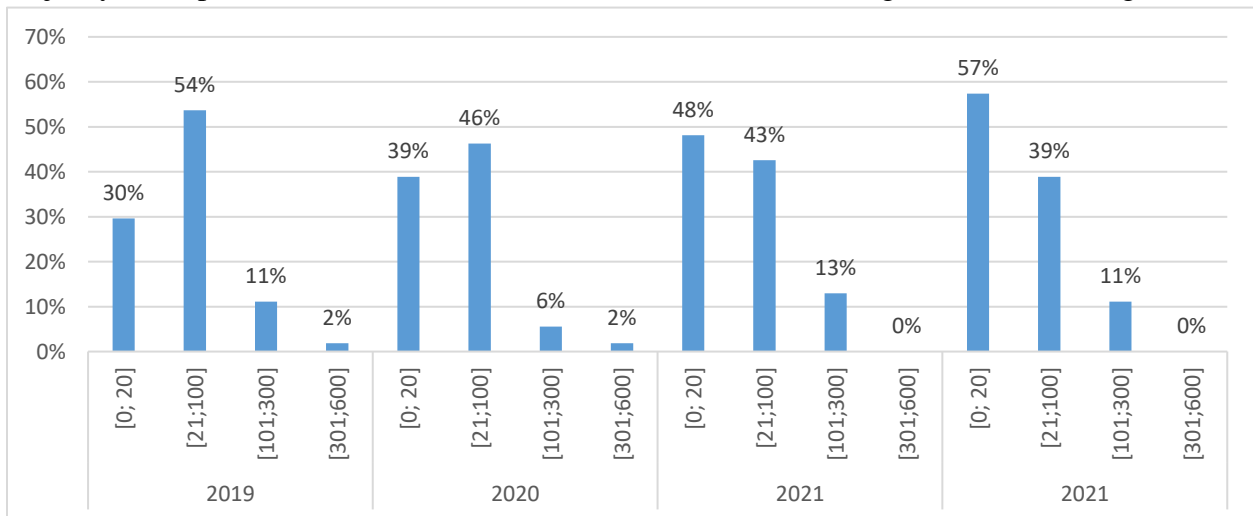


Figure 8 - Number of Milking Cows per Farmer Between 2019 & 2022

The average yearly production of milk per farmer confirms the same shrinking trend whereby the average production has been constantly dropping since 2019, from 416,000 liters per farmer in 2019

to 193,536 liters, less than half the quantity farmers used to produce. Same applies for the quantity of milk sold in 2021 and 2022 which fell below half of the quantity sold in 2019, with a slight improvement in 2022.

Speaking of the financial management for the cow milk farmers, 86 percent have to pay for the input material in fresh USD and full payments. Among them, only 11 percent still settle some of the payments in Lebanese Pounds and 11 percent were able to pay using their current USD accounts. They primarily rely on self-financing (84 percent); 12 percent indicated that they received a second source of financing distributed as such, 14 percent had a loan from the bank, 2 percent from microfinance institutions, 2 percent from government and 2 percent from NGOs.

Concerning the changes in prices that were inevitable during the 2019-2022 crisis, the results from the quantitative data suggest that both the average costs of purchasing the material and producing and the average selling are on the rise. Please note that there are 2 charts for the average cost of product (Fig. 9 & 10) and 2 charts for the average selling price of one liter of milk (Fig. 11 &12): this is due to the fact that some farmers were giving the values in USD and others in LBP, and due to the immense fluctuation in the Lebanese Pounds rate, merging the values into one graphs was not possible.

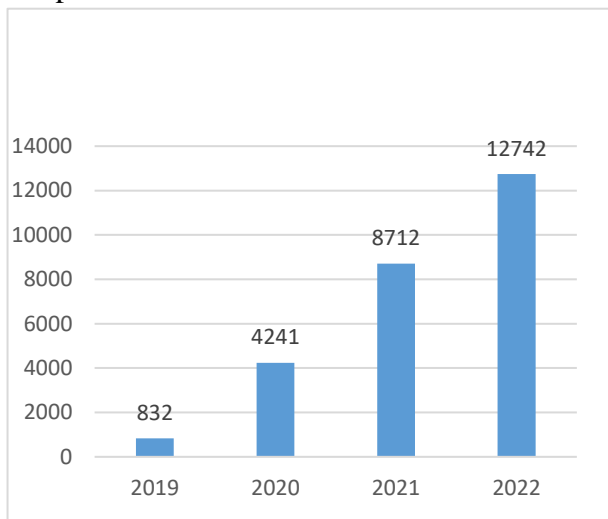


Figure 9 - Average Cost of Production for one Liter of Milk (LBP)

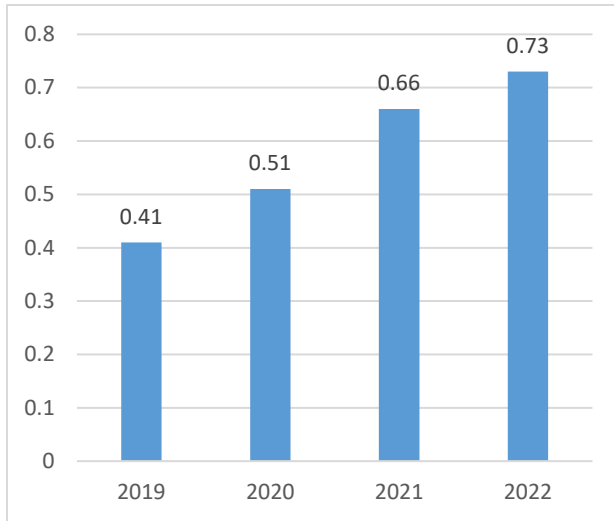


Figure 10 - Average Cost of Production of One Liter of Milk (USD)

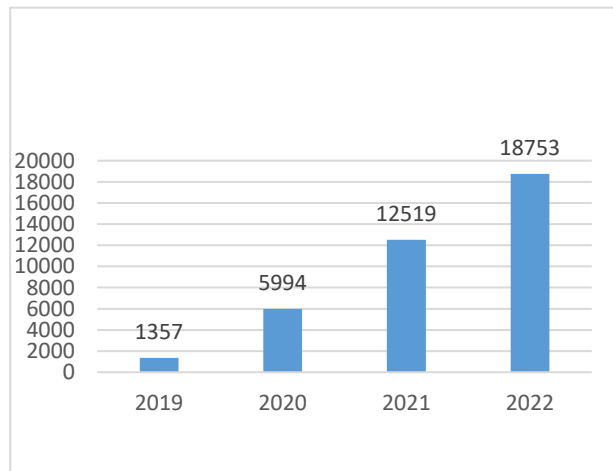


Figure 11 - Average Selling Price of one Liter of Milk (LBP)

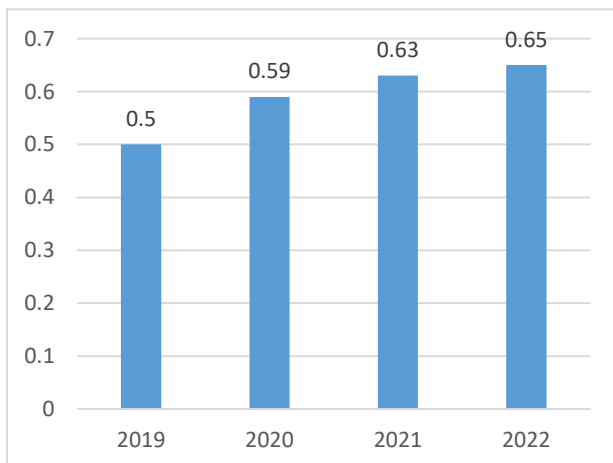


Figure 12 - Average Selling Price of one Liter of Milk (USD)

For instance, the average cost of producing one liter of milk was exponentially increasing in both currencies, the LBP and the fresh USD. As shown in figure 15, the cost in LBP increased from 832 to 4241, to 8,712, up to 12,742 LBP in 2019, 2020, 2021 and 2022 respectively. In figure 16, the costs of production are shown in fresh USD, where it increased from 41 cents in 2019 to 51 cents in 2020, to 66 cents in 2021 and 73 cents in 2022. When asked if the actual price of 70 cents per liter of milk at the gate determined by the MoA covers their operational costs, 82 percent of the farmers responded negatively. Similarly, the average selling prices in LBP increased from 1,357 to 5,994, to 12,519, up to 18,753 LBP in 2019, 2020, 2021 and 2022 respectively (Fig. 11). Prices in fresh USD increased from 50 cents in 2019 to 59 cents in 2020, settling at 0.63-0.65 USD in 2021 and 2022 (Fig. 12). These numbers reported by farmers in USD show that the cost of production of one liter of milk started exceeding the selling price since 2021, which justifies the decrease in the production volume in the sector that has dropped to almost half in 2019.

Despite increasing sales prices to cope with the increased costs of purchased materials, the number of farmers who could reach the break-even point declined from 2019 until 2022. From the interviewed farmers, 20 percent reported loss in 2019-2020, 36 percent in 2020-2021 against 64 percent in 2021-2022. Furthermore, for the farmers the profit margins from one year to another has been dropping from 12.5 percent between 2019 and 2020 to 6 percent between 2020 and 2021, reaching 4.9 percent between 2021 and 2022. (Fig. 13)

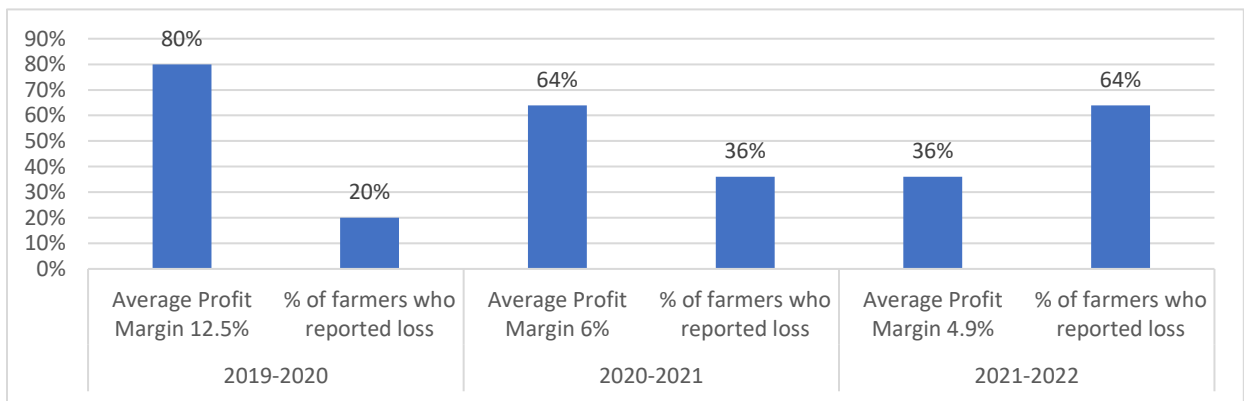


Figure 13 - Average Profit Margin v/s Loss for Milk Farmers Between 2019 & 2022

Market adjustments to the crisis resulted in 91 percent of farmers reducing their sales volume while maintaining the same quality. Another 2 percent are selling less and had to change the quality; and 2 percent managed to sell the same quantity but had to change the quality.

The farmers indicated they are facing challenges securing several input materials due to the Lebanese currency depreciation. The top materials in shortage were fuel and electricity (95 percent), vaccines and veterinary inputs (48 percent), drugs (46 percent), feeding input (45 percent), breeding input (38 percent) and packing materials (27 percent). Some farmers (7 percent) mentioned that the inputs exist from private sources but at very high prices given the existing shortage of the subsidized material specifically vaccines. Also, 95 percent of the respondents

purchase their vaccines from private suppliers, among them 9 percent rely also on the MoA national vaccine campaign and 2 percent on vaccines provided by NGOs.

The farmers purchase their input material mainly from local input suppliers (100 percent); among them (5 percent) buy from other farmers. Locally, the farmers purchase their inputs from sellers located in all governorates Akkar, Beirut, North, Mount Lebanon, Beqaa, Baalbek-Hermel, and South. In parallel, their main customers are processors (50 percent), retailers such as mini markets, supermarkets, and groceries (30 percent), households (34 percent), wholesalers (13 percent), the HORECA sector (5 percent), distributors/collectors (4 percent), and cooperatives (4 percent). The customers are from all governorates; however, it is noticed that the farmers mainly sell in their governorates and are not extending their networks beyond their neighborhoods.

Concerning quality control and certificates, around 75 percent of the cow milk producer respondents indicated that the quality of the milk is controlled and tested in a small laboratory on the farm or at the level of the group/association/cooperative to guarantee the safety of the products. Concerning certificates, the vast majority of respondents (89 percent) do not have any certificates (AB, GAP, ISO, HACCP), 4 farmers said they had a certificate but did not recall its name, only one has the ISO and another one said to have won the number one prize related to veterinary and breeding practices. It was noticeable that 13 percent of these farmers have started applying for certificates.

Challenges and Bottlenecks

The section above paves the way for identifying the various challenges and bottlenecks faced by the cow milk producers and farmers. The main financial and economic challenges were lack of access to loans and financial support, lack of liquidity (lack of cash), shrinking local markets, currency depreciation and inflation and finally high transportation cost. The farmers main source of losses in their products were due to electricity shortage.

Concerning the challenges related to resources (physical raw material, equipment and capital) the poor sewage and roads quality, water supply appeared important and the highest rank was given to the lack of the electricity supply. The cow milk producers didn't find difficulty in using new updated machines and equipment as important challenge but they considered the lack of raw material, skilled workers, affordable machines very challenging and contributed to many losses.

In the case of the competition challenges, they were slightly concerned in marketing and advertising, more in domestic and imports competition and mostly threatened in the lack of government support in terms of tariffs, subsidies, trade quotas, etc.).

Coping Mechanisms

Similar to all VC actors, cow milk producers and farmers adopted different coping mechanisms to survive the ongoing crisis in Lebanon. The main practices were increasing the selling prices, modifying feeding rations in order to decrease costs, downsizing and using straw as a feed.

A small number of them turned to additional coping strategies such as increasing their exports, negotiating payments delays to banks, closing temporarily, installing solar panels, introducing new products and e-commerce and finally collaborating with other businesses.

Opportunities

The major opportunities selected by those chain actors to help them improve their businesses were: support in marketing and advertising, projects that help them reduce their costs of production and transportation, capacity building to enhance their skills, agreements to facilitate the imports of raw material, and support in acquiring certificates.

Within the scope of the collected data for this study, producers and farmers indicated the need for fuel (96 percent), cash (84 percent), vaccines and veterinary services (80 percent), incorporating new technology (80 percent), training/capacity building (66 percent), cooling (68 percent), storage (65 percent), packing material (50 percent) and other material (34 percent) such as animal feed, solar energy and government subsidy.

C. Cow Milk Distributors

The participants were all males, 95 percent Lebanese and 5 percent Syrian, with ages between 18 and 64⁺. Almost 50 percent of the cow milk distributors who participated to the survey are illiterate, 20 percent have university degrees, and 30 percent attended school. When asked about memberships and collaborations, 75 percent of them indicated that they are independent, 20 percent members of a cooperative and 5 percent members of a union. The business sizes are in majority small-scale (85 percent), according to the number of employees, including the owner, that does not exceed 10 people. There are only 15 percent who have 11 to 49 workers. On a further note, 55 percent of the cow milk distributors depend solely on this business, while 45 percent have a second source of income.

Trends / Price Patterns / Profit Margins / Consumer Behavior

In terms of financials for the cow milk distributors, 60 percent pay their suppliers in Lebanese Pounds and 40 percent in fresh USD among who 5 percent managed to pay in USD bankers checks, or what has commonly become known as “lollars” during the current Lebanese financial crisis (referring to the “Lebanese Dollar” given to depositors at an arbitrary exchange rate used by the Central Bank). They all rely on self-financing and none of them benefit from any other source of financing.

Most cow milk distributors confirm that the milk prices are mainly determined by processors and factories (55 percent); 25 percent of these VC actors consider the government and the MoA to have the decisive role in such pricing, whereas 10 percent believe it is the market forces that decide and another 10 percent of distributors believe it is related to the cost of fuel, animal feed and workers fees.

The crisis caused an enormous fluctuation in collected milk prices. For instance, the average cost of one liter of purchased milk increased from 1,132 LBP in 2019 to 2,918 LBP in 2020 and 9,612 LBP in 2021 and 15,018 LBP in 2022. Similarly, the average selling prices increased from 1,394 LBP in 2019 to 3,116 LBP in 2020, 11,018 LBP in 2021, and 16,000 LBP in 2022. The average cost in USD increased from 45 cents in 2019 to 65 cents in 2022 and the average selling price went up from 55 cents in 2019 to 75 cents in 2022. (Fig. 14, 15, 16 & 17)

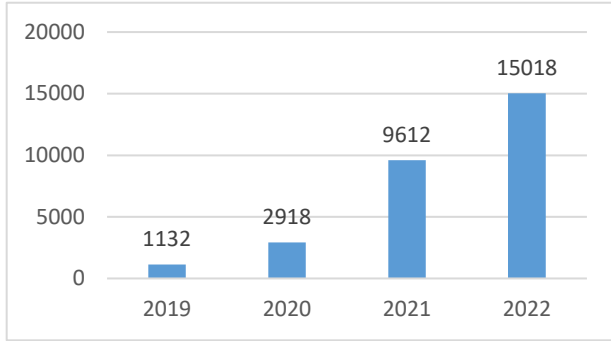


Figure 14 - Average Price of One Liter of Collected Milk In LBP

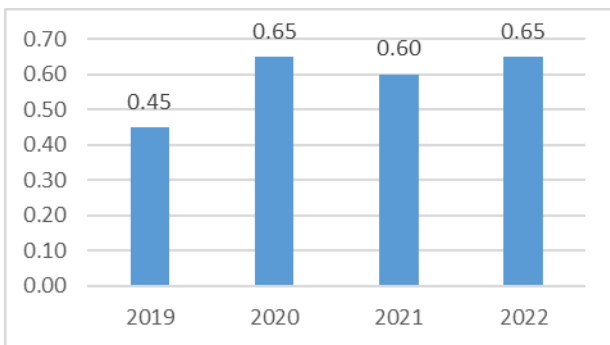


Figure 15 - Average Price of One Liter of Collected Milk In USD

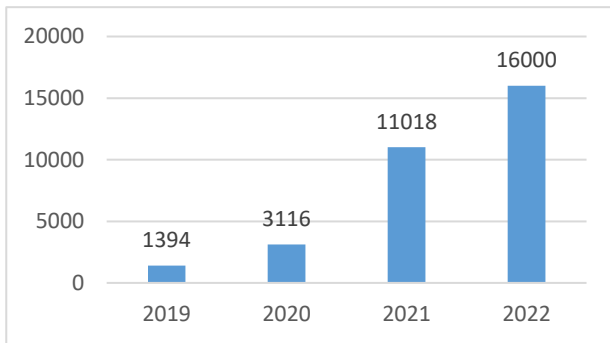


Figure 16 - Average Selling Price of One Liter Milk by Distributors in LBP

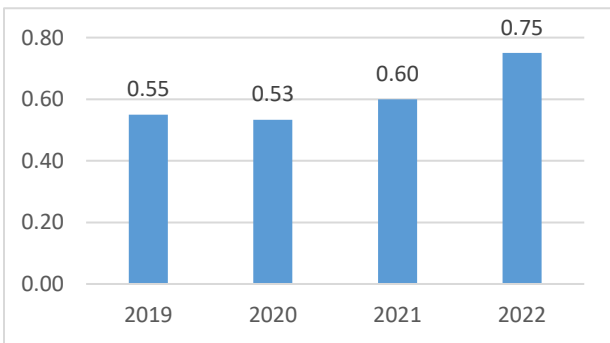


Figure 17 - Average Selling Price of One Liter of Milk by Distributors in USD.

