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# Value-chain analysis for Pomegranates & Derivative Products in Lebanon

Pomegranates, molasses, juice, oil



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Lory Boutchakdjian  
FAIR TRADE LEBANON  
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## Table of Contents

|  |           |
|--|-----------|
| <b>EXECUTIVE SUMMARY .....</b>                                     | <b>4</b>  |
| <b>INTRODUCTION TO THE SUBSECTOR.....</b>                          | <b>5</b>  |
| AIM OF THE STUDY .....   | 5         |
| <b>THE MARKETS.....</b>  | <b>6</b>  |
| THE DOMESTIC MARKET .....  | 6         |
| The domestic market for fresh pomegranates .....                   | 6         |
| The domestic market for pomegranate molasses .....                 | 6         |
| The domestic market for pomegranate juice .....                    | 7         |
| THE EXPORT MARKET .....  | 7         |
| The export market for fresh pomegranates.....                      | 7         |
| The export market for pomegranate molasses .....                   | 8         |
| The export market for pomegranate juice .....                      | 9         |
| The export market for pomegranate oil and pomegranate extract..... | 9         |
| COMPETITION .....  | 10        |
| Worldwide View .....   | 10        |
| Regional competition for fresh pomegranates .....                  | 11        |
| Regional competition for pomegranate molasses .....                | 11        |
| Regional competition for pomegranate juice.....                    | 11        |
| Regional competition for pomegranate oil .....                     | 11        |
| Regional Fair Trade competition .....                              | 11        |
| <b>SUBSECTOR MAP.....</b>  | <b>12</b> |
| VALUE CHAIN MAP .....  | 12        |
| CHANNELS & GOVERNANCE STRUCTURES.....                              | 13        |
| Channel 1—Products marketed before harvest (daman) .....           | 13        |
| Channel 2—Fresh finished Products (fresh pomegranates).....        | 13        |
| Channel 3—Final Products (Pomegranate Molasses...).....            | 13        |
| DISCUSSION BY FUNCTION .....                                       | 13        |
| Production .....   | 13        |
| Input Supplies.....  | 14        |
| Subsector Functions and Participants .....                         | 14        |
| LEVERAGE POINTS .....  | 17        |

|   |           |
|---|-----------|
| Cultivation.....  | 17        |
| Processing.....   | 18        |
| Marketing.....  | 18        |
| <b>SUPPORTING ORGANIZATIONS AND REGULATORY FRAMEWORK.....</b> | <b>19</b> |
| SUPPORTING ORGANIZATIONS.....                                 | 19        |
| LARI.....   | 19        |
| Safadi Foundation.....  | 19        |
| <b>SUBSECTOR DYNAMICS.....</b>                                | <b>19</b> |
| MARKET TRENDS AND DRIVERS.....                                | 19        |
| <b>AUTHOR'S RECOMMENDATIONS.....</b>                          | <b>20</b> |

## **EXECUTIVE SUMMARY**

The world-wide increasing awareness of the nutritional benefits of pomegranates can still be harnessed in the export and domestic markets of Lebanon. Lebanese pomegranate yield barely covers half of the market demand. The majority of the Lebanese production is concentrated on the coastal regions of the North, while the rest is located in the South. In Aakkar, 2,379,026 dunums are planted and 457,714 dunums in Donniyyeh.

Most of the yield is processed into molasses, while the rest is sold at the wholesale market or shops near the village. Fresh pomegranates are marketed mainly by the main players in the fruit and vegetable market. A large percentage of the yield of the North available to the market is purchased by processing companies through traders.

The main marketing problem in the Lebanese fresh pomegranate market is lack of quality vis-a-vis cheaper good quality imported pomegranates, since more than half of the supply is imported from neighboring Syria or Turkey. However, quality can easily be improved to supply the domestic market, since existing varieties are not well selected or well cultivated. Pomegranate orchards are rare, but are rather treated as secondary plantations, planted around other orchards with no special care.

The pomegranate molasses market is dominated by low-quality sugar and preservative added products. The process of production of authentic molasses is mainly limited to households. Proper marketing in this market can focus on the authenticity and purity of the product.

On the export level, the main exporters are India, Turkey, China and Iran. Asia, Dubai and Bangladesh are main importers of soft-seed varieties. Regional competitors for pomegranate exports are Iran, Turkey, Iraq, Azerbaijan, Afghanistan, Uzbekistan and Israel, while main regional exporters of pomegranate juice include Iran, Uzbekistan and Azerbaijan, who sell at low prices. Many countries that have 0% duty rates and no sales tax should be explored: for fresh pomegranates, Bahrain, Kuwait, Oman, Qatar and UAE are potential importer countries. For molasses, France, Sweden, Germany, and England are potential importer countries to be explored further.

On the Fair Trade market, there is minimal competition. Fair trade certified pomegranate products available in the market are restricted to pomegranate flavored tea.

There are many leverage points that can be taken advantage of in the pomegranate markets, the most important of which is the cooperation of farmers, in order to ensure marketing power. The improvement of the pomegranate quality is crucial, by choosing the right varieties to plant, and process, which should be based on the type of final product. Quality is also improved by planting at the right area, at the right altitude. Moreover, irrigation

should be considered when it comes to selling fresh pomegranates; however irrigation costs should be minimized. The quality of molasses can also be improved by choosing rain-fed fruits to minimize boiling and achieve a high shelf-life. Since the domestic market has a large volume of imports, cost control is crucial, especially by taking advantage of all the components of the fruit. On the marketing side of things, certifications such as Fairtrade, organic and TEQ certifications can appeal to a niche market, while focusing on derivative products with interesting niche markets, such as pomegranate juice for the domestic market and pomegranate molasses-olive oil mix for the export market. All marketing activities should be directed towards the health conscious, calorie-conscious and lovers of exotic Mediterranean foods.

