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Comparative Advantages of Orange

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Foreword

The Syrian economy is gradually going through in-depth transformations for the last decade with an increasing exposure to international competition. The agro-industrial sector has a critical role in this transformation due to its contribution to the GDP, employment and its potential for diversifying sources of foreign currencies earning through exportations increase. However, this transformation poses a number of challenges in particular for several strategic crops that have benefited, or are benefiting, from various levels of trade protection and government support. To what extent these crops and their related agro-industries will be able to adjust to an open economic environment? Concurrently, for other crops that have not benefited from any particular public support during the past decades, the larger integration of the Syrian Economy in the world market may provide new opportunities for expansion. However, in this case also, their actual potential for competing with other countries exporting similar products remains an issue.

Policy makers need a comprehensive assessment of the potential impact of possible policy changes on the economic viability of these commodities. This assessment will assist policy makers in formulating the most relevant and adapted policies required to facilitate the adjustment of the agro-industrial sector and to anticipate and control any potential drawbacks on population welfare.

To this end the National Agricultural Policy Centre (NAPC), with the assistance of the FAO and the Government of Italy, has carried out, a systematic review of the comparative advantage of selected agricultural commodities (cotton, wheat, olive, tomato, orange and livestock) , the Comparative Advantage Study (CAS), in order to provide the necessary information base for decision making.

This report presents the results for fresh orange and concentrate's orange, while the results for the other commodities have been published in separate similar commodity reports that are available from the NAPC. A synthesis has been produced putting in perspective the status of each commodity where the methodology applied and presented in details.

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Executive Summary

This study focuses on the comparative advantage of fresh orange and juice concentrate. Therefore, after analyzing and making sensitivity analysis of the data, the results were as the following:

Fresh orange

There are three main systems according to water sources, which are public net irrigation scheme, well by flood way, and well drip. The main destination of packaging fresh orange was gulf countries. Besides, there are many attempts to inter European market by either sea or land. The results illustrate that there was a substantial comparative advantage in packaging fresh orange for regional and world markets.

Concentrate

According to surveys and interviews with owners of processing companies, all companies didn't work with their normal capacity since there is no sufficient supply of orange to be processed because Syrian farms include various types of citrus (mixed) of different size and quality. Consequently, Syria has no comparative advantage in orange concentrate under current capacity and no competitiveness in the world market because the private price of one ton of concentrate produced locally was about 2000 USD, while the world price varied from1000 to1200 USD.

 Furthermore, during the analysis it's assumed that companies are working under normal capacity where there is adequate specified juice orange for making concentrate. As a result, Syria has comparative advantage in concentrate under normal capacity.

Chapter 1 – Background and Justification of the research

The share of national citrus production accounts for about 2.3 % of the agricultural production and 0.6 % of GDP. It is considered a product with an increasing export potential. Citrus area accounts for 21% of the national irrigated area under fruit trees and in some governorates such as Lattakia and Tartous where the irrigated area of citrus accounts respectively for about 92% and 77% of the total irrigated area under fruit trees. In the same governorates in 2002, the total production of irrigated citrus was 97% and 89% of total production of citrus. Besides, there is a remarkable expansion in the demand for citrus (15-20 thousand tons/year) especially orange which requires diversifying production according to the demand. This has boosted the total production of citrus for local consumption transferring the country to a self-sufficient, denoted with excess supply, and export oriented situation which in turn has promoted exploring new international markets to market the excess supply leading to an improvement in the income of producers.

Nowadays, Syria tries to sign an Association Agreement with the European Union to have a better access to European markets, and to gradually liberalize its economy. Therefore, it is necessary to assess to what extent the Syrian orange commodity chain has a comparative advantage taking into account the various current and potential export destinations (Middle East and European countries) in order to diversify and increase the sources of foreign currency. The study also aims at identifying the gains or losses that can be obtained in terms of comparative advantages by developing new line of product such as orange concentrate.

1.1. Applied policies

This section presents the applied policies until 2003. In 1981, the Council of Ministers released the decision no 1466, on 4/8/1981, stating that orange import is banned or restricted to the General Establishment for Fruit and Vegetables according to the agricultural calendar agreed upon among the Arab Free Trade Area(AFTA) Agreement countries. In 1987, the government released the decision on the ban of the import of citrus seedlings. to respond to the needs of the Ministry of Agriculture and Citrus Board which are responsible for supplying of citrus seedlings. Thus, there was a promotion of citrus production because the price of citrus seedlings in public nurseries was 12-15 SP/ seedling against 50 SP /seedling in the private ones. Furthermore, since 1992 the government has been concerned to use the biological control to have citrus products free of residue effects. Also, since 1998, traders has the permission to trade the vegetables and fruits according to the Agriculture Calendar of AFTA with a tariff reduction of 5%, 10% and 20% in the last years before the full implementation of AFTA agreement. The full implementation was early 2005.