Despite increasing sales prices to cope with the increased costs of purchased materials, the number of distributors who could reach the break-even point declined from 2019 to 2022. From the interviewed cow milk distributors, 10 percent reported loss in 2019-2020, 55 percent in 2020-2021 against 65 percent in 2021-2022. Furthermore, for the distributors who were able to reach the break-even, the below figure 24 shows that the profit margin from one year to another dropped from 11.5 percent between 2019-2022, to 9.5 percent between 2020-2021, reaching 4.2 percent between 2021-2022.

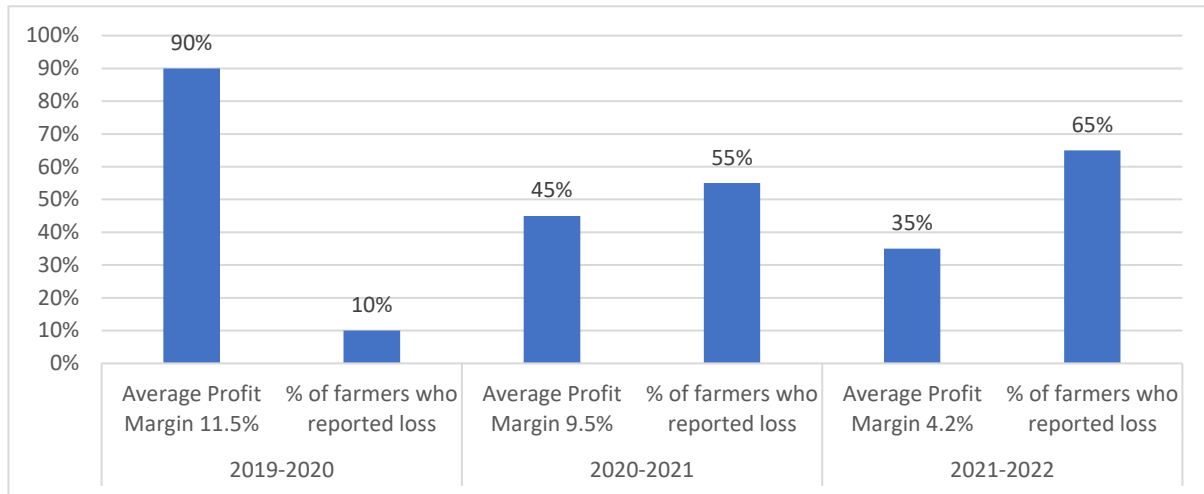


Figure 18 - Profit Margin v/s Loss for Cow Milk Distributors Between 2019 & 2022

Almost 65 percent of the distributors have a refrigerated vehicle. The collected data (Fig. 19) show that the quantity of milk collected and sold by distributors is on the decline since 2019. It went from 1,987,306 liters collected and sold per distributor on average in 2019 to below half its value, precisely to 890,606 liters in 2022. Cow milk distributors reported exactly same figures for the volume of milk collected and sold.

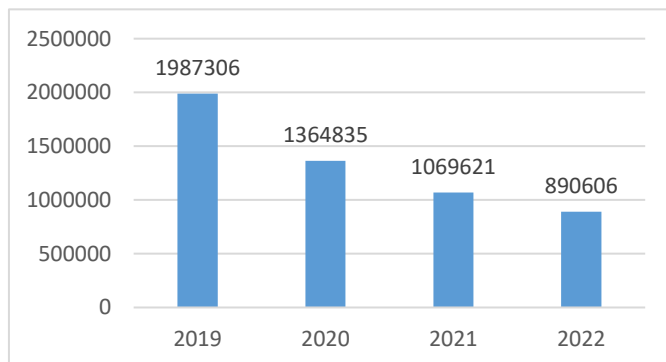


Figure 19 - Average Volume of Collected & Sold Milk by Distributors in Liters Between 2019 & 2022

Distributors indicated that they purchase their products and sell mainly in Bekaa. In parallel, most distributors sell the milk to processors (95 percent), whereas only 5 percent of them sell it to wholesalers.

As part of the market's adjustment to the crisis, 10 percent were still selling the same volume and the same quality, and 10 percent of the distributors started selling fewer products of lower quality, 10 percent were selling the same quantity but had to compromise on the quality, while 70 percent of them maintained the quality but faced less demand.

Challenges and bottlenecks

On the financial and economic levels, challenges that cow milk distributors primarily faced was the decrease in purchasing power among citizens. Common to all other sectors, VCs, and actors, currency depreciation, inflation and lack of liquidity deeply affected distributors businesses, where they encountered a decrease in their trading volume, which in turn affected their earnings and profits. The lack of access to loans and financial support has also affected the distributors in their ability to grow their businesses or even in their resilience to remain in the market, in case of financial deficit. The high transportation cost is another major challenge that distributors are enduring, due to the high cost of fuel, and its scarcity in some cases.

For the sources of losses, the milk distributors attributed it to electricity shortages, inability to do regular maintenance to their fridges and finally to poor quality of raw material: all these are naturally linked and a result of the previously mentioned financial and economic obstacles.

On the national level, these VC players are strongly impacted by the high competition from imported milk and the lack of government support that protects the local production: these include tariffs, subsidies, trade quotas, etc.

Coping Mechanisms

The cow milk distributors adopted different coping mechanisms to survive the ongoing crisis in Lebanon. The main practice was increasing prices. Confirming what has been mentioned by cow milk producers, distributors are the main decision maker when it comes to milk pricing.

Distributors deal with the increase in fuel and milk transportation requirements by rationing the number of trips (instead of 4 times a day, they are reducing it to 2 times a day for example) with a pre-arrangement with the farmers about the time for collecting milk on one hand, and accumulating orders to be delivered in one trip on the other hand. Some distributors indicated charging 500,000 LBP extra fees per order, and others mentioned not storing milk anymore.

Opportunities

In light of the insightful findings of this node of the cow milk VC, several opportunities impose themselves for potential enhancement or amelioration for the current status quo of milk distributors. A first opportunity resides in providing support for these VC actors in marketing and advertising strategies. This will boost their exposure to the market and coalitions that establish linkages between VC players at the national level.

Another opportunity is present in introducing methods to reduce the costs of product transportation, such as special fridges and collaborative shipping from one area to another): these opportunities could valorize the distributors businesses and contribute to their growth.

In terms of support or required interventions, cow milk distributors could benefit from cash and fuel as these are essential material needed for their daily operations; capacity building trainings programs would also increase their knowledge about new techniques and methods that would increase their efficiency. Support in the areas of providing refrigerated trucks, solar energy and packing material would have a great impact on distributors as well. It is worth noting that 33 percent of these actors recommended providing support for cow milk farmers.

D. Cow Milk Retailers

The survey participants for these actors of the cow milk VC were Lebanese, 93 percent males and 7 percent females, aging between 18 and 64. Almost 28 percent have university degrees, 17 percent attended school, 14 percent received vocational education and 41 percent indicated that they have no education.

Trends / Price Patterns / Profit Margins / Consumer Behavior

Financing for retailers was also deeply affected by the economic and financial crisis in Lebanon since 2019. All retailers relied on self-financing during the past three years and most of them indicated that they bought and sold their products in Lebanese Pounds; some mentioned paying their suppliers in regular installments. Due to the currency devaluation and constant floating exchange rate in the national currency, both the average of purchasing price of the material and the average selling (retail) increased. For instance, the average cost of one liter of milk increased from 2,749 LBP in 2019 to 14,722 LBP in 2020 and 39,092 LBP in 2021 then 67,992 LBP 2022. Similarly, the average retail prices increased from 4,657 LBP in 2019 to 18,203 LBP in 2020, 47,037 LBP in 2021 then reached 110,883 LBP in 2022. (Fig. 20 & 21)

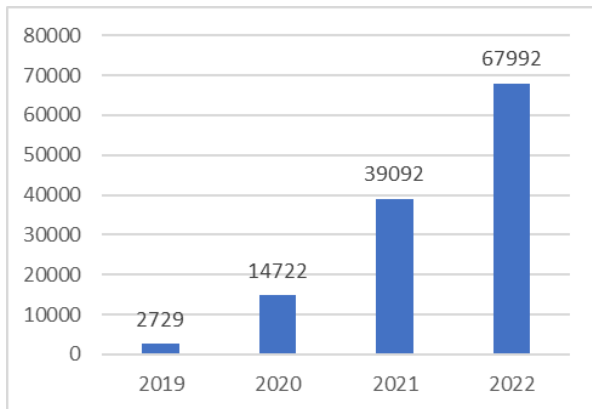


Figure 20 - Average Cost of One Liter of Milk for Retailers Between 2019 & 2022

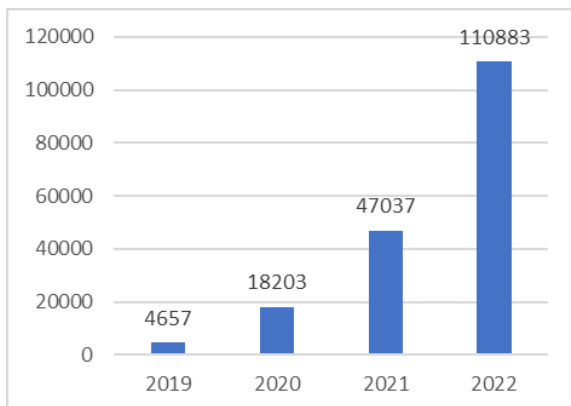


Figure 21 - Average Retail Price of One Liter of Milk Between 2019 & 2022.

Despite increasing sales prices to cope with the increased costs of purchased materials, the number of retailers who could reach the break-even point declined from 2019 to 2022. Furthermore, the below figure shows the percentage of retailers who reported loss increased from 21 percent in 2019-2020 to 28 percent in 2020-2021 to 42 percent in 2021-2022. The profit margin from one year to another drops from 2019 to 2022 with 52 percent of the participants declaring a profit margin between 0 and 5 percent in 2022 and 41 percent indicating loss.

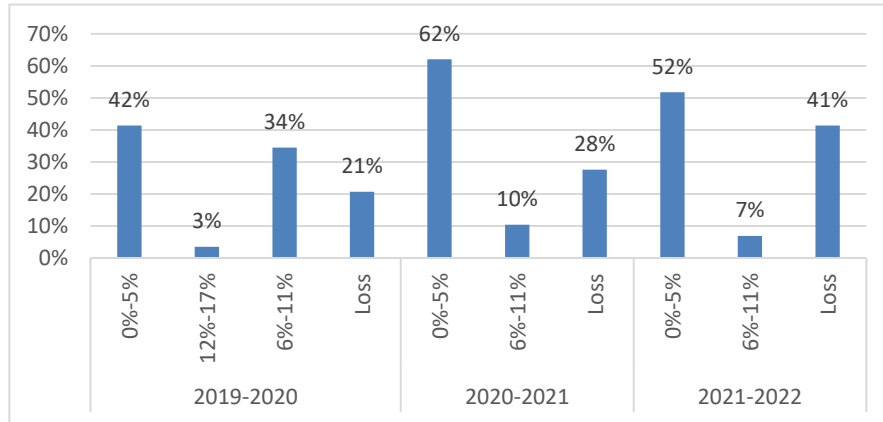


Figure 22 - Profit Margin in % of Milk Retailers Between 2019 & 2022.

The retailers indicated that they were facing challenges primarily due to the Lebanese currency depreciation. They purchased their products from local farmers (69 percent), from collectors/distributors (21 percent), from processors (14 percent) and 10 percent from wholesalers. Locally the input suppliers purchase their goods from seller located in all governorates and mainly from Beqaa. None of them indicated importing or exporting their goods.

All retailers decreased their selling volume while maintaining the same quality of the milk, due to the demand pattern that has shifted during the crisis.

Challenges and Bottlenecks

The main challenges encountered in terms of financial and economic were the lack of liquidity, the high cost of transportation, shift in consumer behavior and low purchasing power with the currency depreciation and inflation. Additionally, strong competition from imports and the lack of Government support (tariffs, subsidies, trade quotas, etc..) were the obstacle against the retailers' activities.

No major coping mechanisms were depicted except the price increase practice that was common among all retailers. Concerning needed support they might benefit from, these VC actors indicated the need for cash, fuel, cooling, storage, packing material, and others such electricity and solar energy.

E. Recommendations for Cow Milk VC

With regards to the animal production sector in general, the VCs are facing two major challenges. The first is related to the access to quality competitive feed. Interviewees within the scope of this project indicated that around 81 percent of the wheat and barley in Lebanon are imported from Ukraine and used as animal feed. In general, animal feed accounts to the biggest share in terms of operational cost (60 to 70 percent) when breeding and rearing animal. With the latest war in Ukraine and the world economic crisis majored by the Lebanese currency devaluation, this share percent has become very heavy to hold by the Lebanese farmer or producer. Hence, experts suggest producing part of the feed locally or buying it from nearby countries to avoid expensive shipping cost (KIIs 2, 3, 4, 5, 6 & 7).

The second challenge is related to the access to electricity and storage. The products and by-products require an important factor: energy supplies. The fuel became scarce due to its price increase caused by the current national and international circumstances. When missing this essential factor in the case of cow milk, many Food Borne Diseases and hygiene problem would affect its safety. It is recommended by experts to help producers in accessing to quality, energy and storage facilities to ameliorate the subsector. (KIIs 3 & 4).

The following section lists some recommendations that, in case adopted by the cow milk VC actors under the supervision of competent authorities, it would address actors' needs and strengthen the cow milk VC:

- Cow farmers would improve their production methods by importing high yield milk-producing breeds of cows, like the Holstein Friesian cow from the Netherlands, to replace local low yield cows. Local cow varieties mature later and have long calving intervals, low conception rates, and low milk yield. However, local cow breeds are better adapted to the environment. Importing Holstein Friesian cows will increase milk production and incomes for cow farmers.
- In terms of bookkeeping, it is essential to provide help the VC actors that frequently have poor accounting and finance systems: this was remarkably noticed when actors were asked about prices in the previous years. Most, not to say all of them gave rough numbers and estimates, rather than going back to their books and giving us the exact values.
- Since most VC actors have limited resources to get into marketing and advertising, it is highly recommended to acquire skills in that field through capacity building and vocational trainings: this would improve their product visibility (packaging, customer access), particularly for home-based businesses.

- Cow milk producers are invited to shift to Goat milk production as proposed by many experts: due to heavy volume purchasing, larger dairy corporations influence milk price, which disadvantages smaller producers that must both purchase and sell at market rates).

Finally, statistics conducted by the Ministry of Agriculture in southern and eastern Lebanon indicate that the return to raising livestock, especially cows and goats, increased in less than two years by a large percentage exceeding 40 percent. (KII 2; Al Mayadin, 2022).

II. Poultry Meat & Eggs VC

To meet growing demand, world poultry meat production soared from 9 to 133 million tons between 1961 and 2020, and egg production shot up from 15 to 93 million tons. In 2020, poultry meat represented almost 40 percent of global meat production. In the last three decades, world egg production has increased by 150 percent. Much of this growth has been in Asia, where production increased almost fourfold. Poultry is raised by approximately 80 percent of rural households in developing countries (FAO, 2022).

In Lebanon, there are over 2000 farms that produce 400 million eggs for human use annually (KII 2). Diverse technical advancements in management and nutrition have helped tremendously chicken farming. Although Lebanon production of poultry meat fluctuated substantially in recent years, it witnessed an upward growth curve from 1971 through the year 2020, reaching a production volume of 126,010 tons in 2020. The poultry meat and egg production VC is considered the most developed in the region, and it occupies about 25,000 families and produces within European standards and has a production capacity that exceeds Lebanon's need of about 110 million chickens per year. In addition, Lebanon's production of eggs primary was at level of 42,227 tons in 2020, up from 39,838 tons in the previous year, indicating a growth of 6 percent. (Knoema, 2022). According to the Lebanese Industrialists Association, the economic crisis impact on the poultry sector resulted in the closure of more than 1,000 farms and the loss of half of the workforce in the sector, i.e. at least 10,000 workers. (KII 12, Assafirnews, 2022).

A. Poultry Meat & Eggs Input Suppliers

Concerning the poultry meat and eggs VC, 37 VC players (input suppliers, farmers, distributors, and retailers) were surveyed in total: the response rate was relatively low (36 percent) for this chain. Most surveyed players aged between 40 and 64; all of them are literate, 50 percent have university degrees and 50 percent attended school. Around 25 percent of the participants said to be members of a union and all the others work independently. 75 percent of them had relatively small-scaled businesses, as the number of employees, including the owner, does not exceed 10; 25 percent of them have a medium size business (number of employees between 11 and 49). 75 percent of the input suppliers depend solely on this business, while 25 percent have a second source of income.

Trends / Price Patterns / Profit Margins / Consumer Behavior:

In this VC also, all input suppliers are forced to pay the full amount for their purchases of input material in fresh USD and in full payments. This issue is further deepened due to the banking sector crisis and the inability of the latter to provide any sorts of liquidity, let alone loans: therefore, they all rely on self-financing. Furthermore, the collected quantitative data suggested that both the average costs of purchasing the material and the average selling increased. For instance, the average cost of purchased materials increased by 73.75 percent, 95 percent, and 151.25 percent between 2019-2020, 2020-2021, and 2021-2022 respectively. Similarly, the average selling prices increased by 82.5 percent, 105 percent, and 126.25 percent between 2019-2020, 2020-2021, and 2021-2022 respectively.

Despite increasing sales prices to cope with the increase in costs of purchased materials, the below figure (Figure 23) shows that the profit margins are shrinking from one year to another, reaching the lower brackets and settling at the 0-5 percent profit bracket in 2022.