## **INTRODUCTION TO THE SUBSECTOR**

### **AIM OF THE STUDY**

This study provides a value chain analysis of pomegranate cultivation in the regions of Aakkar and Donniyyeh of Northern Lebanon. It aims to identify the bottlenecks present in the value chain of pomegranate cultivation and processing that prevent the development of the industry, and the leverage points that can be used to improve the quality of the end-product and enable the production of added-value products that can compete in the regional and international markets.

The study brings to the forefront the state of pomegranate cultivation in Aakkar and Donniyyeh, from varieties present to cultivation techniques used. The supporting organizations, machinery available, processing centers and cooperatives present are also indicated. In addition, this value chain analysis suggests steps for the improvement of cultivation techniques, in addition to ways to improve the processing, packaging and storage activities in order to ensure the production of the highest quality product possible in the context of the designated area.

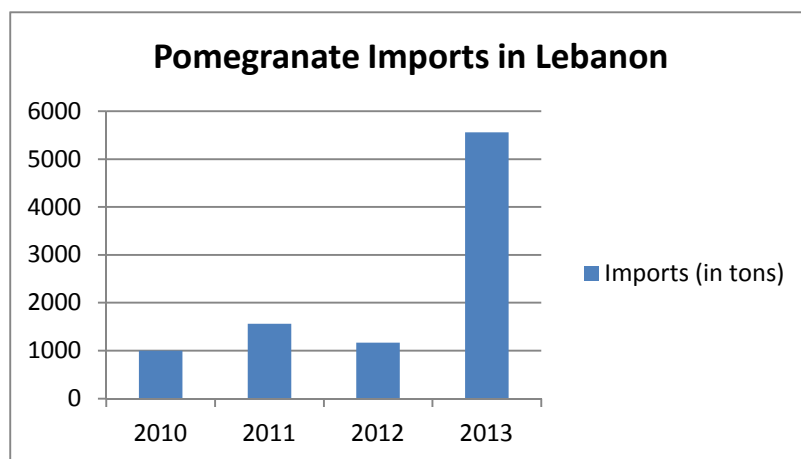
Moreover, this study gives an overview of the marketing activities carried out in Aakkar & Donniyyeh for pomegranates and other products derived from pomegranates, while showing the main actors of the industry in this area, keeping in mind the regulatory framework in which industry operates. It also pinpoints the markets available on the national, regional, and international levels, through an analysis of the evolution of imports and exports in Lebanon and the main importers and exporters of the region and internationally, in order to bring to light the opportunities of marketing the pomegranate products of the Aakkar and Donniyyeh regions.

Finally, the study conducts a financial analysis of the cultivation of pomegranates, and production of pomegranate products in Aakkar & Donniyyeh.

## THE MARKETS

### THE DOMESTIC MARKET

#### The domestic market for fresh pomegranates



In the last 5 years, the pomegranate imports have seen an average of 2321 tons per year. With 736 tons of imports in 2014 recorded until the end of September, it seems that the 2014 figure will be close to the 2012 figure. Therefore the trend in pomegranate imports is rather stable at around 1500 tons per year, with occasional bursts probably due to low domestic production because of weather or pests. According to Lebanese producers, more than half of the pomegranates in the Lebanese market come from abroad, especially Syria.

In 2013, the average value of each imported ton of pomegranates was \$423.3, i.e. 635 LBP per kg. While this price is on the cheaper side, it can be competed with. The price of Lebanese pomegranates at the farm's gate ranges from 600 to 1000 LBP/kg, while imported Syrian pomegranates are worth 450-600 LBP/kg and are of good quality. The prices of pomegranates chosen and sold by traders are higher. At the latest MoA report, in 2012, the prices of sweet pomegranates for instance were as follows: the wholesale prices ranged from 996 to 1498 LBP, while retail prices went from 1454 to 2094 LBP/kg, depending on the quality. In supermarkets, the price reaches 3000 LBP/kg.

#### The domestic market for pomegranate molasses

There are no official trade data for pomegranate molasses; therefore imported quantities are not available to the public. However, the local production available in the domestic market is clear: producers and retailers reveal that the pomegranate molasses market includes an overwhelming quantity of sugar-added products. 3 varieties can be distinguished: the authentic molasses prepared only by cooking the juice (\$10-20/kg), 2<sup>nd</sup> grade sugar-added molasses cooked with the pulp and seeds (with the necessary addition of water) (\$3/kg), and glucose blends with pomegranate essence added and additives like

sulfuric acid, citric acid and glucose (\$1/kg). The problem with the pricing system is that density is not taken into consideration, and therefore quality is not well differentiated.

### **The domestic market for pomegranate juice**

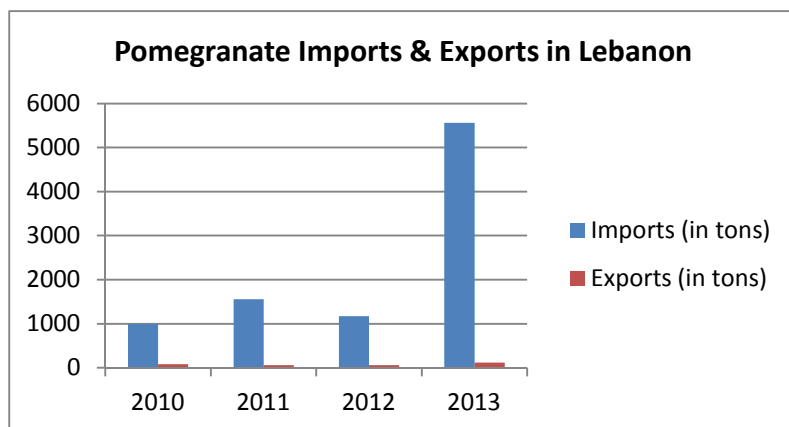
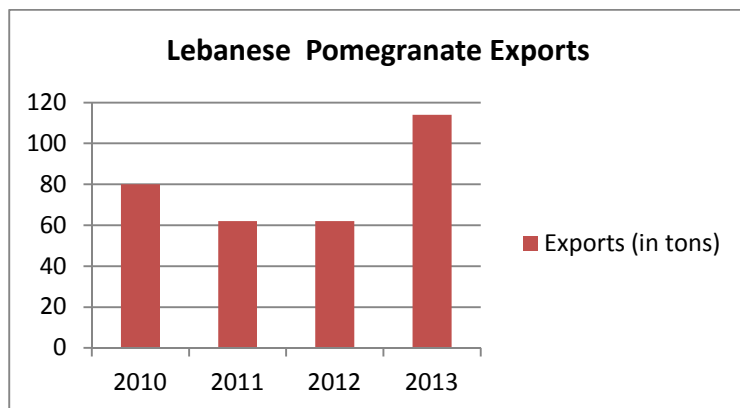
In Lebanon, the increasing awareness of the nutritional benefits of pomegranate is not being fully harnessed by the juice industry. It is mainly offered in a few small fresh juice bars scattered around Beirut. Commercially, there are now only a few juice brands offering pomegranate juice in grocery stores and supermarkets. The major brands such as Maccaw, Uno, x-tra do not offer the pomegranate flavor until now. The only brands available in the market are: the local brands Nadec (5,990 LBP for 1.75 L), Tropicana Slice and imported brands like the American brand Ocean Spray (Cran-Pomegranate juice) and Happy Day by the brand Ranch.