Many official actions and facilities related to Syrian export promotion were issued as the following:

1. Legislative Decree no. 15 on the third of July 2001 issued that all kind of exports (agricultural or non agricultural goods) are excluded of agricultural production tax and income tax of profit. Moreover, Ministry of economy issued decree no. 1100 on July 15, 2003, which eliminated the obligation to finance import through export earnings stipulating the following:

   - Regulations related to the repayment of the value of imports from foreign exchange earning from exports are eliminated;

   - Exporters have the right to keep 100 % of hard currency earning from exported vegetables and fruits, or they are allowed to retain their exports' earnings as well as to use them either by selling them to the Syrian commercial bank at the *neighboring countries' exchange rate for non-commercial transactions*, or cover the value of imports or sell them to other dealers through the commercial Syrian bank.

2. Furthermore, there are many facilities that are given to exporters for enhancing and encouraging the industrial sector and to reducing the transportation cost such as legislative Decree no 48 of August 4, 1998 that includes joining Syria to the Transit International Agreement (TIR). As a result, fees on Syrian trucks and frozen truck have decreased leading to a reduction of the transportation cost of exported vegetables and fruits.

3. Ministry of Transportation issued generalization no. 17854 of September 24, 2001, which illustrated that Turkish trucks are permitted to enter Syrian land to ship Syrian vegetable and fruit to Western Europe Countries.

4. Ministry of Economy and Foreign Trade issued decision no. 672 of May 18, 2002, which illustrates that all private importers are allowed to import used freezing cars and trailers either from original or non original country under some conditions like year of head manufacturing is not exceeding 5 years (including the year of manufacturing). Imported used freezing trailer should be as one join unit (head of engine with its body). Values of imported used freezing trailer were paid from hard currency earning from exportation vegetable and fruits.

5. Private exporters of vegetables and fruits are allowed to import used lines of packing and waxing, stipulated that manufacturing year is not exceeding 4 years. Export is opened to private exporters. Indeed exported agricultural products, with their containers, are exempted from taxes. Furthermore, exporters are compelled to put labels on exported products explaining product characteristics, name of the company, and the address of the factory. In addition, exporters are committed to declare that all the exported products are controlled according to the standard characteristics in destination countries.

6. Import taxes are imposed on imported orange concentrates (29% for the concentrate of orange juice used for the industry and 102% for the concentrate used for orange juice).

1.2. The place of the product in agriculture

Importance of the citrus sector

In 2002, the share of agricultural sector was about 26 % of net domestic product at 2000 constant prices. The share of plant production is about 67 % of agricultural production at 2000 constant prices. During the last decade, the importance of vegetables and fruit trees has been increasing remarkably. The shares of vegetables and fruit trees are 5.8 % and 18 % of the agricultural production at 2000 constant prices, respectively.

Moreover, there has been a remarkable development in the citrus sector in Syria. The share of national citrus production accounts for 11.4 % of fruit trees, 2.3 % of agricultural production,

and 0.6 % of Gross Domestic Product (GDP)[1]. Indeed, during the seventies Syria didn't have enough quantities of citrus for local consumption. Where, the total orange production was very limited and accounted for 3,868 ton in 1970. So Syria has imported all its needs of citrus. But, during the last decade, the orange production has been increasing, e.g. in 2002 the total quantity of produced orange was 427,148 ton as a result of increasing the cultivated area; developing the irrigation methods; using the biological pest control; introducing the high quality varieties from abroad that replaced local varieties; producing the seedling without any virus in the citrus Board; and supplying the stocks that resist the Malsico illness. As consequence, the production and returns are increasing and there is expanding in fruit's supplies for both local consumption and export, which has made the country self- sufficient and transferred it from an imported to an exported country.

Annual domestic consumption

In 2002, the total production of citrus was 746,148 ton, of which 10 % (74,615 tons) is delivered to juice companies to process concentrate and 5 % (38,365 tons) is exported. Assuming losses of 5% (harvesting and transport), the volume of the domestic market for fresh orange is estimated at 601,510 tons. Thus, the per capita annual consumption of citrus amounted to 35 kg.

Development of orange production (area & yield)

Figure 1.1 and 1.2 illustrate the development of the area planted, number of fruit bearing and young orange trees, and orange production on the national level during the last three decades.