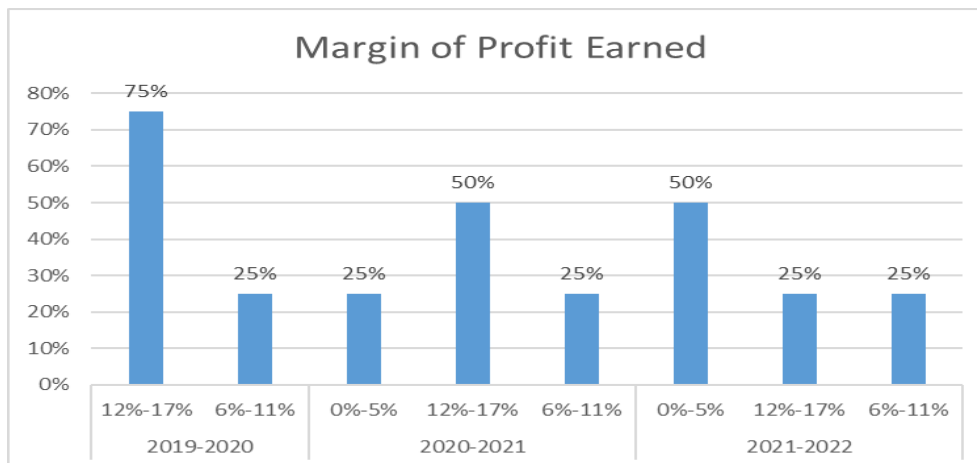


Figure 23 - Profit Margin in % of Poultry Input Suppliers Between 2019 & 2022.

Poultry meat and eggs input suppliers indicated that they are facing challenges securing some input materials due to the importing hurdles, primarily due to the Lebanese currency depreciation. The top material in shortage were fuel and electricity (100 percent) similar to all the Lebanese population is enduring the same this scarcity. About 25 percent of the input suppliers reported shortages in packing materials, equipment and tools and animal feed. However, no shortage was mentioned in terms of vaccines and veterinary input.

All poultry meat and eggs VC input suppliers purchase their material from local wholesalers. Locally the main distributors are spread over the 8 governorates, but mostly concentrated in Beqaa, the North, Akkar, the South and Mount Lebanon. In parallel, their main customers are farmers (100 percent), distributors (75 percent) and retailers (50 percent). The customers are equally spread across the 8 governorates with a special concentration in the South.

Impacting input suppliers of the poultry meat and eggs VC like other actors of all VC, the change in the demand pattern led to 75 percent of the input suppliers sold less while maintaining the same quality and 25 percent reported selling the same volume and same quality as before the crisis.

Challenges and bottlenecks

Poultry meat and eggs input suppliers encounter serious challenges that need to be addressed in a matter of urgency. First and most importantly, the currency depreciation and inflation that caused a sharp decrease in purchasing powers in the country: the shrinking local markets is limiting their sales drastically.

Another challenge also related to the current Lebanese crisis is the lack of access to loans, of financial support, and of liquidity: this obstacle is jeopardizing the future of suppliers who are at risk of going out of business if the situation remains static in that regards.

Another surging challenge is the high transportation cost: this is an international complication caused by the Ukrainian-Russian war and whose ripple effect has aggravated the already suffering economy in Lebanon. As for the reasons lagging behind their losses, poultry meat and eggs input suppliers blamed it on the decrease of sales.

Major challenges related to infrastructure are to be accounted for including the lack of electricity supply, poor roads quality and lack of water supply.

During the crisis, the input suppliers didn't find any difficulty in using new updated machines and equipment or in adopting the food safety standards or access to packing material. However, they found some problems in retaining skilled workers and in finding affordable machines and

equipment and mostly in accessing to local raw materials, which obliged them to import them at higher costs.

All the input suppliers weren't aware of the impact of the crisis on their marketing and advertising business while they mentioned their inexperience in the poultry chain, they felt strong domestic and imports competition but they suffered most the lack of the government support.

The Secretary of the Lebanese Poultry Syndicate, William Boutros, issued a statement expressing his deep regret at the government decision to stop subsidizing the poultry sector: this had negative repercussions on all VC actors and citizens alike. Boutros revealed that a number of major poultry producers in Lebanon had reached the cessation of subsidy disbursement from the Banque du Liban, stressing that this decision would raise production costs and increase prices. Boutros stressed that this behavior harmed the production cycle of an essential food VC, which is the only one that fully meets the needs of the local market for protein, despite all the obstacles it faces. If there is an inability for the subsidy to continue in its current form, Boutros urgently demanded that the government take a series of measures to preserve and protect this VC, especially raising the custom tariffs to match its previous value that was in effect before the collapse of the national currency." Furthermore, the syndicate representative revealed that the frozen chicken breast imported during the year 2022 so far is equivalent to 15 million chicken. This caused the closure of hundreds of poultry farms in Lebanon whose chicken quality is considered among the highest in the world, while the imported chicken is produced on much less specifications. (Assafirnews, 2022; Alakhbar, 2022)

Coping Mechanisms

In regards to coping mechanisms within the current circumstances, poultry meat and eggs input suppliers mainly mentioned that they worked on improving their management efficiency, reducing operational costs and downsizing their overhead. Also, these suppliers increased the product prices to match the currency devaluation.

Opportunities

Opportunities for input suppliers were various and their answers indicated the level of need in each field. For instance, the 3 highest ranked opportunities are: support in marketing and advertising strategies to boost their exposure to the market, support in securing certificates which boosts consumer confidence in their products, and capacity building to enhance skills and use developed methods. Other important opportunities include linkages and agreements to facilitate exports and imports of raw material.

Similar to most actors in all VC, input suppliers commonly express their need for cash assistance, fuel, training/capacity building, incorporating new technology and equipment, and the urge to find new lower-prices sources of imports, as well as the importance of subsidizing farmers.

B. Poultry Meat & Eggs Farmers

For the Poultry and Meat Eggs VC, the collected data was retrieved from a survey that included Lebanese participants, 92 percent males and 8 percent females, aging between 29 and 64 with a majority between 40 and 64. On the education level, 8 percent of surveyed poultry meat and eggs farmers were illiterate, 38 percent had university degrees and 54 percent attended school. When asked about memberships and collaborations 15 percent indicated they are part of a union and the remaining 85 percent work independently. These farmers' business size varied from small businesses with less than 10 workers (85 percent of the respondents) and large businesses between 50 and 100 workers (15 percent of the respondents). On a further note, 69 percent of the farmers depend solely on this business, while 31 percent have a second source of income.

Trends / Price Patterns / Profit Margins / Consumer Behavior

Around 1/3 of the respondent farmers in the poultry sector have broilers and 2/3 have laying hens. The total number of birds per farmer has sharply decreased from 54,388 birds per farmer on average in 2019, to 24,030 in 2022. This sharp decline has damaged equally both the number of broilers and laying hens. (Fig. 24)

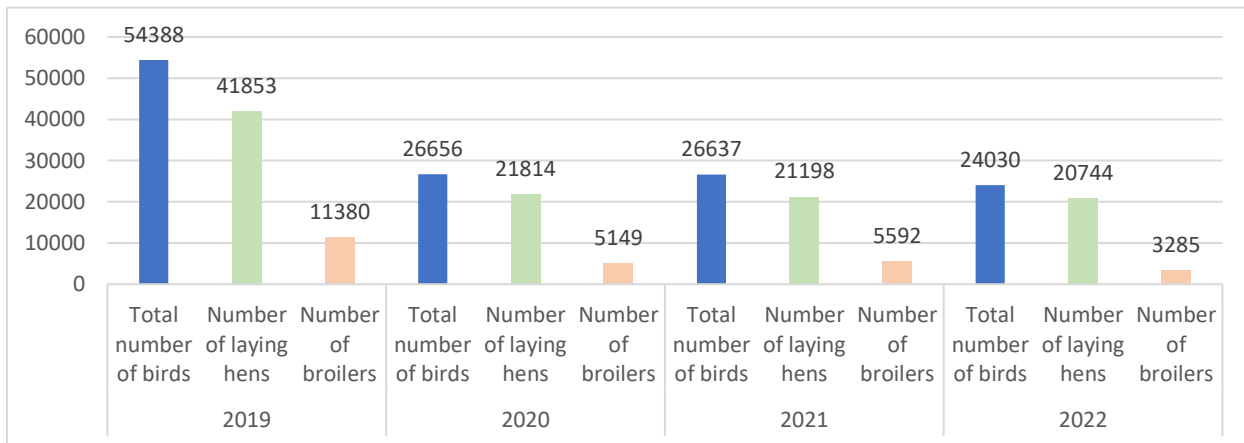


Figure 24 - Average Number of Birds Per Poultry Farmer Between 2019 & 2022

Chicken Meat

About half chicken meat producers took care of the slaughtering and all of them indicated that it is done manually. There was no significant gap noticed between the quantity of chicken meat produced and the quantity sold in the market. However, these quantities have jointly decreased to about half of their value in 2019, from 70,000 kg produced/sold per farmer on average in 2019 to about 36,000 kg in 2022 (Fig. 25)

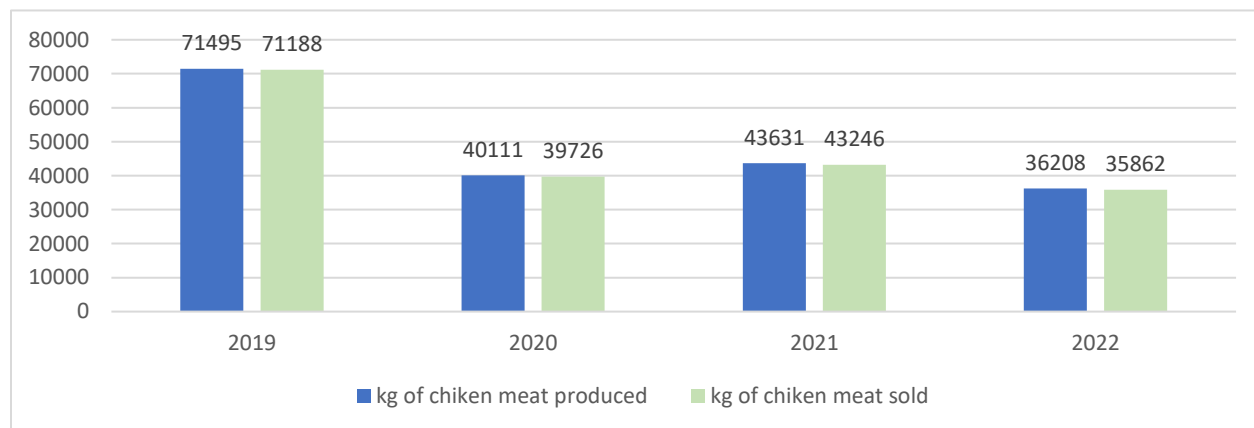


Figure 25 - Chicken Meat Produced v/s Chicken Meat Sold Between 2019 & 2022.

Chicken Eggs

The data collected from respondents (Figure 26) shows that there is no gap between the quantity of chicken eggs produced and the quantity sold in the market. However, same as for the chicken meat, these quantities have jointly decreased to less than half of their value in 2019, from 8,424,000 cartons of eggs produced/sold per farmer on average in 2019 to about 3,369,000 cartons in 2022.

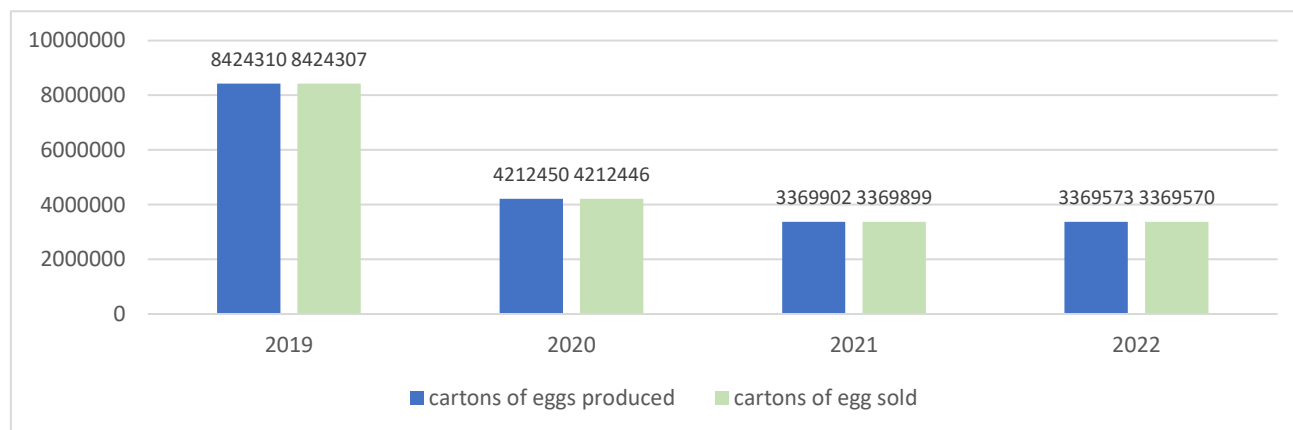


Figure 26 - Cartons of Egg Produced v/s Cartons of Egg Sold Between 2019 & 2022

Regarding the payment methods, 85 percent have to pay for the input material in fresh USD, 31 percent mentioned having to pay the sum in full payments and 23 percent in regular payments, the remaining farmers did not provide any information regarding the modality of payment. The farmers primarily rely on self-financing (92 percent); 8 percent indicated that they benefited from a bank loan.

Due to the current crisis, the average costs of production as well as the average retail price of their production increased. For chicken meat, the respondents provided figures in fresh USD showing that the average cost of production for one kilogram of chicken meat increased from 2.02 to 2.48, to 2.48, to 2.9\$ in 2019, 2020, 2021 and 2022 respectively (Fig. 27). The average selling price of one kilogram of chicken meat increased as well from 1.2 to 1.4, up to 2.8 then 3.7 USD in 2019, 2020, 2021 and 2022 respectively. (Fig. 28)

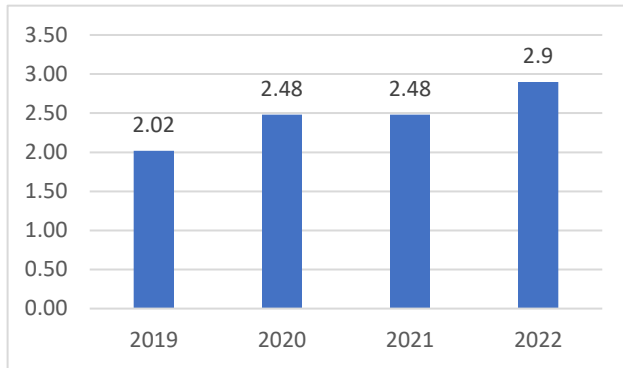


Figure 27 - Cost of Production in USD of One Kg of Chicken Meat Between 2019 & 2022

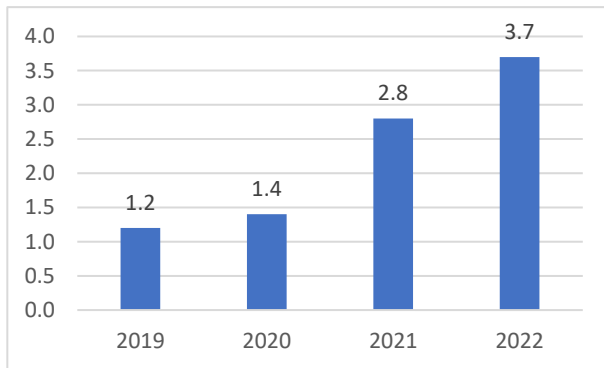


Figure 28 - Selling Price in USD of One Kg of Chicken Meat Between 2019 & 2022

For the chicken eggs, some respondents provided figures in USD and others in LBP (Fig. 29, 30, 31 & 32). The cost of production for one carton of 30 eggs in LBP increased from 5,429 to 15,571, to 52,857, up to 84,286 LBP between 2019, 2020, 2021 and 2022 respectively. Costs in fresh USD increased from 83 cents in 2019 to 1.33 cents in 2022. Similarly, the average selling prices in LBP increased from 9,500 LBP in 2019, to 21,857 LBP in 2020, to 61,000 LBP in 2021 up to 92,000 LBP in 2022. Prices in fresh USD increased from 1.17 dollar in 2019 to 1.5 dollar in 2022 after a slight decrease in 2020 to 1 dollar.

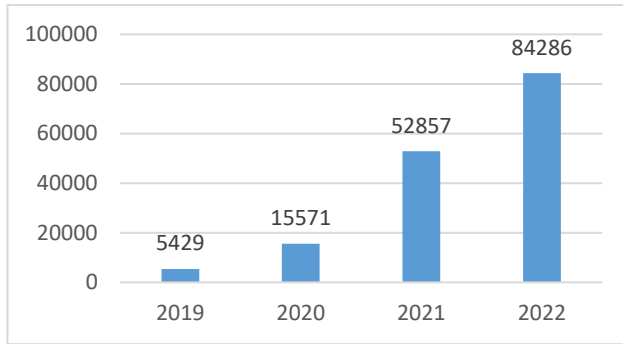


Figure 29 - Average Cost of Production of One Carton of Eggs in LBP

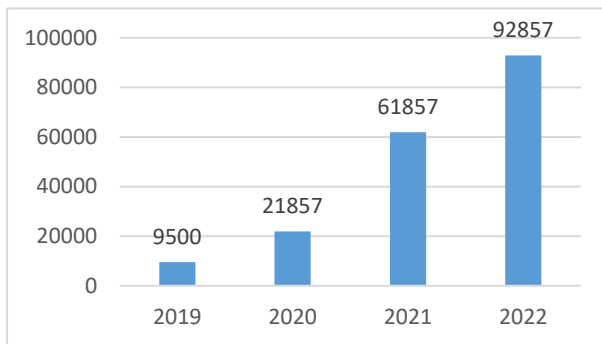


Figure 30 - Average Selling Price of One Carton of Eggs in LBP

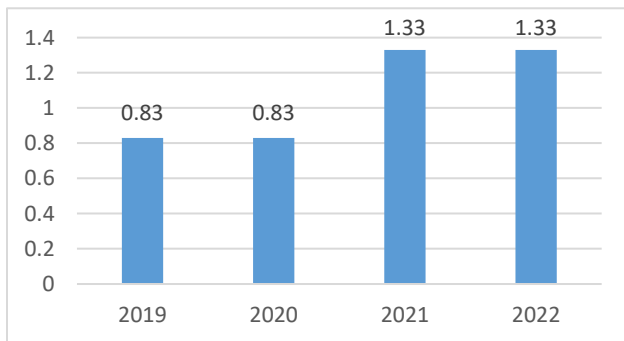


Figure 31 - Average Cost of Production of One Carton of Eggs In USD

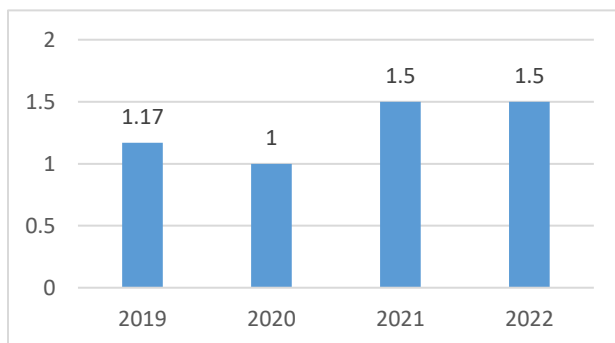


Figure 32 - Average Selling Price of One Carton of Eggs in USD

Despite increasing sales prices to cope with the increased costs of purchased materials, the number of farmers who could reach the break-even point declined from 2019 until 2022. From the interviewed farmers, 8 percent reported loss in 2019-2020, 23 percent in 2020-2021 against 46 percent in 2021-2022. Furthermore, for the farmers who were able to reach the break-even, the below figure shows that their profit margins from one year to another has been dropping from 15.3 percent between 2019 and 2020 to 9.1 percent between 2020 and 2021, reaching 5.1 percent between 2021 and 2022. (Fig. 33)