Because of the extremely tart taste of the pure pomegranate juice, other juices are usually added to the mix, like red grape juice, apple juice or cranberry juice. Sugar is also usually added. It seems that the local juice companies do not produce pomegranate juice themselves, but purchase the concentrate and dilute it. Concentrates available in supermarkets are mainly Chtaura Gardens (only the pomegranate aroma is added), Kassatly Chtaura (natural and artificial pomegranate flavor), the Carrefour brand (11,990 LBP for 1.5 L). Only one pomegranate flavored alcoholic drink exists, which is Freeze. On the level of organic grocery stores, Qi juices, specialized in detoxification juices, offers a juice blend called 'Rummantic' that contains pomegranates and other fruits and vegetables.

## **THE EXPORT MARKET**

### **The export market for fresh pomegranates**

Pomegranates have enjoyed a rapid increase in demand in the international marketplace since 2004 thanks to recent discoveries of their high level of anti-oxidants that lead to a reduction of risk of cancer, heart disease and other maladies. Asia for instance has seen a growing demand for 'soft-seed' fresh pomegranates. Asian demand for "soft seed fruit" is likely to remain robust over the near future. American demand for fresh fruit or concentrate has been growing in the last years, however the demand is satisfied by Californian production rather than imports. It is however interesting to explore the markets of Hong Kong, Macau, Bahrain, Kuwait, Oman, Qatar and UAE since these countries have 0% duty rates and no sales tax on fresh pomegranates.



Source: Lebanese Customs, 2014

Compared to the imports of pomegranates, exports are basically non-existent. The average exports in the last 5 years were 83 tons. The average net value of fresh pomegranate exports in the last 5 years was \$1289/ton, i.e. \$1.29/kg. This high price explains the lack of export volume.

### The export market for pomegranate molasses

As mentioned before, there are no official data on trade numbers of pomegranate molasses. However, based on the interviews conducted in Aakkar and elsewhere with important stakeholders, quantities exported are low since the pomegranate yield is low.

Of course, there are some producers who export molasses. Again based on interviews, it seems a large majority of the molasses exports consists of the cheap kind to which sugar is added in order to decrease costs. In fact, one molasses producer and manufacturer of pomegranate molasses equipment estimates that 4/5<sup>th</sup> of the amount of pomegranate molasses sold to the Arab countries (like Dubai) is the cheap, sugar-added version, which is also popular in the Western countries where around 50% of the imports constitute the cheap version. Western countries that import Lebanese pomegranate molasses include France, Sweden, Germany, England and the USA.



### **The export market for pomegranate juice**

Since the peak of demand for pomegranate juice, prices of concentrate juice (65 °Brix) have decreased. Exporters include Iran, Uzbekistan and Azerbaijan, who would sell at low prices, starting from \$4.800/MT. Lower quality juice can be found for \$3.500/MT.

The US was the largest importer of pomegranate juice concentrate in the world. According to Mintel's 'Juice and Juice drinks, US' report, the US juice and juice drink industry was worth \$ 15.5 billion in 2013. However, by increasing its pomegranate production, the company POM wonderful (with a semi-sweet semi-tart taste) is now able to fulfill nearly all the demand of the US market in terms of pomegranate juice.

The growth of demand of pomegranate juice in the European market has stabilized by now, however it is worth mentioning that the average price for a 200 mL of bottled pomegranate juice is sold for €2.5. In Asia, it is interesting to explore the markets of Hong Kong, Macau and Panama, since they have 0% duty rates and no sales tax on pomegranate juice.