Figure 1.1. Evolution of fruit bearing, young trees and orange production, 1970-2002
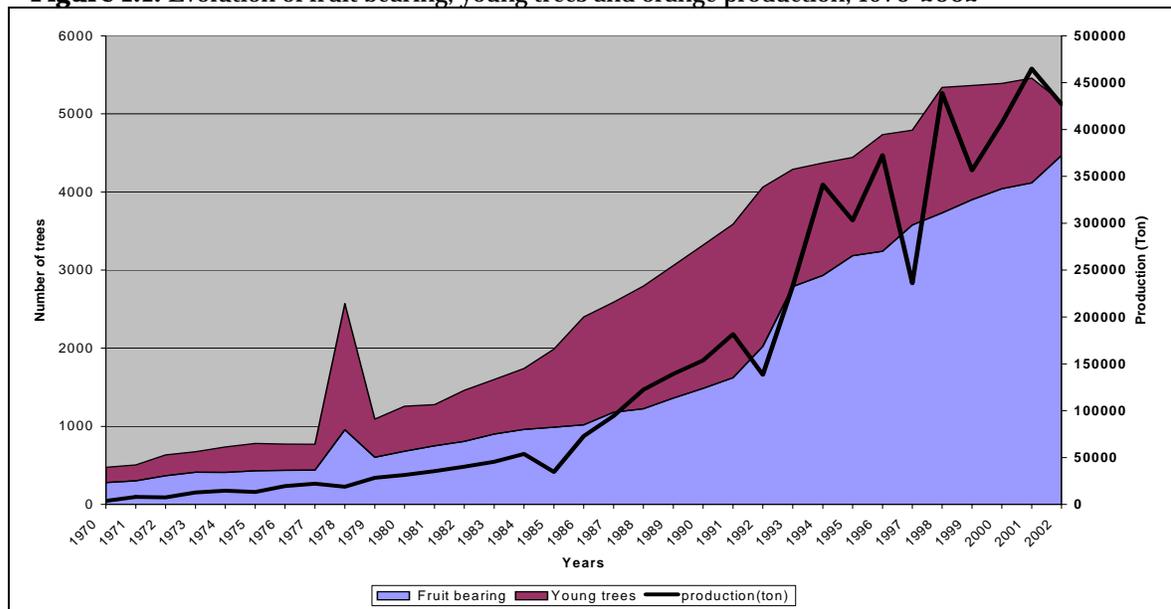
Source: NAPC database.

For example, in 1970 the total orange area was only 1,208 ha and the total number of orange trees was 475 thousands, out of which 280 thousands were fruit bearing, 41 % was young trees not entered the full production phase and 59% was in full production stage. So the total production was very limited (3,868 tons). In contrast, in 2002 the total orange area became 15,259 ha, and the total number of orange trees was 5,155 thousands, out of which 4,467 thousands were fruit bearing, 13 % was not in full production phase and 87 % was in full

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[1] Central Bureau of Statistics (CBS), Statistical Abstract 2003.

production stage. The total orange production was 427,148 tons, while the total citrus production was 746,148 tons.

Figure 1.2. Evolution of the planted area under orange, 1970-2002
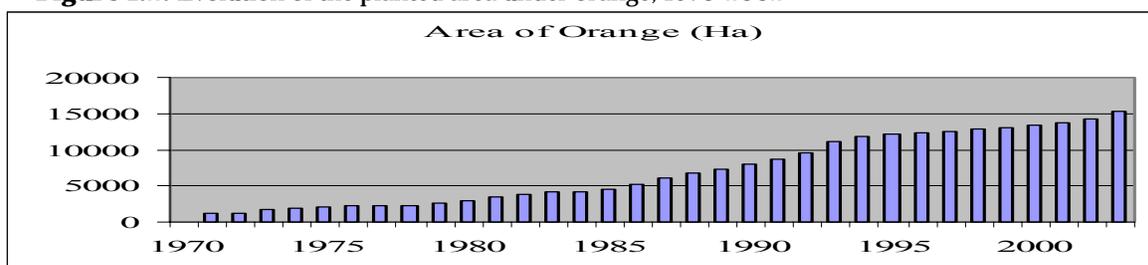
Source: NAPC database.

Ministry of Agriculture promotes planting of orange by introducing new and high yielding varieties, providing high quality and cheap seedlings, conducting land reclamation programs; providing long - run credits, enhancing new technical methods of planting and irrigation and implementing the Integrated Pest Management programs (IPM).