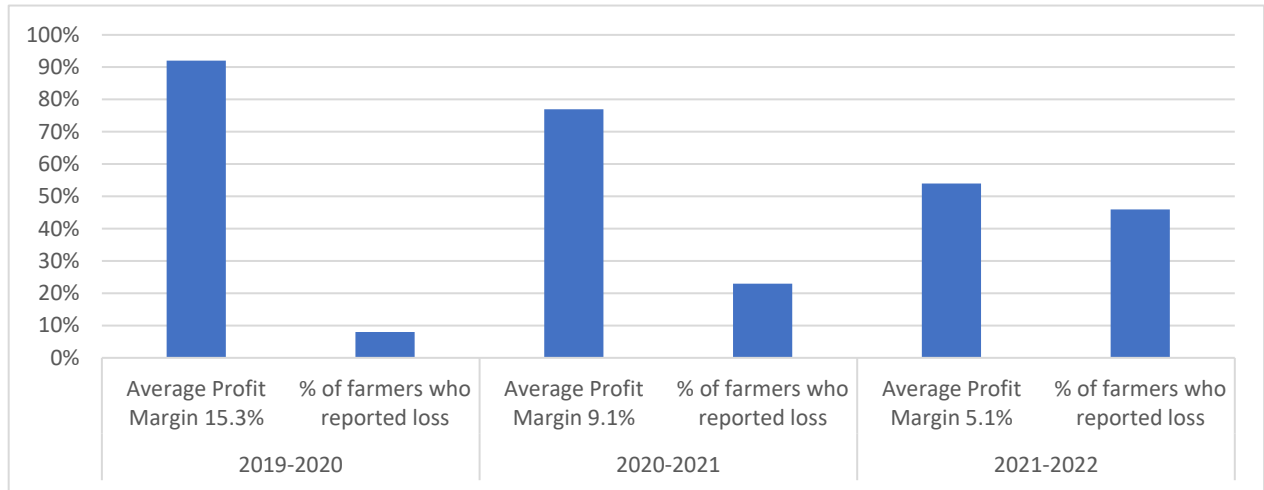


Figure 33 - Profit Margins in % & Poultry Farmers Reporting Losses Between 2019 & 2022

Due to shifts in consumer behavior, in one hand, 46 percent of the farmers started selling fewer products while maintaining the same quality. In another hand, 46 percent were selling same volume and same quality; only 8 percent managed to sell the same quantity but had to change the quality.

The farmers indicated they were facing challenges securing several input materials due to the Lebanese currency depreciation. The top materials in shortage were fuel and electricity (54 percent), feeding input (15 percent) and to lesser extent some indicated shortages in vaccines and veterinary inputs (8 percent), drugs (8 percent), breeding input (8 percent) and packing materials (8 percent). Some farmers (8 percent) reported no shortages in any of the input materials. All of the respondents purchased their material from private veterinarians or private firms.

Concerning the feeding input shortage due to the crisis, market sources in Lebanon confirm that poultry in Lebanon is fed 95 percent grains and that the meals are free of antibiotics. Most of the grains imported by Lebanon are destined for animal feed. (BlomInvestBank, 2016).

All farmers purchased their input materials from local input suppliers; among them, 8 percent also import some of their inputs. Locally, the farmers purchased their inputs from sellers located across Lebanon, while the countries of imports mentioned were France, the US, Netherland and Jordan.

Regarding the sales channels, farmers mentioned selling their products to the following customers: wholesalers (54 percent), retailers such as mini markets, supermarkets, and groceries (46 percent), the HORECA sector (15 percent), households (15 percent), processors (15 percent), other farmers (8 percent), distributors (8 percent) and cooperatives (8 percent).

Around 15 percent of the farmers sample surveyed indicated that the quality of meat was controlled and tested in a small laboratory on the farm or at the level of the group/association/cooperative to guarantee the safety of the products. Concerning certificates, 92 percent of the respondents did not have any certificates (AB, GAP, ISO, HACCP), while 8 percent had the ISO, and all of them have started applying for certificates.

Challenges and Bottlenecks

Poultry meat and eggs farmers are facing several challenges, most importantly the currency depreciation, inflation, transportation costs, lack of liquidity, and lack of access to loans and financial support. For the sources of losses, the poultry producers mentioned the volume of unsold products, the unavailability of hens drugs and electricity shortages to be among the major sources of waste. Additional challenges encountered were the lack of water and electricity supply, followed by a poor quality of roads.

During the crisis, the poultry producers were very concerned in finding local raw material and they were forced to import them at high costs. In addition, the producers found very challenging the fact of recruiting skilled workers.

All the poultry producers expressed their worries from the strong domestic and imports competitions, and they suffered mostly from the lack of the government support.

Coping Mechanisms

The farmers resorted to different coping mechanisms in the Lebanese crisis. The main practices were reducing cost by shifting to another sources of supply or lower quality inputs, improving management, modifying feeding rations in order to decrease costs, increased prices and downsizing.

However, due to the 2-3 times spike in poultry egg and meat costs brought on by the economic downturn, many farmers in rural regions began to think about growing their own chickens for egg and meat use as well as perhaps as an extra source of revenue. The shutdown of several commercial chicken production farms became a genuine prospect as a result of the economic slump (KII 6).

Opportunities

Poultry farmers indicated different opportunities they considered valuable to improve their businesses such as: coalitions that establish linkages between chain players at the national level, linkages and agreements to facilitate exports. As mentioned in previous opportunity, the players are giving more importance now to the idea of clustering and the benefits it can bring to the group as a whole.

They highlighted the importance of creating a project that reduces the cost of production by increasing the quantity of production, in addition to the linkages and agreements that could facilitate the imports of raw material.

Finally, strong evidence was revealed as the producers found good potential in implementing methods to reduce the costs of product transportation (such as special fridges, collaborative shipping from one area to another) and also, to increase their capacity building and enhancing their skills and ability to use developed methods.

Poultry farmers expressed their need for additional support in the form of cash assistance (69 percent of respondents), fuel (54 percent), vaccines (54 percent) training/capacity building (54 percent), veterinary services (46 percent), incorporating new technology (38 percent), cooling (31 percent), packing material (23 percent) and storage (15 percent), and other material (69 percent) such as animal feed, solar energy and subsidized loans.

C. Poultry Meat & Eggs Distributors

While collecting data, it is worth noting that most of them declined the request to participate. The interviewed distributor of the poultry sector was a Lebanese male of 51 years old. He has school education level from the South, and does not have another source of income. He gets the product he sells from the South and sells it in the South and Nabatieh. Due to the crisis, he sells less but keep the same quality. He was self-financed but needed several subsidies from the donor/government as cash, fuel, cooling, and solar energy. Moreover, he paid the supplier in fresh USD and owned a refrigerated vehicle. However, he barely reached the breakeven between 2019 and 2022.

Challenges and Bottlenecks

As most distributors, challenges faced include decrease in purchasing power, inflation, currency depreciation, high cost of transportation, and lack of liquidity. For the sources of losses, the poultry distributor blamed it mainly on his inability to sell his products and on electricity shortage.

The poultry meat and egg distributor encountered major difficulties in finding affordable machines and equipment during the current actual crisis. He found strong competition from imports and emphasized on the important challenge created in their field of work in the absence of the Government support.

Coping Mechanisms

The distributor adopted different coping mechanisms to survive the ongoing crisis in Lebanon. The main practice was increasing prices and reducing costs by organizing more efficiently the distribution per area.

Opportunities

The distributor considered several opportunities as potential ideas for growth such as coalitions to establish linkages between chain players at the national level, the linkages and agreements to facilitate exports, methods to reduce the costs of product transportation (such as special fridges and collaborative shipping from one area to another) and the support in marketing and advertising strategies to boost market exposure.

When asked the further support for distributors, he indicated the need for subsidies from the donor/government as cash, fuel, cooling, and solar energy.

D. Poultry Meat & Eggs Retailers

Retailers who took part in the data collection within the scope of this study were Lebanese males, aging between 29 and 64. They all attained school level education.

Trends / Price Patterns / Profit Margins / Consumer Behavior

In terms of financial management, all poultry retailers relied on self-financing during the past three years. They all confirmed buying and selling their products in Lebanese Pounds and did not specify whether in full payments or regular installments. Concerning the fluctuation in prices caused by the economic crisis in the country, both the average costs of purchasing the material and the average selling price increased. For instance, the average cost of one kg of poultry meat increased from 5,909 LBP in 2019 to 23,455 LBP in 2020 and 47,727 LBP in 2021 and 107,455 LBP in 2022. Similarly, the average selling prices increased from 9,000 LBP in 2019 to 130,455 LBP in 2020, 55,091 LBP in 2021 and 116,818 LBP in 2022. (Fig 34 & 35)

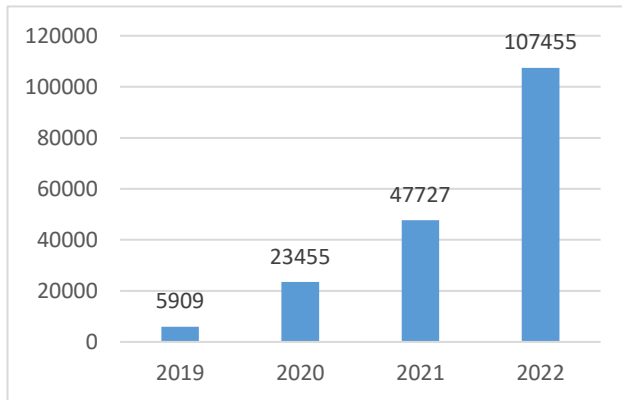


Figure 34 - Retailers Costs for Poultry Meat Between 2019 & 2022

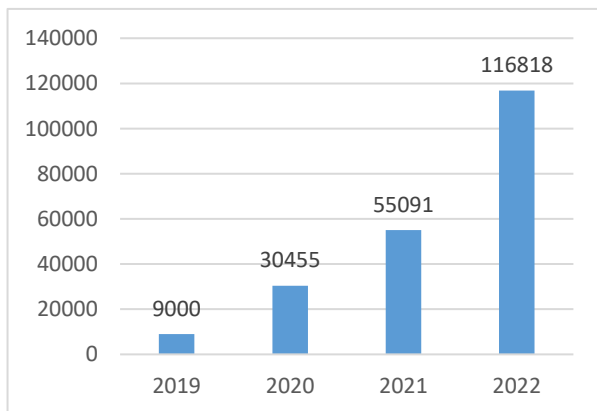


Figure 35 - Retailers Selling Prices for Poultry Meat Between 2019 & 2022.

Despite increasing sales prices to cope with the increased costs of purchased materials, the number of retailers who could reach the break-even point declined from 2019 to 2022. Furthermore, the percentage of retailers who reported losses increased from 9 percent in 2019-2020 to 27 percent in 2021-2022. The profit margins from one year to another dropped from 2019 to 2022 with 73 percent of retailers declared a profit margin between 0 and 5 percent in 2022 and 27 percent endured losses.

45 percent of the retailers purchase their material from wholesalers, 36 percent from farmers and 18 percent from processors. The retailers purchase their goods from local sellers and none of them indicated importing or exporting their goods. Concerning the market's adjustment to the crisis, all the retailers indicated selling less poultry meat and eggs but maintained the same quality of the product.

Challenges and Bottlenecks

Like all economic sectors in Lebanon since 2019, poultry meat and eggs retailers are facing major challenges that include a lack of liquidity, inaccessibility to loans and financial support, low customers purchasing power, high transportation cost, and currency depreciation and inflation. Retailers also endured moderate difficulty in facing the imports strong competition but they suffered mostly from the lack of the government support

To cope with the ongoing crisis, retailers adopted the common practice of increasing their prices. Also, retailers weighed the importance of providing them with support to be able to survive these circumstances, which include cash assistance, provision of fuel, cooling, storage and packing material.

E. Recommendations for the Poultry Meat & Eggs VC

Protecting the poultry sector is a national responsibility, because it is the only sector that provides Lebanon with self-sufficiency in protein. The list of recommendations that could be implemented to empower the poultry sector are as follow:

- Create a national plan for introducing natural feeds with nutrients to cut down on commercial feed by up to 50 percent over the course of three years.
- Implement a program to improve the living conditions for healthier chicken care and cleanliness, paying special attention to the risks to public health that poultry and its byproducts have for the transmission of infectious diseases.
- Incorporate higher productivity layers into the mix while establishing a farmer-based program for chicken renewal and gender mix based on goals for the family's intake of meat and eggs, additional revenue, and breeding preferences.
- Access to medical assistance depending on need, with a focus on preventative elements of handling chicken and its eggs.
- Banning the import of poultry from countries that produce with specifications lower than those approved in Lebanon.
- Adoption of a reliable global monitoring company to monitor the specifications of imported chicken, livestock and meat, in order to preserve the health of the Lebanese and to prevent illegal speculation.
- Implementation of the decisions of the governmental institutions and the specifications of the “Libnor” institution, which requires the commitment of sales centers to implement the mechanism of displaying imported meat and poultry in its original packaging with its label, and to separate what is frozen, cooled and fresh, in order to prevent fraud, fraud and harm to the health of the citizen.
- Medium and large-scale establishments are invited to introduce new production methods and adopt international best practices
- Help the small-scale farmers to become more formal and high-skilled.

III. Greenhouse Crops VC

A total of 85 players (input suppliers, farmers, distributors, and retailers) and 7 experts, professionals and government representatives in this chain agreed to participate in this study; the response rate was relatively acceptable for this chain (45 percent). The following findings, suggestions and information are based on the input from the chain players, experts and professionals participating in this study.

A. Greenhouse Crops Input Supplier

The input suppliers who participated in the survey were Lebanese, 89 percent males and 11 percent females, aged between 29 and 64. All of them were literate, 56 percent had university degrees, and 44 percent attended school. When asked about memberships and collaborations, 11 percent were part of a cooperative and 11 percent were union members. The remaining 78 percent work independently. The majority of businesses were rather small-scaled, considering the number of employees, including the owner, that do not exceed 10. On a further note, 67 percent of the input suppliers depended solely on just this business, while 33 percent had a second source of income.

Trends / Price Patterns / Profit Margins / Consumer Behavior

In terms of financial management for the greenhouse input suppliers, they all have to pay for the input material in fresh USD and full payments. Among them, only 22 percent still settle some of the payments in Lebanese Pounds. They primarily rely on self-financing (89 percent), with only 11 percent of the input suppliers declaring that they had a loan from the bank. Most input suppliers have small scale businesses, they all have to pay in fresh USD and full payments. They primarily rely on self financing, around 11 percent had bank loans. The average cost of purchase of their input materials increased by 38 percent between 2019 and 2022 while their selling prices increased by 52 percent. The input suppliers were purchasing at high prices the input materials and consequently, they were proportionally selling them at elevated prices.

Greenhouse crops input suppliers had to increase the selling prices of the products they sold to cope with the increase in costs of purchased materials. Nonetheless, the number of suppliers who reached the break-even point declined from 2019 until 2022. Furthermore, the below figure shows that the profit margins shrank over the years, reaching the lower brackets and settling at the 0-5 percent profit bracket in 2022. We can observe that in 2021 and in 2022 the profit margin above 18 percent completely disappeared if compared to other previous years (Fig. 36).

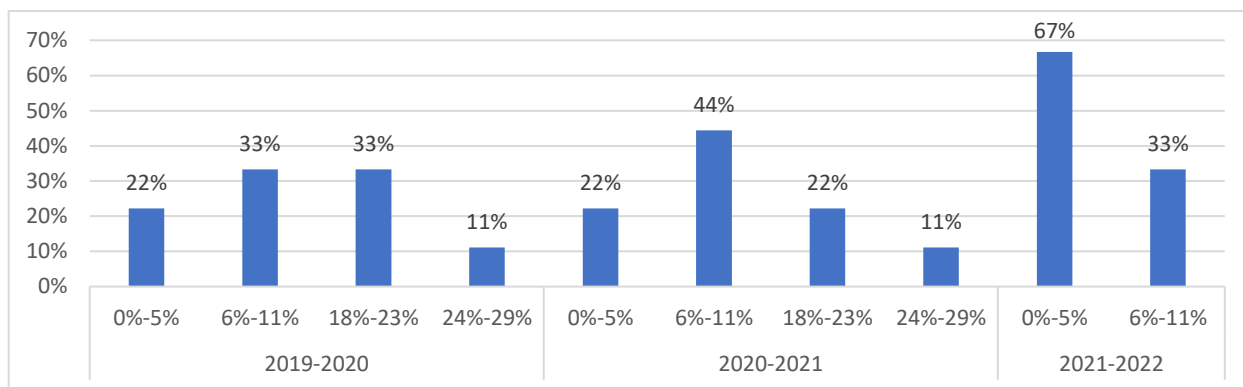


Figure 36 - Greenhouse Crops Input Suppliers - Profit Margin Between 2019 & 2022

These input suppliers indicated that they were facing challenges securing several input materials due to the importing hurdles, primarily due to the Lebanese currency depreciation. The top materials in shortage were chemical fertilizers (67 percent), insecticides (67 percent), fungicides (67 percent), and seeds (67 percent). They are followed by herbicides (33 percent), irrigation parts and pipes (33 percent), fuel and electricity (33percent), and equipment/tools (33percent). Anti-sprouting and packing material were of a lesser concern (11 percent). The input suppliers purchased their material from local wholesalers (67 percent), or another local retailer if they faced any shortages (11 percent) and another 11 percent import. Locally the input suppliers purchase their goods from seller located in Beirut (78 percent), North (44 percent), Bekaa (22 percent), Akkar (22 percent), and South (11 percent). The main country of import was Turkey before and after the crisis. In parallel, their main customers are farmers (44 percent), distributors (33 percent), and shops such as mini markets, supermarkets, and plat shops (33 percent): the customers are from Akkar (88 percent), North (33 percent), South (22 percent), and Bekaa (11 percent). In terms of demand pattern that was considerably affected by the crisis, 56 percent of the input suppliers began selling fewer products of lower quality. In comparison, the remaining 44 percent maintained the quality but faced less demand.

Challenges and Bottlenecks:

While being surveyed about the main financial and economic challenges they were going through during the crisis, greenhouse crops input suppliers were mostly affected by the decrease in their customers' purchasing power, inflation, currency depreciation and the lack of liquidity which are all interrelated. High transportation cost was also listed as a main challenge, considering the increase in fuel prices at the international level, which is adding to the difficulty of purchasing imported material that Lebanese are suffering from due to the currency depreciation. Regarding losses, these VC actors reduce it to when they are unable to sell their products.