### **The export market for pomegranate oil and pomegranate extract**

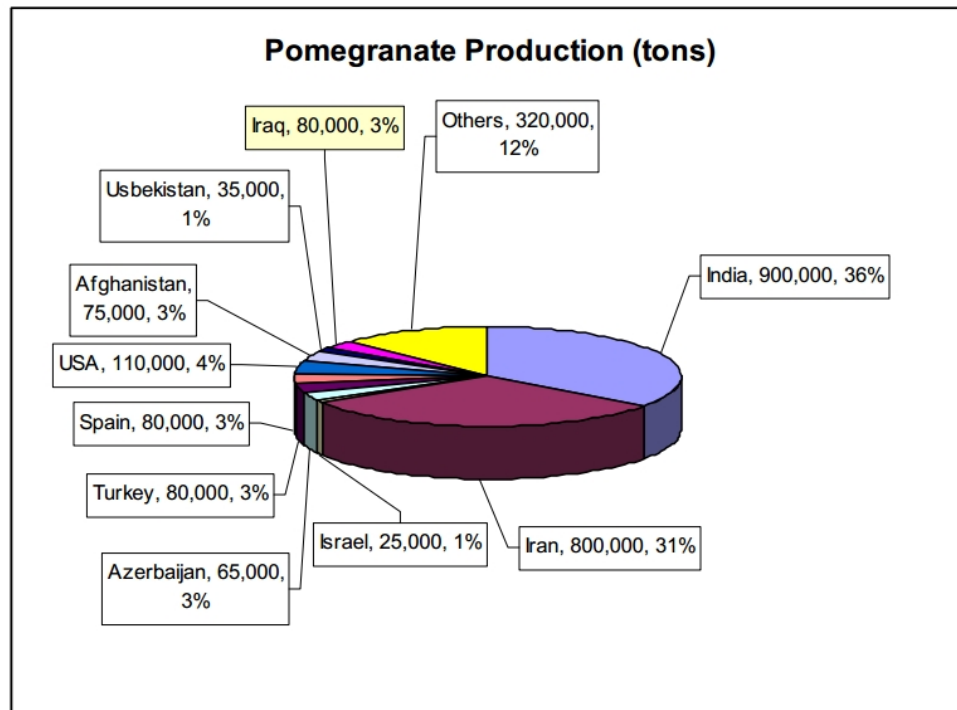
With the increase of awareness about pomegranates' health benefits, its antioxidant properties are being harnessed by both the cosmetic industry and the nutritional supplements industry. Pomegranate oil is used in the cosmetic industry where it is known for benefits including boosting restoration & repair, fighting against free radicals, improving collagen production, helping reverse sun damage and acting as a natural SPF booster. These benefits are used in many cosmetic products, mainly consisting of anti-ageing moisturizers and hair products. Cosmetic brands using pomegranate oil in their formulations are mainly natural cosmetic brands such as Badger, Pai, Weleda, Fushi, Dr. Scheller... in products ranging from body oils to stretch mark creams to hair treatments. Weleda actually has a whole range of pomegranate products.

The pomegranate seed oil is amber in color and has a nutty odor. The pomegranate seed oil's health benefits include: relief from stomach disorders, helps fight depression, heart diseases, reduces risk of cancer development, decreases dental plaque, reduction of symptoms of anemia and decreases the risk of delivering premature babies. Increase of awareness about pomegranate's health benefits has yet to be harnessed fully in the food industry. However, the pharmaceutical industry has caught on with the production of supplements. Pomegranate oil is also used in the nutritional supplements industry, since it can be fit into soft gels. Producers of pomegranate oil include: Verdure Sciences and Arista Industries (Wilton, CT) and PLT health solutions. These same producers offer pomegranate extract products also: Verdure Sciences and Arista Industries produce the POMELLA supplement which is USDA organic, ISO, GMP and kosher certified, while PLT offers the Pomegranate P40p.

It is interesting to note that Guernsey, Hong Kong and San Marino have 0% duty rate for the most favored countries and no sales tax on imported pomegranate oil.

## COMPETITION

### Worldwide View



Source: FAS US – Spain and Iran Pomegranate Boards year 2007

The increase in demand has of course been answered with an increase in supply. World production of pomegranates is now estimated to be more than 1.8 million tons. Due to the investments of POM Wonderful, the USA has expanded its cultivation of fresh pomegranates and pomegranate juice, while Iran and Azerbaijan have increased their capacity in the production of concentrate.

On a global scale, India is the largest producer of pomegranates, with 900,000 MT produced in 2007 alone (36% of world production) and 30,159 exported in 2011-2012. India focuses on exporting fresh table pomegranates to Dubai, which is then re-exported to Asia (Korea, Singapore, Hong Kong, Japan) and Canada. The main market however still remains the UAE with 30,000 tons imported from India in 2011-2012, mainly of the soft-seed varieties (called Ganesh or Ruby, Bhagwa, Mridula, Arakta). The second main market for India is Bangladesh which accounted for 16% of Indian pomegranate exports in 2011-2012, followed by the Netherlands, UK and Saudi Arabia.

Iran competes with India by producing around 31% of the world production (700 KT). The other large producers are: USA (127 KT), Turkey (80 KT), Spain (50KT), Iraq, Azerbaijan, Afghanistan, Uzbekistan and Israel.

The major exporters are Iran, Turkey, India, and China.

### **Regional competition for fresh pomegranates**

At the Middle-Eastern level, important regional producer-countries include world-rank producers such as Iran, Turkey, Iraq, Azerbaijan, Afghanistan, Uzbekistan and Israel. Other regional producers are: Morocco, Armenia and Russia.

Estimated yield per acre is 4 tons in India, 5 tons in Iran, and 5 tons in the US.

### **Regional competition for pomegranate molasses**

As mentioned before, trade statistics are hard to find for such specific products as pomegranate molasses. However, in terms of quality, most of the regional competition provides mostly 2<sup>nd</sup> grade molasses (sugar-added), especially the Turkish and Syrian producers. Producing countries include Turkey, Cyprus, Syria, and Egypt...

### **Regional competition for pomegranate juice**

As mentioned before, main exporters of juice include Iran, Uzbekistan and Azerbaijan, who sell at low prices.

### **Regional competition for pomegranate oil**

The price of pomegranate oil from China or Africa can range from \$20/kg to \$35/kg, however the oils on the cheaper side of this range are usually mixed with cheaper almond oil. The price of authentic pomegranate seed oil is estimate at around \$50/kg. Oil extracted from the skin (lower oil yield) is sold at around \$100/kg.

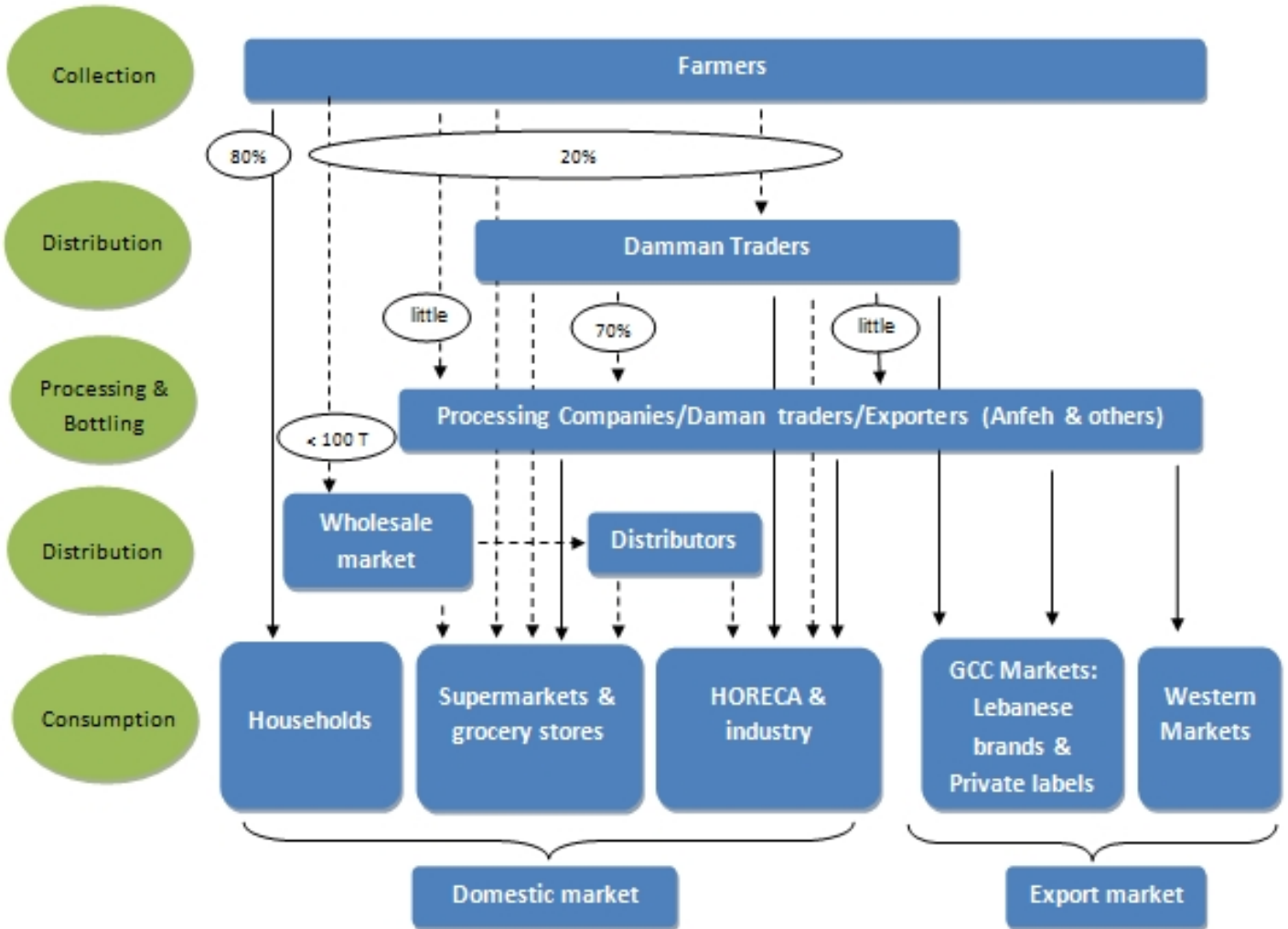
### **Regional Fair Trade competition**

Fair Trade pomegranate products to date are restricted to pomegranate tea like the ones provided by the English Tea Shop, Honest and Bentley's brands. The English Tea Shop is the only brand that uses actual pomegranate pieces (rather than just pomegranate flavor) non fair-trade certified, which can be a potential buyer to be considered. There are also Fair Trade energy drinks like the Fair Trade Pomegranate & Wild Berries by Herbal Magic.

There is no Fairtrade minimum price for pomegranates in Lebanon, and the premium consists of 15% of the commercial price (fresh pomegranates, for processing, for juice, for drying)

SUBSECTOR MAP

VALUE CHAIN MAP



**Legend**

- Pomegranate Molasses
- - -→ Pomegranates

## CHANNELS & GOVERNANCE STRUCTURES

### Channel 1—Products marketed before harvest (daman)

Most of the large food companies like Wadi El Akhdar and Cortas ensure (daman) farmers' pomegranate yield and pay a part of the price beforehand. Wholesalers estimate that around 70% of the pomegranate yield of the North is purchased by processing companies through traders.

### Channel 2—Fresh finished Products (fresh pomegranates)

The Pomegranate yield in Aakkar and Donniyyeh is usually sold in 2 forms: as fresh fruit or as pomegranate molasses. Estimations from farmers and retailers in the area state that around 20% of the yield is marketed in the form of fruit while 80% is processed into molasses. Fresh pomegranates in Aakkar and Donniyyeh are sold to nearby vegetable shops in a period of roughly 15 days. For instance, farmers in Menjez usually sell to small vegetable shops in the nearby village of Kouechra. Of course, some is sold to the wholesale market in Tripoli. Payment is done at delivery.

### Channel 3—Final Products (Pomegranate Molasses...)

The only processed product derived from pomegranates produced in Aakkar and Donniyyeh is molasses. Most of the molasses yield is sold to households in the area.

## DISCUSSION BY FUNCTION

### Production

According to the Ministry of agriculture, the area planted with pomegranates was around 625 hectares in 2009. The area planted, as well as the production quantity, decreased since 2004, when there were 900 hectares producing 12800 tons of the fruit. By 2009, the production quantity decreased to 6900 tons and the area planted to 625 ha. This decrease in yield may be due to the decrease in price: from 1200 LBP/kg in 2008 to 1100 LBP/kg in 2009 to around 900-1000 LBP/kg in 2014.

The majority of the Lebanese production is concentrated on the coastal regions of the North, while the rest is located in the South. In Aakkar, 2,379,026 dunums are dedicated to pomegranates, and 457,714 dunums in Donniyyeh. In these areas, in addition to coastal plantations, pomegranates are also planted at 700-800 m altitudes. Main areas of plantations are: Zgharta, Joumi, Dahr El Shoueir amongst others. The village of Jebrayel yields from 75 to 400 tons yearly, depending on the season. The village of Menjez has around 2000 trees, 1050 of which are sweet-tart (لّفان).