Greenhouse input suppliers also suffer from poor roads quality and electricity shortages. As the crisis progress, input suppliers are mainly encountering the lack of raw material, which forces them

to import it at high costs; these players also suffer from the lack of skilled workers. The input suppliers slightly felt the impact of the domestic competition but highly stressed on the impact of imports on their activities.

Coping Mechanisms

Multiple strategies are currently being used by greenhouse crop input suppliers in Lebanon since the beginning of the crisis. The most common practice to all players among all VCs is downsizing, reducing cost and increasing efficiency. Input suppliers also shifted to other sources of supply or lower quality inputs, and introduced new products at inflated prices.

Opportunities

Greenhouse input suppliers expressed their need for support and interventions in terms of cash assistance, fuel, training and capacity building, incorporating new technology and equipment, and others such as solar energy.

In terms of Technical and Vocational Education and Training (TVET), this is the most recurrent opportunity that most players in all agricultural VC could benefit from. While designing new projects and interventions, concerned parties should consider the gap in this area and structure the topics according to needs of VC actors. This was mentioned during several KIIs completed within the scope of this study and mentioned in the Mckinze National Strategy Report in 2018. Government lacks financial and human capacity to provide adequate agricultural extension and TVET programs: higher education focuses on training highly qualified agricultural engineers while TVET based agriculture is limited. Since farmers rely on input suppliers as their main source of advice, such trainings are crucial. According to the Mckinze, limited extension services are one of the most important obstacles to effective and sustainable agricultural development, the absence of which leads to widespread application of inappropriate agricultural practices. Consequently, training topics should include solutions to irrational use of fertilizers, pesticides, and water resources, along outdated and harmful harvesting. (KIIs 6 & 8; Mckinze, 2018)

B. Greenhouse Crops Farmers

The participants were Lebanese, 90 percent males and 10 percent females, with ages ranging between 18 and 64⁺ with a higher percentage for the upper age groups 40-50 years old and 51-64 years old. Regarding their education, 7 percent did not receive any, 17 percent had university degrees, 57 percent attended school, and 19 percent received vocational education. About memberships and collaborations, 19 percent indicated they are part of a cooperative, and 2 percent are union members; the remaining 89 percent work independently. The businesses ranged between small- and medium-size ones, and around 88 percent have between 0 to 10 workers, and 12 percent have 11 to 48 workers. On a further note, 52 percent of the input suppliers depend solely on this business, while 48 percent have a second source of income.

Trends / Price Patterns / Profit Margins / Consumer Behavior

All farmers own or lease the land they are cultivating; in other words, the interviewed farmers were the business owners and not just the workers. The majority cultivated between 1 to 9 dunums constantly over the past three years. Fewer farmers were cultivating 10 dunums and more. The farmers produced a variety of greenhouse crops such as tomatoes (95 percent), cucumbers (95 percent), iceberg (60 percent), eggplants (62 percent), pepper (55 percent), leafy vegetables (62 percent), in addition to other open field plantations (62 percent namely potatoes and green beans (لوبياء)). (Fig. 37)

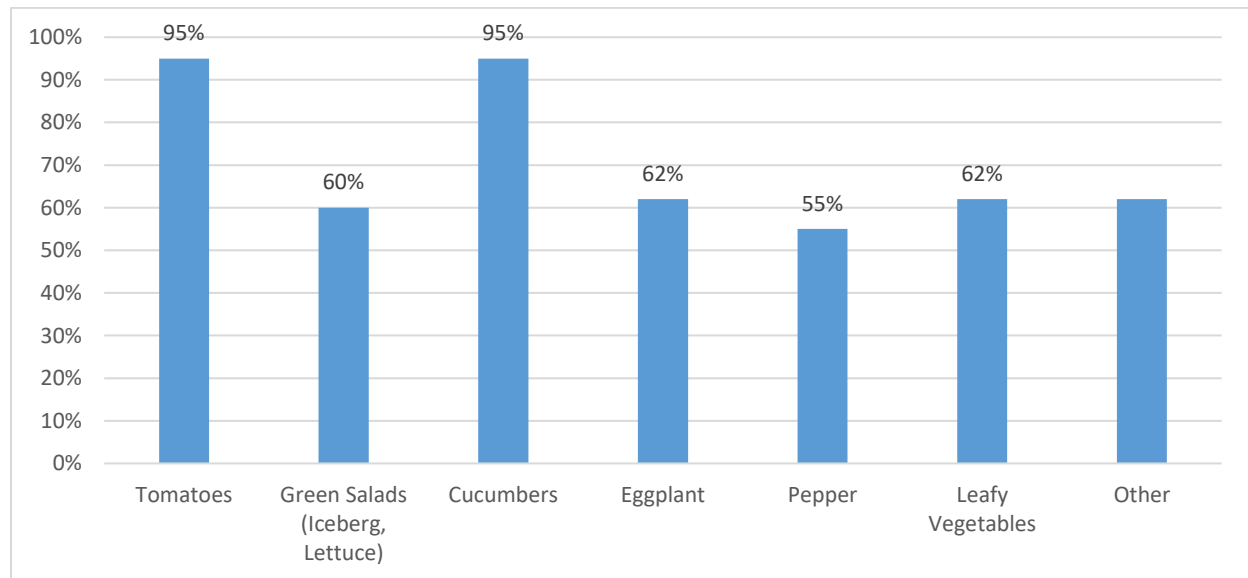


Figure 37 - Greenhouse Crop Varieties in %

Concerning the major crops, the figure below (Fig.38) shows that the farmers could not sell all the produced crops. In 2019, they sold 91 percent of the produced crops, 90 percent in 2020, 86 percent

in 2021, and 84 percent up to date in 2022. Furthermore, the production and the selling volumes declined from 2019 until 2021 to increase slightly in 2022.

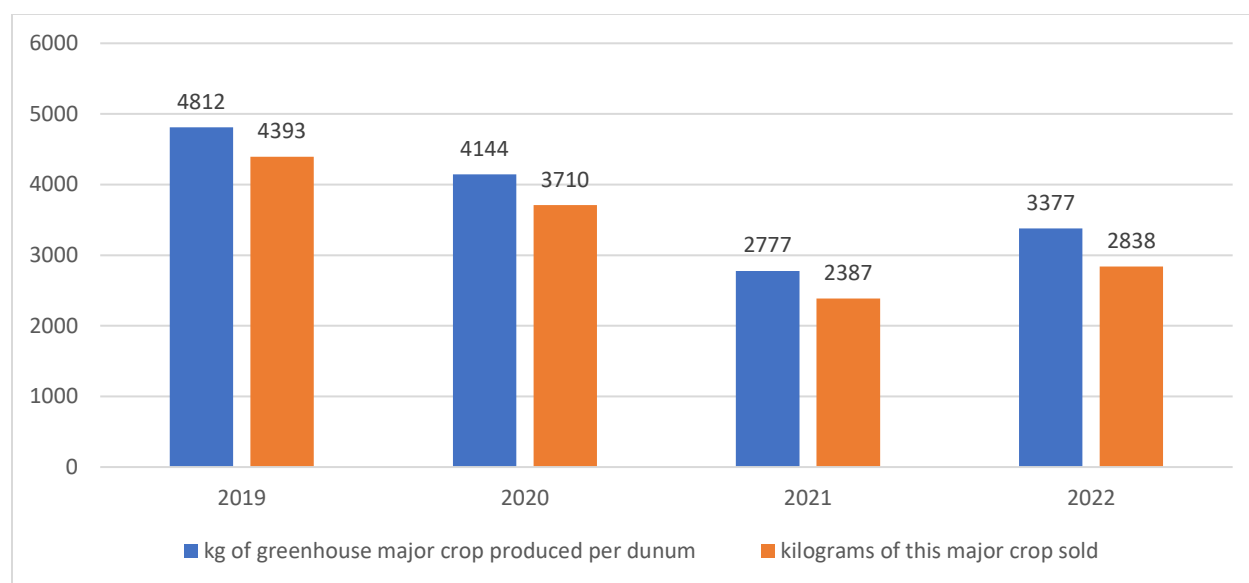


Figure 38 - Major Greenhouse Crops Yield Produced & Sold Between 2019 & 2022.

Financially, 74 percent pay for their input material in fresh USD and in full payments. Among them, only 50 percent settle some of the payments in Lebanese Pounds, and only 2 percent were able to pay using their current USD accounts. They primarily rely on self-financing (100 percent); among them, 12 percent receive a second source of financing distributed as such, 5 percent had a loan from a bank, 5 percent from microfinance institutions, and 2 percent from NGOs. Concerning the inevitable price change during the crisis, the quantitative results for greenhouse crops farmers suggest that both the average costs of purchasing the material and the average selling were increasing. For instance, the average cost of production of major crops was growing in both currencies, the LBP and the fresh USD. Cost of production of one kg of the major crop in LBP increased from 468 to 937, to 2,873, up to 6,085 LBP in 2019, 2020, 2021, and 2022. Costs in fresh USD increased from 50 cents in 2019 to 75 cents in 2020, settling at 1 USD in 2021 and 2022. Similarly, the average selling prices increased in LBP from 1,439 to 2,404, to 6,048, up to 10,085 LBP in 2019, 2020, 2021, and 2022. Prices in fresh USD increased from 1 USD in 2019 to 1.5 USD in 2020 and settled back at 1 USD in 2021 and 2022. Furthermore, the number of farmers who reached the break-even point declined from 2019 until 2022. The average profit margins from one year to another was dropping from 29 percent between 2019 and 2020 to 22 percent between 2020 and 2021, reaching 10 percent between 2021 and 2022.

The market's adjustment to the crisis led 55 percent of the farmers to sell fewer products while maintaining the same quality. Another 21 percent were selling less and had to change the quality; only 2 percent managed to sell the same quantity but had to change the quality. In comparison, 21 percent were able to sell the same volume and same quality before and after the crisis.

The farmers indicated that the main materials were chemical insecticides (90 percent), chemical fertilizers (88 percent), fuel and electricity (86 percent), irrigation parts and pipes (81 percent), and seeds (67 percent). They are followed by fungicides (10 percent) and herbicides (7 percent). Other materials were related to the greenhouse infrastructure. By the same token, all farmers purchased their input material from local input suppliers and 12% of them buy from other farmers too. Locally, the farmers purchase their goods from sellers located in all governorates. In parallel, the farmers' main customers were wholesalers (55 percent), retailers such as mini markets, supermarkets, and groceries (43 percent), households (43 percent), other farmers (2 percent), and HORECA (2 percent); they were from all governorates. However, it was noticed that the farmers mainly sold in their governorates and did not extending their networks beyond their neighborhoods.

In terms of quality control and certifications, almost 90 percent of farmers indicated that the quality of products was not controlled nor tested in a small laboratory on the farm or elsewhere to guarantee the safety of the products. Similarly, none of the respondents had any certificates (AP, GAP, ISO, HACCP), while only 7 percent had started applying for certificates. The farmers controlled the harvesting practices (correct timing and handling), sorting, grading, packing, labeling, and traceability themselves.

Challenges and Bottlenecks

The challenges were relatively heavy financially and economically on greenhouse crops producers who expressed the urgency of addressing. The decrease in purchasing power, inflation, currency depreciation, and the lack of access to loans and liquidity all impacted the producers, in addition to the high cost of transportation. For the sources of losses, the farmers estimated their losses were rarely due to fuel prices (necessary for irrigation and farm energy supply). In addition, they related that their major losses were mainly due to sales problems and mostly due to electricity shortage. The dominance of oligopoly coupled with the exchange rate crisis made it difficult for most farmers to afford seeds, equipment and materials. Smallholders suffered from low returns and very limited profit margins. This led to a reduction in cultivated areas and a decrease in total production. The heavy dependence on fuel for irrigation lead to an increase in the cost of production, which limited the supply. Processing and distribution are also largely controlled by a few wholesalers who have a monopoly on the market. This dependency affects the availability and accessibility of food, leading to higher prices, lower quality, and limited varieties.

Concerning the impact of the crisis and its consequences on the greenhouse production activity, many challenges were mentioned by the farmers such as the lack in water and electricity supply, the poor roads quality and to a lesser extent the poor sewages quality. Most agricultural holdings invest minimal equipment and infrastructure and are often limited to small pieces of equipment, such as water pumps and others. This is due to the fact that agricultural holdings are small in size

(micro-enterprises), which hinders economies of scale, and in turn affects the availability and diversity of food produced for local markets.

The farmers didn't find very difficult to use new machines and equipment but they were triggered by the retaining skilled workers, threatened by the lack of local raw materials that obliged them to purchase imported ones at higher costs. In addition, they found the retaining skilled workers of highly importance.

Concerning the competition challenges, most farmers highlighted the negative impact of the strong domestic and foreign competition. They were slightly concerned with the marketing and advertising challenges and surprisingly the government support.

The labor force is mainly comprised of low-skilled workers, who are often Syrian refugees. So far, there were no actual figures that could pinpoint the challenges in their skills that a greenhouse producer was facing to remain operational and sustainable in the current crisis.

Coping Mechanisms

The farmers adopted different coping mechanisms to survive the ongoing crisis in Lebanon. The main practice involved lowering Plant Protection Products (PPP) applications and using manure instead of chemical fertilizers.

Opportunities

Greenhouse crops farmers stated different opportunities that improve their businesses. These include, from the most to the least importantly perceived ones are:

- support in securing certificates that can boost consumer confidence also the support in marketing and advertising strategies to boost the farmers products exposure to the market were considered good potential to be considered.
- capacity building to enhance your skills and the use of developed methods
- project that reduces the cost of production by increasing the quantity of production,
- coalitions that establish linkages between chain players at the national level
- linkages and agreements to facilitate the imports of raw material
- methods to reduce the costs of product transportation (such as special fridges, collaborative shipping from one area to another)
- linkages and agreements to facilitate exports

In addition, modern greenhouses can enhance yields by up to 100 percent on some farms, according to research conducted in Akkar and the Bekaa as part of pilot projects to examine their

productivity effects. Crop quality has increased, bug occurrences have decreased, and working conditions are better in contemporary buildings, among other advantages. (ILO, 2021)

Some additional support is needed in several areas. The weak cooperative system does not help link farmers with extension services or other market actors, including the agro-food industries. Although there were 1,238 cooperatives registered in 2017, only a third of them are operational: they are concentrated in the south and Nabatieh, while only 7 percent of them are located in Zahle and the West Bekaa, despite the fact that these 2 areas have intensive agricultural production where medium and large farms predominate. Agricultural cooperatives constitute half of the registered cooperatives (51 percent) and the agrifood sector is about a quarter of existing cooperatives (27 percent).

Farmers also expressed their need for fertilizers (93 percent) and pesticides (91 percent), training/capacity building (76 percent), incorporating new technology and equipment (62 percent), cash (43 percent), packing material (7 percent) and other material (52 percent) such as nylon and water funneling means.

C. Greenhouse Crops Distributors

The greenhouse crops distributors who took part of the survey were all Lebanese males, with ages between 29 and 64. Almost 92 percent were literate, 38 percent had university degrees, 46 percent attended school, and 8 percent received vocational education. All of them said they are independent and not members of any cooperative or union. The business nature is small businesses (92 percent) as the number of employees, including the owner, does not exceed 10. There are only 8 percent who have 11 to 49 workers. Additionally, 54 percent of the distributors depend solely on this business, while 46 percent have a second source of income.

Trends / Price Patterns / Profit Margins / Consumer Behavior

Financially, all distributors pay for the input material in Lebanese Pounds and total payments. Only 8 percent settle some of the payments in fresh USD. They primarily rely on self-financing (100 percent), among them 8 percent declaring they had a loan from the bank. Concerning the price fluctuations during the 2019-2022 crisis, the survey confirms that both the average costs of purchasing the material and the average selling are on the rise. For instance, the average cost of purchased materials increased from 969 LBP in 2019 to 2,138 LBP in 2020 and 5,615 LBP in 2021 and 12,423 LBP in 2022. Similarly, the average selling prices increased from 1,323 LBP in 2019 to 2,558 LBP in 2020, 6,715 LBP in 2021, and 13,942 LBP in 2022 (Fig. 39 & 40).

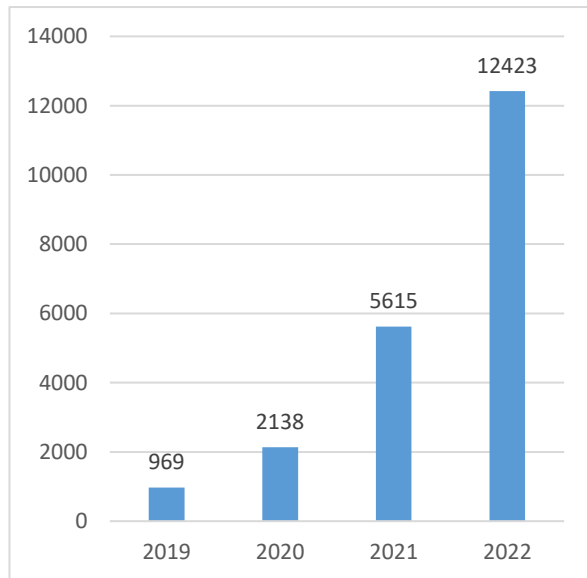


Figure 39 - The Average Prices of the Major Crops Bought in LBP between 2019 & 2022.

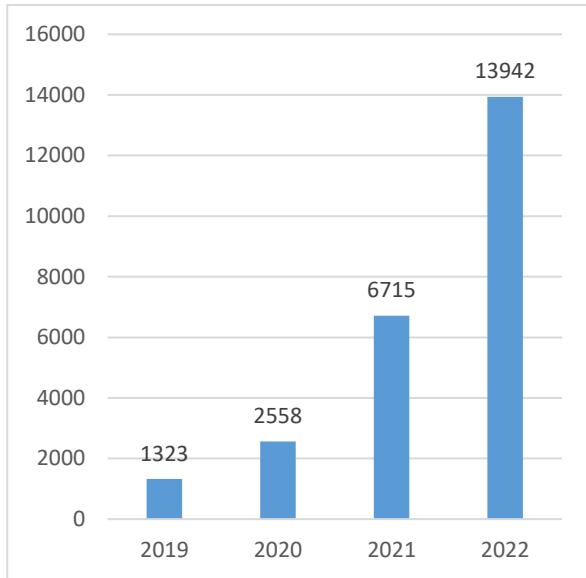


Figure 40 - The Average Retail Price of The Major Crop Sold in LBP Between 2019 & 2022.

Despite increasing sales prices to cope with the increased costs of purchased materials, the number of distributors who could reach the break-even point declined from 2019 to 2022. Furthermore, the below figure shows that the average profit margins from one year to another drops 28 percent between 2019-2022, 24 percent between 2020-2021, and 19 percent between 2021-2022 (Fig 41). The margin profit decreased 10 percent from its original value before and during crisis.