The main varieties grown in Aakkar and Donniyyeh are known under simple names like tart (حامض), sweet (حلو), and sweet-tart (لفان). The tart variety is the old local variety used for molasses. The Meliss version of the tart variety is smooth but has a lot of seeds. The sweet and sweet-tart varieties are suitable for eating raw. The sweet-tart variety's molasses have a smooth taste. The sweet varieties can be differentiated between Lajouji, Bardi and Normal (حلو عادي). The first 2 are the best kinds, while the latter has a lot of seeds and is suitable for juice. Farmers and retailers estimate the yield is distributed in the following way: 50% is of the sweet-tart variety, 35% of the tart variety and 15% of the sweet variety.

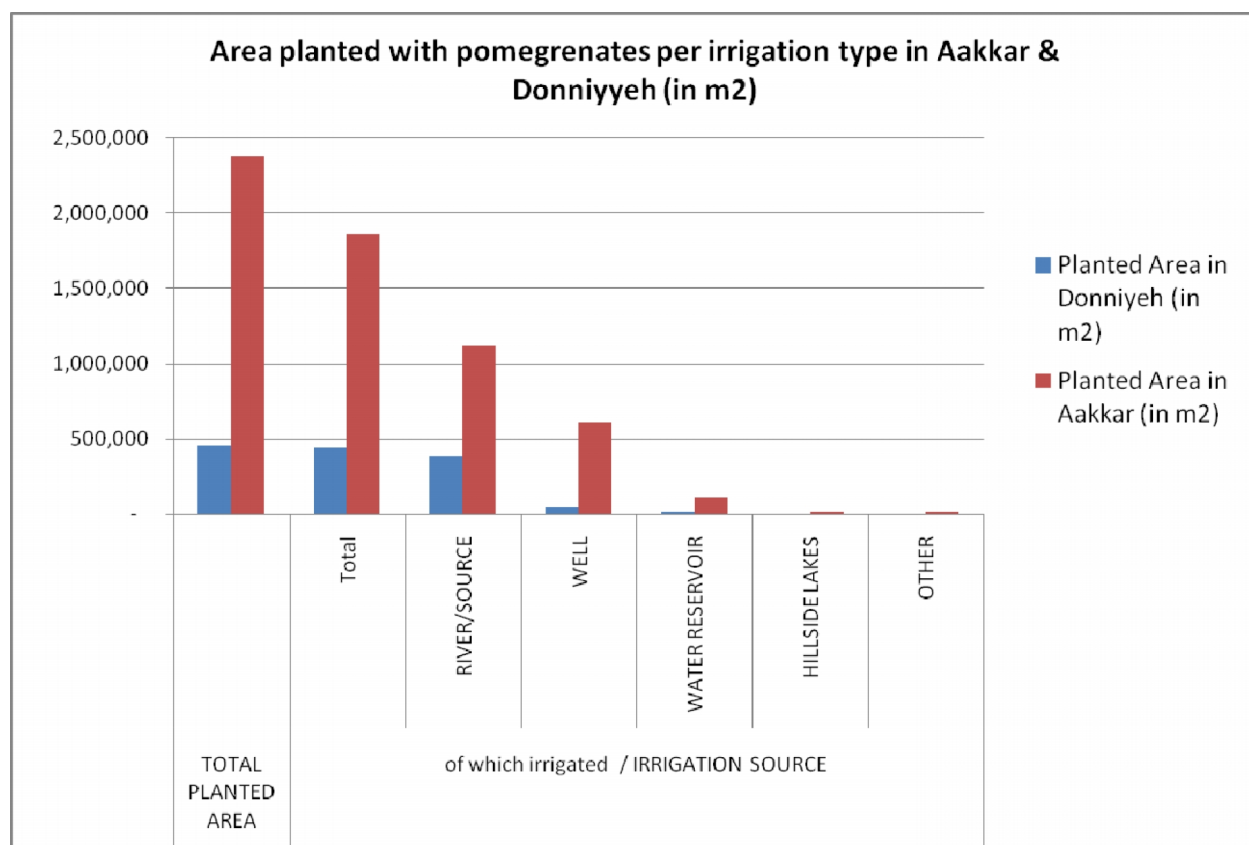
### **Input Supplies**

Although pomegranate trees are rarely irrigated in Lebanon, seedlings need a lot of irrigation for adequate growth. The trees take 3 years to give their first yield, while trees that are 5 years old are considered large enough to provide an adequate quantity of fruits. According to the farmers of the agricultural cooperative in Menjez, the optimal irrigation frequency is once per month. Others recommend irrigating every 7-10 days with 90 Liters. Over irrigation leads to the fruit cracking open.

### **Subsector Functions and Participants**

#### **Cultivation:**

Rather than seeing orchards of pomegranate trees, Aakkar and Donniyyeh, as Lebanon in general, witness trees planted around an orchard of another crop, as a protective shield or in empty spaces in the grove. Other rural households have a couple of trees in their garden, only enough to satisfy their own needs. Usually no care is taken of the trees, which require minimal work.



Source: MoA, 2010

| Region    | Irrigation Type       |                      |              |         |                 |                |        |
|-----------|-----------------------|----------------------|--------------|---------|-----------------|----------------|--------|
|           | Total Cultivated Area | Total Irrigated Area | River/source | Well    | Water Reservoir | Hillside Lakes | Other  |
| Aakkar    | 2,379,026             | 1,862,409            | 1,114,400    | 612,410 | 113,249         | 11,150         | 11,200 |
| Donniyyeh | 457,714               | 439,106              | 385,396      | 40,860  | 11,550          | 100            | 1,200  |

In Aakkar, 78% of the pomegranate cultivations are irrigated. Around 60% of the irrigated areas are done so by a river or a source. In Donniyyeh, 86% of the trees are irrigated. 88% of the irrigated areas are irrigated by a river or a water source.

When it comes to altitude, the optimal altitude for good quality pomegranates is less than 200 meters, since warmth is essential. However, cultivations range from 450 meters to 600 meters. Lands at 700-800 meters are also planted, but have lower yields. The best period for planting is in the beginning of February. The flowering period happens in April and May.

The spacing between trees in Aakkar is 3m on average, but inside the field, the spacing is usually 5m to allow easy access for machinery.

The yield per tree in Aakkar ranges from 30 to 150 kg, according to age and rainfall. On average a young tree produces around 25 kg, while a tree of

more than 6 years yields 40-50 kg. Older trees provide on average 50 to 75 kg while very large trees can yield between 100 and 150 kg.

#### Collection:

The harvesting period is around September and October. It can also extend until December. The cost of harvesting is around 108 LBP/kg.

#### Processing Techniques

The process of molasses production is mainly limited to households. Manually, the top part of the fruit is removed, then it is cut in the middle, then the top is tapped with a tool until all seeds have dropped. Each household uses its own kitchen equipment to extract the juice and boil it until it is transformed into molasses.

In a commercial setting, pomegranates are washed in a machine that cuts them into 4 pieces, then separates the contents and yields 2 by-products: the skin and a mixture of water and solids, which is then juiced yielding the juice and a mixture of seeds and pulp. The juice is then cooked. Then preservatives may be added (Citric acid and starch), then filled in a bottle, cooled and then vacuum-packed.

If the processor wishes to use the entire fruit, it is possible to produce seed oil by using another machine to separate the seed and the pulp. Then the seeds are dried with hot air until the humidity level reaches 7.5-7.85%. Afterwards, the seeds are sun-dried before being pressed. The by-product is the dry-matter: it contains vitamin A and can therefore be used as animal feed or as a substitute for baking powder.

On average, the fruit weighs from 0.5 to 1 kg. The overall rate of conversion from fruit to molasses is 4-8% depending on the water content of the fruit. In commercial production, where sugar, starch, salt and preservatives may be added, this rate may go up to 10%.

When it comes to the production of seed oil, the rate of conversion from fruit to seeds is 0.9% (500 tons of pomegranates yield 4.5 tons of seeds). The seed oil extraction rate ranges from 12 to 16%, depending on the machinery used.

#### Packaging

In terms of packaging, molasses are usually vacuum-packed (which increases shelf –life) in standard size bottles of 500 mL, then packed in a box with paper lining.

#### Growers

The main large scale pomegranate growers in Lebanon, let alone in Aakkar & Donniyeh cannot reach a 2 digit number. Some growers worth mentioning are: Joseph Min'im (منعم) in Anfeh who produces around 400 tons,



Abou Hamid (ابو حميد) located in Zgharta who produces around 200 tons yearly, and A. Farah in Jebrayel who produces from 4-12 tons depending on the season (300 trees). Min'im is a processor and a marketer also: he produces molasses that he sells mainly abroad and to large companies in Lebanon, exports the pulp and sells the rest in the local market. Farah sells part of the produce as is and part of it in the form of molasses.

### Processors/Marketers/Exporters

Fresh pomegranates are marketed mainly by the main players in the fruit and vegetable market, like Dakkash, Berrofarm, Abi Semaan...

In terms of processing companies in the North, there are many pomegranate molasses processing companies in Anfeh, in Chekka. The majority of the Northern pomegranate yield available to the market (as opposed to auto-consumption at the household level) is purchased by these processing companies, like Wadi Al Akhdar and Cortas, that export a large part of their molasses yield.

In terms of cooperatives, the cooperatives in Aakkar and Donniyeh that produce molasses include: the cooperative for agriculture and processing in Akkar and Donniyeh (الجمعية التعاونية للتصنيع والانتاج الزراعي في عكار والضنية) founded by the Safadi foundation, the cooperatives of Tekrit (الجمعية التعاونية الزراعية الإنتاجية - تكريت), Fneideq and Ain Yaaqoub. The cooperative of Aakkar and Donniyeh is seeing an increase in demand: in 2013, it purchases 15 tons of pomegranates from farmers, while in 2014 it was able to purchase 20-25 tons.

### Storage

The optimal storage temperature for fresh pomegranates is 10-15 C. Lower temperatures dry the fruit out. The fruit can last up to 1 year at room temperature, granted it does not have any bruises or disease. Authentic pomegranate molasses on the other hand can last for up to 3 years in room temperature, if all water is removed well. It is not advisable to leave molasses in the open air, which leads to oxidization and a change of color to black. For commercial production, large processing companies may add preservatives such as sulfuric acid, citric acid and glucose to increase the shelf-life.

## LEVERAGE POINTS

### **Cultivation**

As a subtropical fruit, pomegranates in Lebanon are best planted at altitudes less than 200 meters, and this is where plantation projects should focus in order to ensure the best quality possible. It is also recommended to explore the potential of planting varieties of soft-seed sweet pomegranates, which are better for eating raw or juicing. The varieties called Lajouji, Bardi and Sweet

Regular (حلو عادي) are already present in Lebanon, however in small quantities. Their expansion will yield new opportunities for marketing both in the domestic market and the export market.

As it is the case for most crops, water is a main issue for pomegranate yield. In seasons with lower rainfall levels, the yield can decrease by as much as 40%. For this reason, better irrigation systems are necessary to ensure a stable sustainable yield level.

### **Processing**

In terms of processing into molasses, it is best to choose rain fed or barely irrigated pomegranates, since the yield of molasses would be higher, given the fact that water is boiled and evaporates during processing. Also, the initial lack of water makes for molasses with better quality, since it is boiled for a shorter span of time and a longer shelf-life. The color of the molasses can be used as an indicator for the quality: the redder, the better.

For pomegranate juice processing, it is best to choose sweet pomegranates, and only use the arils for juicing. Pomegranate juice seems to be a growing market in Lebanon. While in industrial settings, the pomegranate fruit is squeezed as a whole, which produces a harsh-tasting juice, squeezing the juice from the arils creates a milder taste, which can be used as a tool of differentiation from other pomegranate juices sold in the market.