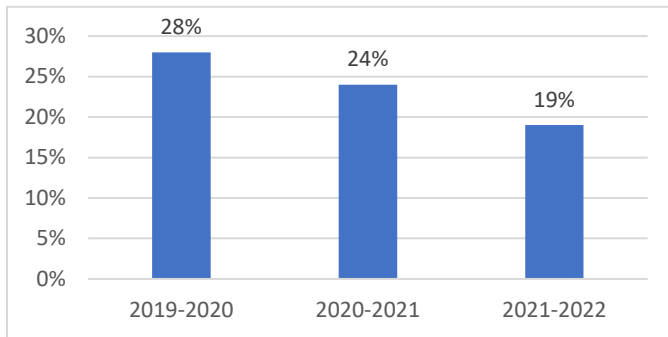


Figure 41 - Profit Margin of Greenhouse Crops Distributors Between 2019 & 2022

Technically, 85 percent of distributors owned a refrigerated vehicle. The below figures show that the distributors worked with a slightly higher number of farmers. This latter increased from 280 to 293 over four years while the number of merchandises was in decline (Fig. 42); however, they were able to sell almost all crops in 2019 (sold 99.99 percent of the products), in 2020 (sold 99.91 percent), and in 2022 (99.81 percent), unlike the year 2021, in which distributors were able to sell only 75 percent of their yields (Fig. 43 & 44).

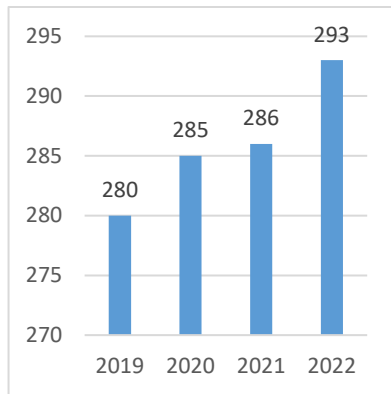


Figure 42 - Number of Greenhouse Crops Farmers Between 2019 & 2022

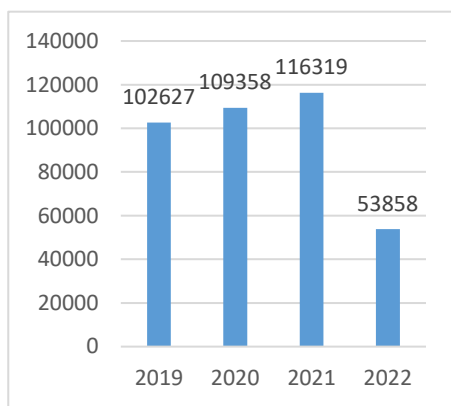


Figure 43 - Crop Yield Purchased in Kg Between 2019 & 2022

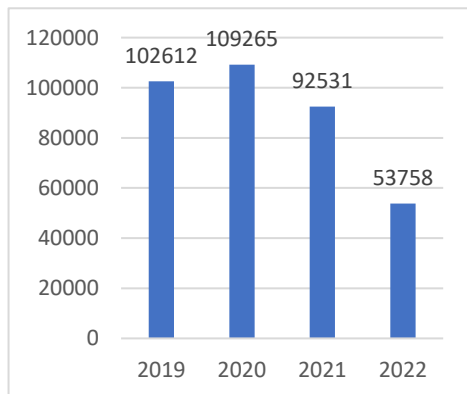


Figure 44 - Crop Yield Sold in Kg Between 2019 & 2022

The distributors purchase their goods from farmers across the country while; their main customers were processors (15 percent), other distributors (15 percent), wholesalers (100 percent), retailers (69 percent), HORECA (38 percent), cooperatives (31 percent), direct household (15 percent) and none of them exported their goods. Since the demand pattern witnessed some changes, it had its repercussions on the market accordingly: only 46 percent were still selling the same volume and

the same quality, while 23 percent of the input suppliers started selling fewer products of lower quality. In comparison, the remaining 31 percent maintained the quality but faced less demand.

Challenges and Bottlenecks

The challenges were multiple on the financial and economic levels: distributors considered the decrease in purchasing power, lack of access to liquidity, inflation, and currency devaluation to be the most harming challenges they were facing, alongside the high cost of transportation; the lack of access to loans presented also an obstacle to them, but to a lesser extent. Concerning the sources of losses, the distributors attributed it sometimes to the poor quality of raw materials. In addition, they stated that their major losses were mainly due to sales problems and to electricity shortage.

In terms of resources, many distributors from the greenhouse crops VC found some minor difficulties in purchasing affordable machines and equipment but the majority were mostly concerned by the lack of local raw material that obliged them to import them at higher costs than usual. On a rather positive note, most distributors mentioned that they were able to manage the strong domestic and imports competition that have resulted from the economic crisis, a challenge that others VC actors were suffering from deeply.

Coping Mechanisms

The distributors adopted different coping mechanisms to survive the ongoing crisis in Lebanon. The main practice was reducing cost by organizing more efficiently the distribution per area, and downsizing.

Opportunities

The distributors who participated in the survey valued different opportunities that can improve their businesses, including providing support in marketing and advertising strategies and methods to reduce the costs of product transportation (such as special fridges, collaborative shipping from one area to another). A further highly perceived opportunity includes creating linkages and agreements to facilitate exports. Another opportunity that was moderately ranked is the creation of coalitions that establish linkages between chain players at the national level.

When asked about the further support they might benefit from, the respondents indicated the need for cash, fuel, training/capacity building, refrigerated trucks, and packing material. It is also worth noting that 60 percent of the distributors recommended supporting the farmers.

D. Greenhouse Crops Retailers

The participants were Lebanese males, with ages between 18 and 64. Almost 19 percent had university degrees, 71 percent attended school, 5 percent received vocational education and only 5 percent indicated that they didn't receive any education.

Trends / Price Patterns / Profit Margins / Consumer Behavior

Speaking of the financial management for the retailers, they all relied on self-financing during the past three years. All the retailers indicated that they buy and sell their products in Lebanese Pounds and in full payments. Concerning the changes in prices, the survey suggests that both the average costs of purchasing the material and the average selling are on the rise. For instance, the average cost of purchased materials increased from 645 LBP in 2019 to 2,014 LBP in 2020 and 6,357 LBP in 2021 and 12,143 LBP 2022. Similarly, the average retail prices increased from 1,002 LBP in 2019 to 2,929 LBP in 2020, 8,119 LBP in 2021, and 14,452 LBP in 2022. (Fig. 45 & 46)

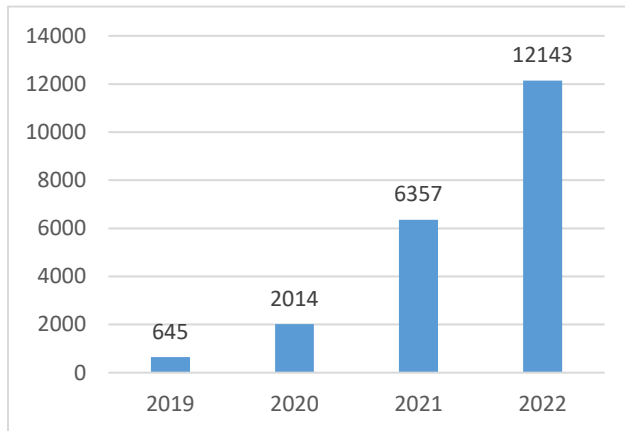


Figure 45 - Average Purchase Prices in LBP between 2019 & 2022 for Greenhouse Crops Retailers

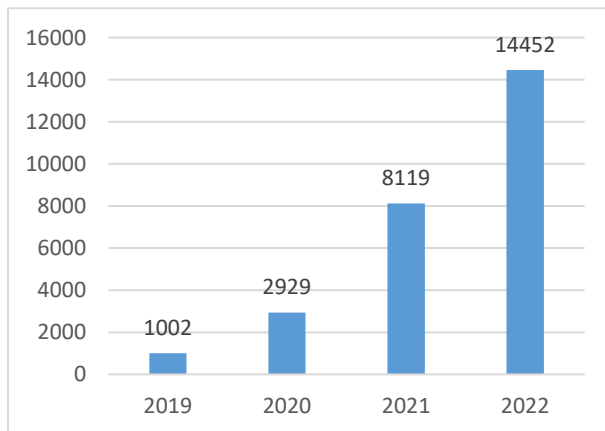


Figure 46 - Average Retail Prices in LBP Between 2019 & 2022 for Greenhouse Crops Retailers.

Despite increasing sales prices to cope with the increased costs of purchased materials, the number of retailers who could reach the break-even point declined from 2019 to 2022. Furthermore, the below figure shows that the average profit margins from one year to another dropped by 25 percent between 2019-2022, 10 percent between 2020-2021, and 4 percent between 2021-2022.

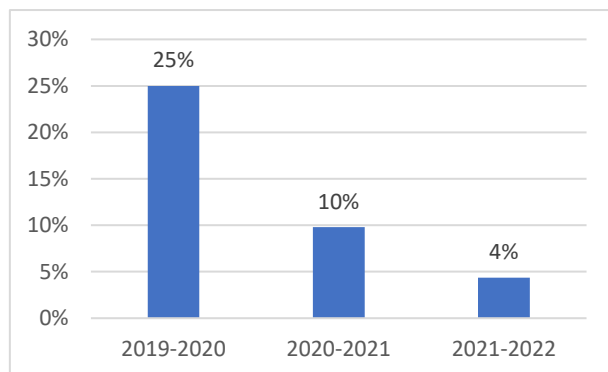


Figure 47 - Average Profit Margins for Greenhouse Crops Retailers Between 2019 & 2022.

On the technical level, retailers indicated that they were facing challenges primarily due to the Lebanese currency depreciation. They purchased their material from local wholesalers (90 percent), from farmers (57 percent) and 5 percent from the distributors. Locally the retailers purchased their goods from seller located in all governorates and mainly from Akkar, Beqaa, North, South and Mount Lebanon.

Concerning the market's adjustment, 38 percent of retailers were selling fewer products of lower quality. Another 38 percent maintained the quality but faced less demand. The remaining 24 percent maintained selling the same quantity with the same quality.

Challenges and Bottlenecks

Financially and economically, challenges were major and included the low purchasing power, inflation, currency devaluation, high transportation costs, and lack of liquidity. In addition, retailers related their major losses to sales problems and to electricity shortage. As for the plant production sector as a whole, the latter encounters two main challenges as well. The biggest challenge today is the farming standards in terms of inappropriate infrastructure, required trainings and water issues. For 50 years, the infrastructure of the agricultural structure didn't change yet and isn't proper. Lack of technology and absence of improvements were found specially that the MoA benefits from the lowest percent of the national public budget. Major problems encountered are water sources and irrigation infrastructures (KIIs 9, 10 & 11). Moreover, there is no proper training on how to plant and pick. The mismanagement of water could be solved by optimizing the infrastructure and by fixing water availability and uses. The second biggest challenge is the access to farming equipment. Nowadays, many farmers reduced, and in some cases even stopped their

farming activities due to the elevated prices in the greenhouse equipment such as nylon rolls, iron and many input supplies. The farming capacity has been reduced considerably and many producers sold their properties to many capital holders, although these are neither experts in the agricultural field, nor were they working in it.

Coping Mechanisms

The retailers adopted different coping strategies to remain in business in such circumstances. The main practices were downsizing and reducing costs by shifting to other sources of supply or lower quality inputs. Few of them participated in local markets on a weekly basis, increased their sales in some product lines, introduced new products, increased their prices or had to increase their efficiencies to reduce the purchase prices.

Like other VC actors, retailers mentioned additional support needed, including the need for cash, fuel, cooling, storage packing material, and others such electricity.

Interviews experts and professionals also advised reconsidering the methods to use pesticides in the plant production sector. For instance, one of the key interviewees suggested considering organic agriculture, which forgoes all types of pesticides and similar measures, since properly treating the land and soil will help the farmers avoid using chemicals to protect their crops. Others suggested using Integrated Pest Management to help farmers use wisely the pesticide (KIIs 1, 2, 6 & 7).

E. Recommendations

Lebanon exports fresh fruits and vegetables on a net basis. The value of annual imports is roughly €185 million, whereas annual exports are approximately €225 million, which is comparable to approximately 500,000 tons in volume. The majority of Lebanon's fresh fruit and vegetable exports are bound towards the Middle East, namely the Gulf states. Since the Gulf markets steadily opened up to global providers in recent years, exports to this area have faced obstacles. (CBI, 2019; KII 3). Worldwide, the market potential for greenhouse vegetables is phenomenal and is growing rapidly. However, the small-scale greenhouse farmers in Lebanon are threatened. The farmers face a host of impediments limiting their performance and competitiveness in the market.

The main recommendations that could be adopted are basically focused on the production actors (farmers) since they constitute the largest part of the VC, as well as the most difficult to control. The long-term viability of the greenhouse market sector depends on some actions such as:

- Help the Small and Medium Scale Enterprises (SMSE) implement sustainable farming practices (better produce, pack and market of competitive early vegetables).
- Encourage local pesticide suppliers and pesticide firms mostly give guidance to farmers.
- Improve or modify the farmers methods to access market and to think out of the box. (Export opportunities).
- Encourage small farmers to engage new added value crops and production networks.
- Control the activity and knowledge in business strategy of the majority of the Lebanese cooperatives, management and governance to better work and cooperate with the farmer individually and between members.
- Replace dilapidated greenhouses that are more than 10 years old.
- Encourage medium and large farmers in investing in crops in cold greenhouses on an area of at least 1 ha
- Improve crop yield, early production and consequently farmers' income through the popularization of new techniques.
- Improve the sanitary quality of products by raising farmers' awareness of the use of pesticides before promulgating the legislative texts regulating the maximum limits of pesticide residues. (i.e. GAP certificates).

- Set up a support system allowing greenhouse operators to modernize their greenhouses with energy saving efforts.
- Although the picture looks gloomy, professionals and experts who are exposed to more advanced techniques are invited to give some innovative solutions to the sector to improve the infrastructure beyond mere subsidies programs. Among the suggested solutions, the use of solar pumps for irrigation and Agri Voltaic Solution which has been proposed and used in Europe to reduce the energy cost.

In reality, this crisis situation offers a real opportunity for development for Lebanon, through the adoption of an appropriate policy in the field of management of the exploitation and promotion of protected crops. Despite these promising prospects, a number of constraints hinder the development of this sector. The development and implementation of a coherent national strategy is necessary to ensure harmonious and sustainable development. Finally, the Minister of Agriculture declared a promising statement that “the national agricultural products will return to Saudi Arabia and the Gulf countries very soon”. (LBC group, July 2022.)

IV. Table Grapes VC

The most important agricultural products exported in 2020 were coffee (10 percent), bananas (9 percent), grapes (9 percent), other nuts (8 percent), and citrus fruits (8 percent) (CCBAI, 2020). The most recent estimate of national grape VC output (including table and wine grapes) was over \$76 million (MOA & FAO, 2016 in USAID, 2020).

A. Table Grapes Input Suppliers

The participants were Lebanese males, with age range between 29 and 64. All of them were literate, 20 percent had university degrees, and 80 percent attended school. When asked about memberships and collaborations, 60 percent indicated they were part of a cooperative and 20 percent of whom were union members. The remaining 40 percent worked independently. The business nature is either small businesses (80 percent of the suppliers have less than 10 workers with them) and 20 percent are big suppliers with 50-100 workers with them. On a further note, all of the input suppliers depend solely on this business.

Trends / Price Patterns / Profit Margins / Consumer Behavior

All input suppliers have to pay for the input material in fresh USD and full payments. Among them, only 40 percent were able to settle some of the payments via their current USD accounts. They all rely on self-financing. The expected changes in prices confirmed that both the average costs of purchasing the material and the average selling are increasing. For instance, the average cost of purchased materials increased by 58 percent, 72 percent, and 97 percent between 2019-2020, 2020-2021, and 2021-2022 respectively. Similarly, the average selling prices increased by 53 percent, 66 percent, and 105 percent between 2019-2020, 2020-2021, and 2021-2022 respectively (Fig. 48 & 49).

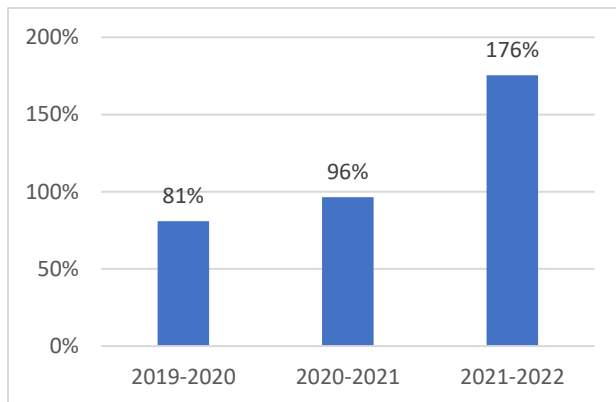


Figure 48 - Costs of Purchased Material by Input Suppliers Between 2019 & 2022

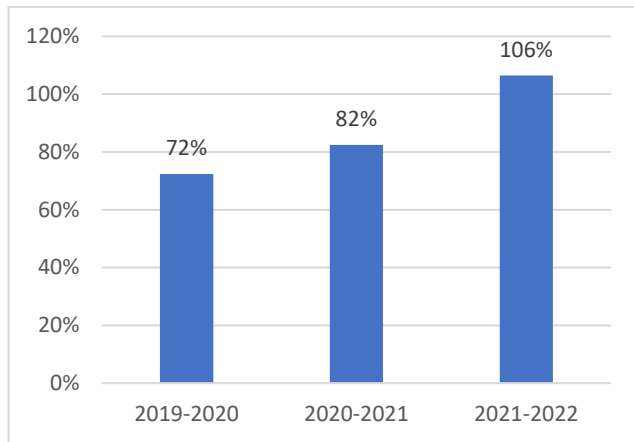


Figure 49 - Table Grapes Input Material Retail Prices Between 2019 & 2022

Despite increasing sales prices to cope with the increase in costs of purchased materials, the number of suppliers who could reach the break-even point declined from 2019 until 2022. Furthermore, the below figure shows that the profit margins from one year to another are shrinking to lower brackets to settle at the 0-5 percent profit bracket in 2022.