Pomegranate processing should be extended to make use of all the components of the fruit: the arils can be processed into juice and molasses, the seeds and skin into oil and the pulp or skin into compost or animal feed.

### **Marketing**

In terms of marketing, the pomegranate juice domestic market remains unexplored: proper marketing directed towards a health-conscious niche market, and also a market of dieters through correct marketing focusing on health benefits: without added sugar, preservatives or coloring. The taste of grape juice complements very well that of pomegranate juice, and its addition eliminates the harsh tart flavor of pure pomegranate juice. Alternately, the oversupply of apples in Aakkar can also be used through the addition of apple juice to the pomegranate juice, which can create a very tasty mixture. Providing freshly made pomegranate juice mixtures in specialized shops would make use of the widespread knowledge of its nutritional benefits, and resonate well with an existing niche health-conscious market.

Fresh Pomegranates can also be value-added by receiving the Fairtrade or TEQ certifications. The Fairtrade certification does not impose a minimum price, but sets a premium of 15%, therefore their prices can still remain competitive.

Organic certification is also easily achievable because of the more or less organic way of pomegranate cultivation in Lebanon.

## **SUPPORTING ORGANIZATIONS AND REGULATORY FRAMEWORK**

### **SUPPORTING ORGANIZATIONS**

#### **LARI**

According to LARI's website, there is a LARI station at Kfar Chakhna, which is in charge of providing advisory services for the farmers, culture improvement at the cazas of Zgharta and Koura. They also indicate that there is a project envisaging to establish a pomegranate mother plot for propagation.

#### **Safadi Foundation**

As mentioned before, the Safadi foundation has founded a cooperative in Aakkar and Donniyyeh under its patronage and produces a small amount of pomegranate molasses. It has the equipment necessary for the processing activities.

## **SUBSECTOR DYNAMICS**

### **MARKET TRENDS AND DRIVERS**

It is well-known fact that the consumer markets worldwide have been increasingly more aware of the nutritional benefits of pomegranates on their health.

According to Euromonitor International, a London-based consumer research company, the juice market in the USA is a strong one but it is a market that has been in decline since 2011, when it recorded a 2% drop, while fruit juices and drinks declined by 4% in 2012. However, this market is witnessing a trend in more innovative and nontraditional juice blends, according to Beverage Marketing. Interest in vegetable juice and vegetable/fruit juice blends has increased as consumers become increasingly health and calorie conscious. This sector has recovered from the recession and has seen growth in the USA since 2006. The addition of spices to juice blends has also become a way to innovate in the juice industry.

Another trend that can be taken advantage of is the increased interest in the pomegranate molasses-olive oil mix. This quality product puts the Mediterranean heritage into the forefront. In fact, this product was first marketed in Lebanon by Zejd, the manager of which affirms it is doing very well in foreign markets. While this mix is common and banal in Lebanon, it is considered as an innovation abroad. An alternative packaging consisting of a spray bottle can cater to a market of calorie-counters.

## AUTHOR'S RECOMMENDATIONS

The author suggests the following actions:

- Strengthening the farmers' network by encouraging cooperation
- Choosing the right varieties for cultivation according to the product to be marketed (such as the sweet soft-seed varieties for fresh consumption)
- Improving the quality of pomegranates through the choosing the right attitude for cultivation, choosing the type of irrigation needed according to the product to be marketed
- Improve the quality of the molasses to achieve a red color (control boiling time...)
- Working on cost reduction and control by taking advantage of all the components of the fruit
- Getting certifications, such as organic, Fairtrade and TEQ certifications to widen chances of achieving higher sales
- Improving marketing of derivative products with interesting niche markets: explore pomegranate juice for the domestic market, potentially fresh juice shops offering pomegranate juice mixes, and explore pomegranate molasses-olive oil mix for the export market...
- Upscale marketing through appealing to the health conscious, calorie-conscious and lovers of exotic Mediterranean foods. Advertise 'no sugar added, no preservatives, no coloring'

## Income Statement (in LBP)

### POMEGRANATE PRODUCTION (for 10 dunums=1 ha)/ Good Season

|                        |       |
|------------------------|-------|
| Yield per tree (in kg) | 30    |
| Area/tree (in m2)      | 15    |
| Yield/area (in kg/m2)  | 2     |
| Land Area (in ha)      | 1     |
| Total yield (in kg)    | 20000 |

|                        |        |
|------------------------|--------|
| Sales Price per kg     | 600.00 |
| Harvesting cost per kg | 108    |

**Investment Costs**

|                                   |           |
|-----------------------------------|-----------|
| Drip Irrigation Installation Cost | 1,950,000 |
|-----------------------------------|-----------|

#### Revenue (LBP)/ 10 dunums 2014

|                                     |            |
|-------------------------------------|------------|
| Sales revenue                       | 12,000,000 |
| (Less sales returns and allowances) | -          |
| Service revenue                     | -          |
| Interest revenue                    | -          |
| Other revenue                       | -          |

#### Total Revenues 12,000,000

#### Expenses (LBP)/ 10 dunums 2014

|                                      |           |
|--------------------------------------|-----------|
| Ploughing (once or twice per season) | 100,000   |
| Pruning                              | -         |
| Pesticides Application               | 50,000    |
| Fertilizers cost                     | 50,000    |
| Harvesting Cost (Manual)             | 2,160,000 |
| Irrigation                           | -         |
| Packaging - Gallons                  | -         |
| Labelling Expenses                   | -         |
| Advertising Expenses                 | -         |
| Rent of Land                         | 3,500,000 |

#### Total Expenses 5,860,000

|                          |           |
|--------------------------|-----------|
| Net Income Before Taxes  | 6,140,000 |
| Income tax expense (15%) | -         |

#### Income from Continuing Operations 6,140,000

#### Below-the-Line Items/ 10 dunums 2014

|                                     |   |
|-------------------------------------|---|
| Income from discontinued operations | - |
| Effect of accounting changes        | - |
| Extraordinary items                 | - |

#### Gross Profit 6,140,000

#### Gross Profit Margin 51%