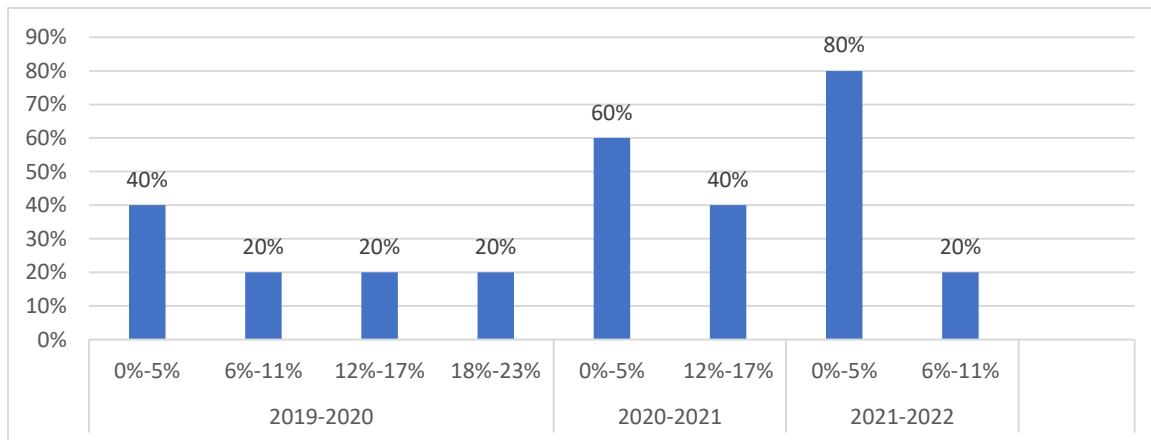


Figure 50 - Profit Margins For Table Grapes Input Suppliers Between 2019 & 2022

The input suppliers indicated that they were facing challenges when purchasing several input materials due to the importing hurdles, primarily due to the Lebanese currency depreciation. The top materials in shortage were fuel (100 percent), chemical fertilizers (80 percent), herbicides (80 percent) insecticides (60 percent), fungicides (60 percent). They are followed by Anti-sprouting Products and Plant Regulators (40 percent), seeds (40 percent) packing material (20 percent) and equipment/tools (33 percent).

The input suppliers purchased their material from local wholesalers (60 percent), and 40 percent import. Locally the input suppliers purchase their goods from seller in all governorates. The main countries of import are Europe and Italy in specific before and after the crisis. The export and import agents are Debbene and Salim Ghosain.

In parallel, their main customers were farmers (100 percent), distributors (40 percent), and other input suppliers (40 percent). The customers were from all governorates. Demand pattern changes resulting in a market adjustment in which 20 percent of the input suppliers continued to sell their products in the same quantities and with the same quality while the remaining 80 percent maintained the quality but faced less demand.

Challenges and Bottlenecks

Many economic and financial challenges imposed themselves on table grapes input suppliers that needs to be addressed urgently, the most important one being the low purchase power, inflation, currency depreciation, high transportation costs, and the lack of access to loans and liquidity. Even though input suppliers said their products were rarely ruined, the causes of losses among these actors resides in bad storage in trucks, or to sales problems.

Table grapes input suppliers' basic infrastructure challenge was the lack of sufficient electricity. Concerning the resources, many of these VC actors found mild difficulties in recruiting skilled workers and in finding affordable machines and equipment. In terms of competition, input suppliers were mostly affected by the lack of the government support. That support could enable them to offer better input material prices and overcome the strong imports competition.

Coping Mechanisms

The input suppliers adopted different coping mechanisms to survive the ongoing crisis in Lebanon. The main practice was increasing the selling prices. In addition, they tried to introduce e-commerce to their activities, collaborated with other businesses, and they improved their management.

Opportunities

When presented with the specific opportunities during the survey, input suppliers found all the suggested options as important to valorize and improve their enterprises. These include coalitions that create connections between chain players at the national level, linkages and agreements to facilitate exports, techniques to lower the costs of product transportation (like specialized refrigerators, cooperative shipping from one area to another), support for marketing and advertising strategies to increase their exposure to the market, capacity building to improve their skills.

When asked about the further support they might benefit from, the respondents indicated the need for cash, fuel, cooling, training/capacity building, incorporating new technology and equipment.

B. Table Grapes Farmers

The participants were 90 percent Lebanese males, with 10 percent Syrian females, with ages ranging between 18 and 64+ with a higher percentage for the upper age groups (40 to 50 years old and 51 to 64 years old). Regarding the education, 45 percent had university degrees, 40 percent attended school, and 15 percent received vocational education. Around 20 percent indicated they were part of a cooperative or union members. The remaining percentages worked independently. The business size ranged between small-scale 55 percent (1-10 workers), medium-scale 35 percent (11-49 workers) and large-scale 10 percent (50 and more workers) businesses. On a further note, 85 percent of the input suppliers depend solely on this business, while 15 percent have a second source of income.

Trends / Price Patterns / Profit Margins / Consumer Behavior

All farmers indicated that they own or lease the land they are cultivating; in other words, the interviewed farmers were the business owners and not workers. As noted in the below figure 51, the majority cultivated between [20-29] dunums constantly over the past three years, 85 percent, while less than 15 percent were cultivating 19 and less.

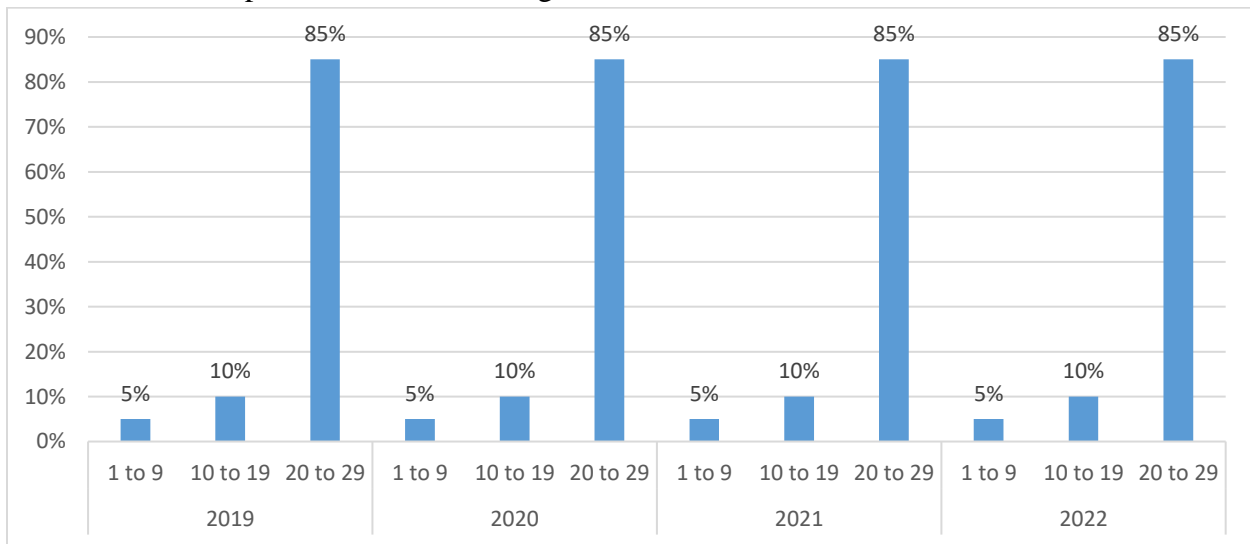


Figure 51 - Table Grapes Production Area Sampled & Cultivated Between 2019 & 2022

The farmers indicated producing a variety of grapes including 20 percent Early Sweet, 70 percent Superior, 15 percent Thompson, 25 percent Crimson, 65 percent Red globe and 55 percent other types. Other types include Scarlet, Royal, Atika, ARA 15, Black Chili, Black Magic, Baytamouni, Black Pearl, Autumn King, Suplima. The majority of the farmers preferred Superior and Red Globe (Fig. 51).

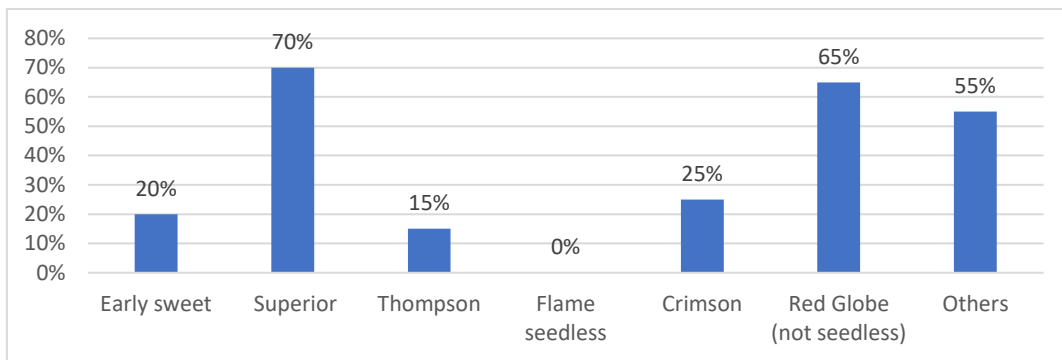


Figure 52 - Percentage of Farmers Cultivating Different Varieties of Table Grapes

The production and the selling volumes were somehow stable between 2019 and 2021 with a noticeable drop in 2022 (yields still not harvested). The figure below shows that the farmers almost sold all their grapes between 2019 and 2021. In 2019, they sold 98 percent of the produced crops, 98 percent in 2020, 97 percent in 2021, and 47 percent up to date in 2022. It is important to note that the season is not over yet (data collected during July-Mid Aug 2022) for 2022 so production and sales may pick up by the end of October 2022 (Fig.53).

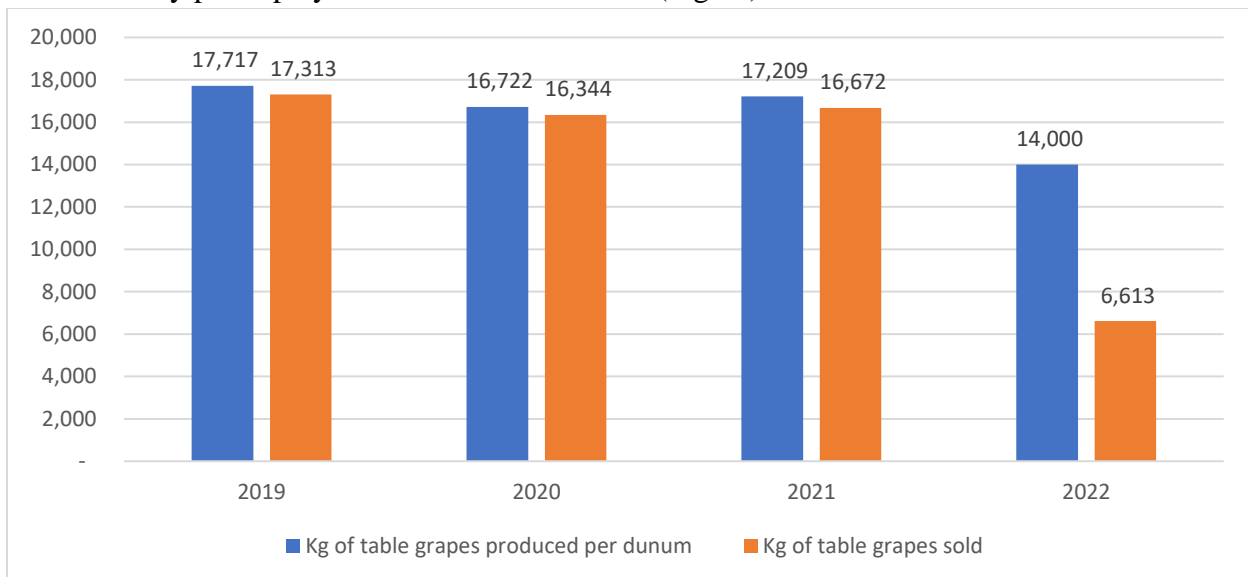


Figure 53 - Volume of Table Grapes Produced & Sold Between 2019 & 2022

Financially speaking, 65 percent paid for the input material in fresh USD and full payments (only 5 percent used installments). Almost 40 percent were able to pay using their current USD accounts. They primarily relied on self-financing (95 percent); and only 5 percent turned to microfinance institutions. As for the price fluctuations, the data shows that both, the average costs of purchasing the material and the average selling would increase. For instance, the average cost of producing the major crops was increasing in both currencies, the LBP and the fresh USD. Production costs in LBP increased from 4,000 in 2019, to 5,500 in 2020, up to 8,000 LBP in 2021, and 10,000 LBP in 2022, while the production costs in fresh USD increased from 38 cents in 2019 to 44 cents in

2020, to 56 in 2021, and up to 61 cents in 2022. Similarly, the average selling prices increased in LBP from 8,500 to 14,000 to 16,500 back to 15,000 in 2019, 2020, 2021 and 2022 respectively. Prices in fresh USD increased from 62 cents in 2019 to 63 cents in 2020 to 64 cents in 2021 and 77 cents in 2022. Fig. 54, 55, 56 and 57).

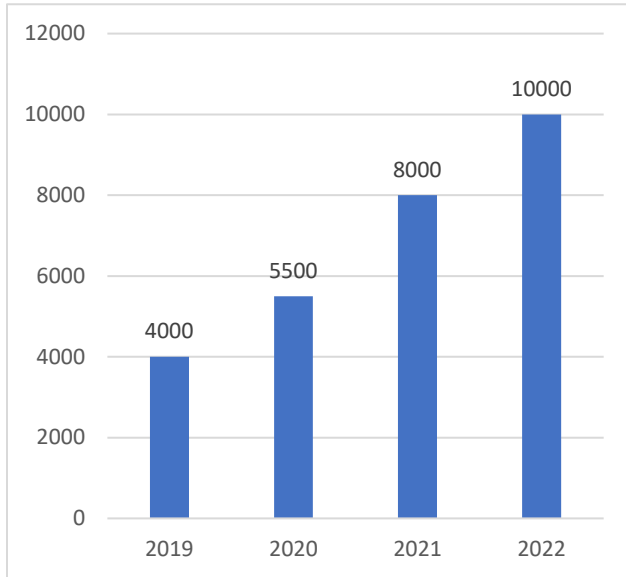


Figure 54 - Cost of Production of Table Grapes on Farmers in LBP Between 2019 & 2022

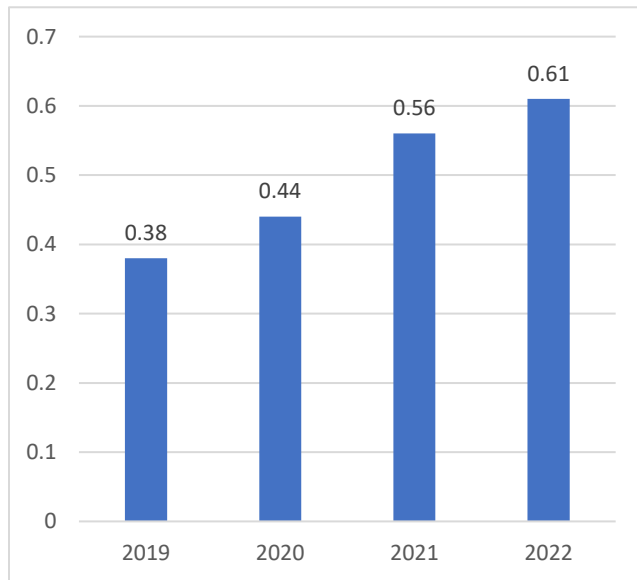


Figure 55 - Cost of Production of Table Grapes on Farmers in USD Between 2019 & 2022

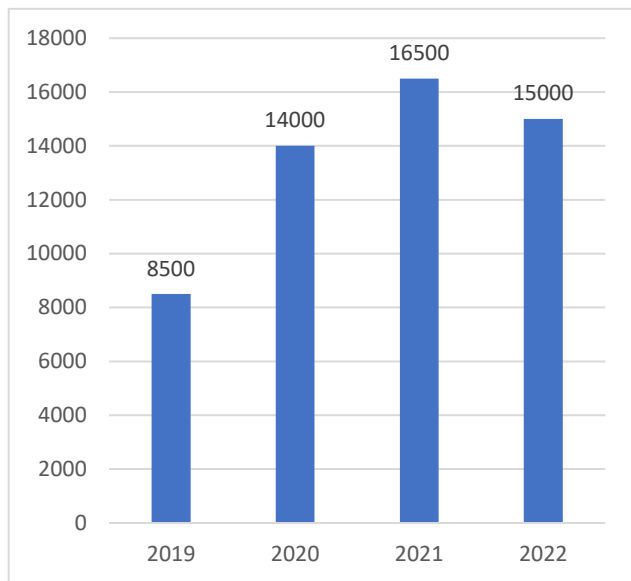


Figure 56 - Selling Prices of One Kg of Table Grapes in LBP Between 2019 & 2022

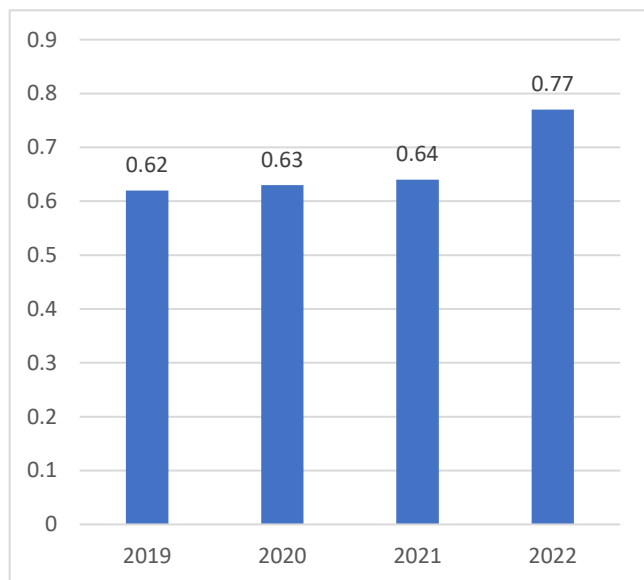


Figure 57 - Selling Prices of One Kg of Table Grapes in USD Between 2019 & 2022

Despite increasing sales prices to cope with the increased costs of purchased materials, the number of farmers who could reach the break-even point declined from 2019 until 2021. Furthermore, the below figure 75 shows that the profit margins from one year to another was dropping from 28 percent between 2019 and 2020 to 19 percent between 2020 and 2021 down to 13 percent between 2021-2022.

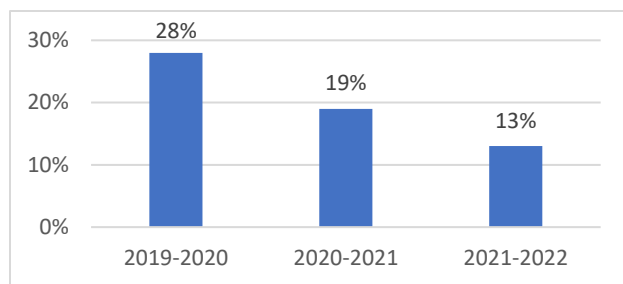


Figure 58 - Average Profit Margin of Tables Grapes Farmers Between 2019 & 2022

Concerning the market's adjustment to the crisis, 40 percent of the farmers started selling fewer products while maintaining the same quality. In comparison, 60 percent were able to sell the same volume and same quality before and after the crisis.

On the technical aspect, the farmers indicated they were facing challenges securing several input materials due to the Lebanese currency depreciation. The top materials in shortage were fuel and electricity (95 percent), chemical fertilizers (65 percent), insecticides (55 percent), fungicides (55 percent), herbicides (50 percent). They are followed by packing material (30 percent) and irrigation parts and pipes (20 percent), and anti-sprouting products and plant irrigation regulators (10 percent).

The farmers purchased their input material mainly from local input suppliers (100 percent); among them (10 percent) imported their input material. Locally, the farmers purchase their goods from sellers located in all governorates mainly Bekaa. As for imports before the crisis, they used to import the input material including but not limited to fertilizers, and bay papers from Greece, Italy, Spain and Jordan. After the crisis, they shifted to China and Greece. Their main customers are wholesalers (85 percent), COOPs (25 percent), Processors (10 percent), retailers such as mini markets, supermarkets, and groceries (10 percent), households (5 percent), and HORECA (2 percent). The customers were from all governorates; however, it is noticed that the farmers mainly sell usually in their governorates and did not extend their networks beyond their neighborhoods. Furthermore, 25 percent of the farmers sell their products in the foreign market (export their grapes), including Kuwait, Qatar, Dubai, Abou Dhabi, Arab Countries and Asia. Their export agents were Mahmoud EL Rakha, Rabih El Helo, Fadi El Zein, BCC Company and CEVA company.

In regards to quality control and certifications, almost 71 percent of the respondents indicated that their products were controlled or tested in a small laboratory on the farm or elsewhere to ensure their quality. Concerning certificates, 65 percent of the farmers had no certificates, 35 percent have Global GAP among them 5 percent did obtain the ISO and 10 percent had other certificates such as (General Rules Assessment on Social Practice) GRASP, BRC, and SCR. Almost 80 percent of the farmers controlled the harvesting practices of (correct timing and handling) sorting, grading,

packing and labeling, and traceability themselves, 5 percent contracted another company and 15 percent did both alternatives.

Challenges and Bottlenecks

On one hand, the challenges that needed to be urgently addressed by the table grapes producers were most importantly in relation to high transportation cost, the currency depreciation and inflation, and the low purchase power, as well as the lack of access to loans and liquidity. For the sources of losses, the farmers estimated their losses mildly due to electricity shortage.

On the other hand, not all table grapes producers can fulfill the demands of domestic and foreign buyers, such as Global GAP. As a result, these farmers are unable to access sales channels, and as a result, they do not obtain better selling prices. In that sense, small farmers rely heavily on the efforts of the intermediary. The domestic market structure is inefficient. In most circumstances, several parties (a lengthy chain) are engaged, and price determination is opaque. Farmers are the weakest link in the VC. The major inconvenient in the table grapes production process was the lack of electricity supply. The table grapes producers found very challenging acquiring affordable machines and equipment, and recruiting skilled workers. The majority of the producers mentioned the absence of the governmental support to protect them from foreign strong competition and ensure equitable domestic one. Almost all the table grape producers didn't mention encountering important problems with their skills capacities and their production activities.

Coping Mechanisms

The farmers adopted different coping mechanisms to survive the ongoing crisis in Lebanon. The main practice was increasing their prices.

Opportunities

The participants found all the suggested options important to valorize and improve their enterprises extremely and to be examined in the future. Those were mainly in investing in projects that reduces the cost of production by increasing the quantity of production. In addition, we can find: coalitions that create connections between chain players at the national level, linkages and agreements to facilitate exports, techniques to lower the costs of product transportation (like specialized refrigerators, cooperative shipping from one area to another), support for marketing and advertising strategies, and finally improving in their capacity building to ameliorate their work conditions and skills.

When asked about the further support they might benefit from, the respondents indicated the need for almost everything cash, fuel, cooling, packing material, training and capacity building, incorporating new technology in addition to fertilizer, pesticides and other specifically prices stability.

C. Table Grapes Distributors

The interviewed distributor of the table grapes sector is a Lebanese male between 51 and 64 years old, having a university education level from Beqaa, his enterprise is medium-sized, and he is a member of a union and cooperative area and doesn't have another source of income. He gets the product he sells from the south and Beqaa and sells it to wholesalers and local markets in the North and Beirut mainly, as well as exports it to foreign markets.

Trends / Price Patterns / Profit Margins / Consumer Behavior

Due to the crisis, he sells less but keeps the same quality. He is self-financed but needs several subsidies from the donor/ government as packing material, training/capacity building, incorporating new technology and equipment, and solar energy. Between 2019 and 2021, the number of farmers who sold him their products was 11 on average farmers. The kilograms of table grapes bought was about 350,000 kg for 0.8 USD each. The kgs of grapes sold was 326,666 kg, for 1 USD each. Moreover, he pays the supplier Fresh USD and doesn't own a refrigerated vehicle. However, he couldn't reach breakeven in 2022 and earned between 0 and 5 percent profit margin in 2022 after earning an average of 30 percent previously.

Challenges and Bottlenecks

The challenges that needed to be urgently addressed by the table grapes distributor in ascending order were: lack of access to loans and liquidity, but the most important challenges encountered were high transportation cost, the currency depreciation and inflation, and the low purchase power. In addition, the distributor related his losses to bad storage conditions of the table grapes and to electricity shortage. The table grapes distributor was mainly concerned with the lack of local raw material and the difficulty in finding affordable machines and equipment.

Coping Mechanisms

The distributor adopted different coping mechanisms to survive the ongoing crisis in Lebanon. The main practice was increasing the sales prices.

Opportunities

The interviewee indicated different opportunities that they can valorize to improve his business. Those were mainly in investing in projects that reduces the cost of production by increasing the

quantity of production. In addition, he highlighted the importance of the followings: coalitions that create connections between chain players at the national level, linkages and agreements to facilitate exports, techniques to lower the costs of product transportation (like specialized refrigerators, cooperative shipping from one area to another), support for marketing and advertising strategies, and finally improving in his capacity building to ameliorate his work conditions and skills.

D. Table Grapes Retailers

The majority of the participants were Lebanese males (91 percent), and 9 percent Syrian Females. The age ranges of the respondents is between 40 and 64. All the respondents have a school degree only.

Trends / Price Patterns / Profit Margins / Consumer Behavior

Table grapes retailers all relied on self-financing during the past three years and they bought and sold their products in Lebanese Pounds and in full payments. Prices fluctuations were expected and therefore both the average costs of purchasing the material and the average selling price are on an upward curve. For instance, the average cost of purchased materials increased from 2,000 LBP in 2019 to 4,455 LBP in 2020 and 8,136 LBP in 2021 and 15,273 LBP 2022. Similarly, the average selling prices increased from 3,091 LBP in 2019 to 6,136 LBP in 2020, 10,500 LBP in 2021, and 18,909 LBP in 2022 (Fig. 59 & 60).

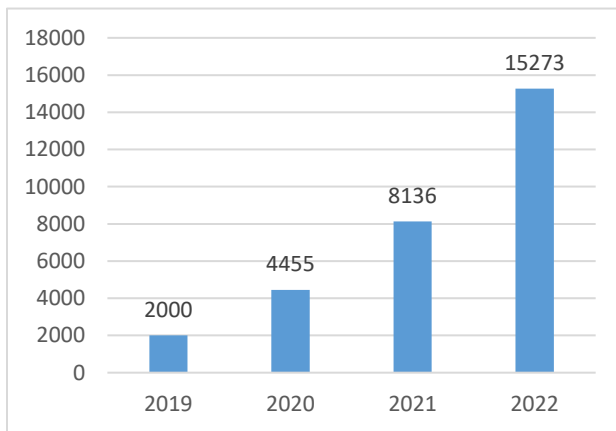


Figure 59 - Average Purchase Price of Table Grapes for Retailers in LBP Between 2019 & 2022

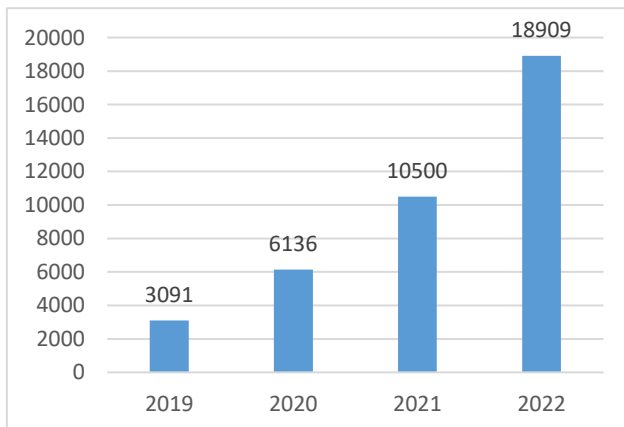


Figure 60 - Average Retail Price of Table Grapes for Retailers in LBP Between 2019 & 2022

Despite increasing sales prices to cope with the increased costs of purchased materials, the number of retailers who could reach the break-even point declined from 2019 to 2022. Furthermore, the below figure 61 shows that the profit margins from one year to another drops 11 percent between 2019-2022, 5 percent between 2020-2021, and 5 percent between 2021-2022.

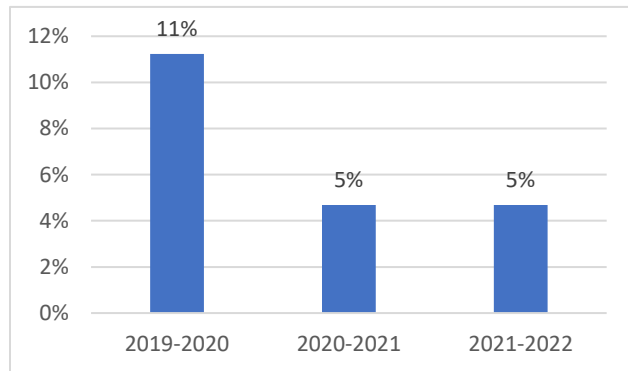


Figure 61 - Average Profit Margin of Table Grapes Retailers Between 2019 & 2022

Technically, table grapes retailers indicated that they are facing challenges primarily due to the Lebanese currency depreciation. The retailers purchase their material from local wholesalers (100 percent). Locally the retailers purchased their table grapes from seller located in all governorates and mainly from Beqaa, Beirut, North, Mount Lebanon, and South. None of them indicated importing or exporting their goods. Concerning the market's adjustment to the crisis, all of the retailers confirmed maintained the quality but faced less demand.

Challenges and Bottlenecks

The challenges that needed to be urgently addressed by the greenhouse producers in ascending order were: lack of access to loans and liquidity, but the most important challenges encountered were high transportation cost, the currency depreciation and inflation, and the low purchase power. For the sources of losses, the farmers estimated their losses were rarely due to fuel prices (necessary for irrigation and farm energy supply). In addition, they found few problems when selling their table grapes or in the electricity shortage as the other VC retailers. The table grapes retailers encountered slight domestic competition but were very concerned with the absence of the government support to ensure their usual resources.

Coping Mechanisms

The retailers adopted different coping mechanisms to survive the ongoing crisis in Lebanon. The main practice was increasing the sales prices. Retailers expressed their need for support in terms of cash assistance, fuel, cooling, storage, packing material, incorporating new technologies and certificates.

E. Recommendations

International Monetary Fund (IMF) supports agrifood players, carry out needs assessments, and implement strategies that aid in their efficient and sustainable provision of financial resources to farmers and SMEs (IFI, 2022). As a result, funders considering fresh contributions in the table grapes VC are urged to take the following actions:

- Determine high-value target markets, varieties, and market needs, and assist farmers and exporters in joining these markets.
- Improve vertical and horizontal VC connections (KII 11).
- Encourage farmers, exporters, and packers to interchange a greater number of products by creating new horizontal and vertical linkages, as well as economic partnerships, among value chain participants.
- Motivate the Farmers to collaborate with packers/exporters to optimize grape harvesting, handling, and packaging
- Support initiatives that help table grapes SMEs and cooperatives become more export-focused, such as helping them increase production, regulate quality, adhere to national and international quality standards, and obtain the necessary certifications.
- Intelligent marketing of the Lebanese table grapes allows growers to compete on the home and/or export markets.
- Most small-scale farmers have old or antique equipment, (KIIs 1, 4, 8, 9 & 11) and cultivate using traditional methods. Local cultivars are used by growers, which may not necessarily fulfill high-end market demands. In large-scale farms, new technologies are more viable, can meet sustainability and safety requirements, and are more cost-effective. Small-scale farmers might benefit from this cost-effectiveness by collaborating with other producers and selling inputs.
- Improving research institute infrastructure by updating buildings (e.g., labs, experimental stations) and expanding staff capacities.
- Improving extension service by establishing skilled consultants and attempting to relate extension service to both practice and research and education.

- More funding must be set aside by the government (MoA) to enhance the level of expertise among all supply chain participants. Technology developments should coexist with the advancement of (necessary) knowledge.

Conclusion

The agrifood sector is vital for the Lebanese and the Lebanese economy, especially during times of multi-layered crisis. Despite the gaps and shortages in the structure of the country to support the sector, there are always measures that could be considered to develop specific changes. The analysis of the findings generated from the surveys and the interviews were based on the input of the chain players, the experts, professionals and government representatives. Findings suggest that, similar to the global challenges facing Lebanon on a macro level, the absence of electricity, water supply, the currency depreciation hit the agrifood sector in its core. Not to mention the Ukraine-Russian war that further inflated the domestic prices of imports and chemicals. In addition to those external factors, the agrifood sector, specifically the four VC under this study, are facing further challenges. Among those challenges, participants stress the importance of exploring new strategies to improve and develop the agricultural sector in Lebanon in terms of introducing new machines, equipment, and tools.

Undoubtedly, the uplifting of the agricultural sector depends heavily on the government's support; the solutions are not merely at a micro-individual level but are of a national nature. Thus, empowering and supporting the government and the relevant ministries such as MoA and Ministry of Environment and the chamber of commerce will, in turn, provide empowerment to the agricultural sector, among others (KIIs 3, 7, 8 & 9). The sector needs electricity, animal feed, irrigation, and cooling systems that require proper infrastructure. Of an equal importance, the sector needs trade agreements that protect its local production and facilitate linkages with foreign markets to expand both the local and international markets for the Lebanese input suppliers, farmers, distributors, wholesalers and retailers. What was noticeable among all players in the four VC under this study is the lack of linkages between the players on the local level, such that each farmer would sell in the close neighboring area, and the lack of international linkages that would facilitate selling their products as well. Furthermore, they expressed the need to introduce new technologies and equipment accompanied by capacity building to cope with the recent advancements. Last, there is a unanimous need for renewable energy sources such as solar systems.

Cooperatives have been and continue to be an appealing subject for rural development due to their capacity to assist funders fulfill development objectives and bridge the gap with the local environment. However, according to other sources, including McKinsey (2018), cooperatives have a minor role in Lebanon. In order to realize the cooperatives' aims and demonstrate that a union of farmers can solve market requirements and obstacles, we urge a specific effort to teach cooperative representatives on governance and management.

The restructuring of value chains will open opportunities for socially balanced growth. The enormous import-export imbalance suggests that production oriented at import substitution is an intriguing option to valorize agricultural activity and agrifood businesses, particularly for sub-sectors with comparative market advantage. Furthermore, more strict wholesale market regulation

to minimize value capture and market supply chain shortening are options for optimizing value chains and increasing producer profit margins. It is recommended to enable cooperatives to contribute to the diffusion of modern agricultural practices. Extension work has the potential to aid small farmers and should be a valuable instrument in taking real efforts toward climate change adaptation. It should also be a valuable instrument for lifelong learning, allowing farmers to obtain assistance and training throughout their careers.

The following recommendations may be made to increase the VC's competitiveness:

1. Enhancement of the value chain organization from producer to exporter by establishing an environment with improved access to technology, expertise, and money. This will enhance the cold chain structure in all value chain links, such as cold storage and novel packing materials or processes.
2. Encourage collaboration among (small and medium-sized) producers in order to form alliances and attain higher volumes of (quality) products in order to be a more appealing provider of quality products to merchants and exporters. One of the requirements for (subsidies, revolving funds, loans) should be to improve the value chain's sustainability, market development, and competitiveness.
3. Improve the links between education, research, and extension service on one side, and practice on the other. (from producer to exporter).
4. Another potential is to develop and provide high-quality items to the worldwide market during the off-season of rival nations. Concentrate on the high-end local and international markets by providing additional value through high-quality, specialty, and/or organic goods such as cherry tomatoes, micro cucumbers, iceberg lettuce, colored peppers, and so on. This necessitates meeting the very minimum of quality criteria (Global GAP, HACCP, etc.). If farmers want to obtain higher prices they have to change to niche markets and export markets and must deliver a better quality according to Global Gap.
5. Emphasizes the prospect of assisting farmers by giving in-kind and monetary aid for inputs such as high-quality seeds, fertilizers, small tools, and equipment such as solar pumps (FAO, 2018; MoA, 2020). However, many farmers' elderly age and poor education levels hinder their ability to learn and use new practices, particularly irrigation technology (GWSSP, 2018).
6. Investing in alternative fodder production provides a chance to boost dairy output while also increasing impoverished farmers' earnings. Developing an alternative to expensive imported feed might assist farmers in better nourishing their animals, generating higher quality milk, and lowering farmer expenses.

7. Strategic use of cold storage (chilling units) might enable Lebanese producers to reach export windows in profitable markets such as Europe, Russia, and the GCC. However, careful planning is required to prevent direct rivalry with big producers like as Egypt and Turkey.

Lebanon confronts significant water management issues due to a scarcity of water resources (including water of appropriate quality for agrifood production) as well as wastewater management. Water shortage is likely to grow in the next decades as a result of climate change, which is expected to result in lower overall levels of precipitation delivered through more intense rainfalls (McKinsey, 2018.). The recently issued Lebanon National Agriculture Strategy 2020-2025 emphasizes the need to improve irrigation water efficiency and make additional water resources accessible for irrigation, notably via the application of advanced irrigation technology (MOA, 2020).

In conclusion, Economic Sustainability is critical for the success of any VC intervention and is closely related to the projected outcomes. True sustainable economic development must account for resource scarcity, population expansion and consumption, potential environmental deterioration, and the effects of climate change.

Interviewees Lists

Key Informative Interview	Sector	Affiliation
KII 1	All VCs	Robinson Group
KII 2	Cow milk, Poultry, Greenhouse Crops VCs	Biomass
KII 3	Greenhouse Crops VC	Lebanese University Professor
KII 4	Table Grapes VC	Multi-Level Actor
KII 5	Dairy Cow Products VC	Dairy Khoury
KII 6	Poultry Meat and Eggs & Cow Milk VCs	MoA - Directorate of Animal Resources
KII 7	Greenhouse Crops & Table Grapes VC	MoA - Directorate of Plant Resources
KII 8	All VCs	IDAL
KII 9	All VCs	Chamber of Commerce
KII 10	Greenhouse Crops VC	الجمعية التعاونية الأشجار المثمرة والبيوت البلاستيكية في تبنين
KII 11	Table Grapes VC	تعاونية للأشجار المثمرة في قضاء زحلة
KII 12	Poultry (Meat and Eggs) VC	الجمعية التعاونية لتربية الطيور والدواجن وتسويق انتاجها في عيترون
KII 13	Cow Milk VC	تعاونية لإنتاج الحليب في شمال البقاع الأوسط والبقاع الشمالي

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