Production, export, and import of fresh orange

Citrus production concentrates in Mediterranean Region and North, Central and South America. Table 1.1 illustrates that the total production of orange in the world was 63 million tons in 2002. The highest orange production was in Brazil (29% of world production), USA (18%), China and Mexico (6 %), Spain (5%), Italy (3%), Egypt (3%) and Turkey (2%). Syrian orange production is still very limited compared to the world production accounting for only 0.7%.

Table 1.1. The production of orange in the world, 2002 (ton)

Syrian Arab Republic	427,148
Australia	437,000
Vietnam	441,800
Indonesia	664,312
Morocco	723,100
Argentina	780,000
South Africa	1,082,330
Turkey	1,160,000
Greece	1,164,508
Pakistan	1,400,000
Italy	1,723,630
Egypt	1,725,000
Iran Islamic Republic	1,880,000
Spain	2,867,100
India	2,980,000
China	3,742,681
Mexico	3,843,960
United States of America	11,225,500
Brazil	18,446,900
World	**63,380,657**

Source: FAO Stat/database.

During the 1970's Syria didn't have enough quantities of citrus for local consumption because of the very limited orange production. Therefore, the excess demand for citrus was covered through import (figure 1.3). Noticeably, in the eighties citrus production increased substantially following the increase in the demand for citrus in the local market giving opportunity for citrus exporters to make high profits. As a result in the early nineties, there was an enormous

expansion in the orange production. Thus, in 2002, the total exported quantity of orange was 26, 483 tons valued 494, 905 thousand SP. But, this exported quantity accounts only for 0.6 % of total world exports, The shares of other orange exporting countries are 31.5% for Spain, 11.7% for USA, 4.9% for Morocco, 3.2% for Turkey, 2.9% for Australia, 2.7% for Italy and Egypt, and 0.9% for Brazil (FAOSTAT /2002).

Figure 1.3. Total quantities of exported & imported orange in Syria, 1979-2001
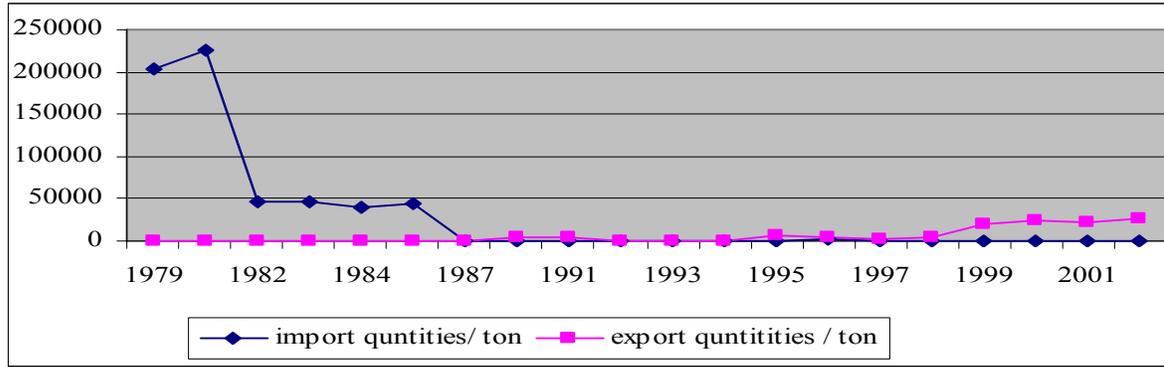
Source: FAOSTAT

Table 1.2 below shows the exported quantities and their shares in total export according to citrus type in 2002, where orange has the highest share and lemon the lowest.

Table 1.2. The amounts and shares of exported citrus varieties, 2002

Type	Exported quantity ton	Share %
Orange	26,483	69
Mandarin	9,087	24
grape fruit	2,071	5
Lemon	724	2
Total citrus	38,365	100

Source: Central Bureau of Statistics /2002

Main destinations of orange trade

Table 1.3 illustrates the total Syrian quantities of exported oranges and their values in 2002 according to the target country. It's clear that the largest share of exported oranges was to Jordan (38%), Saudi Arabia (35%), Kuwait (9 %), and United Arab Emirate (7%). These high shares are due to that these markets:

- don't require very high quality and uniform oranges;
- don't require forward contracts;
- allow mixed shipments of oranges and vegetables on the same truck;
- are not subject to substantial price fluctuations; and
- are flexible concerning the exported quantities of oranges.

On the contrary, limited orange quantity was exported to the world market such as the European Union (0.02 %), United Germany (0.08 %), Japan (0.01 %), Bulgaria (0.07 %), Turkey (0.13 %), and Romania (0.01 %)[2]. This limitation due to the large competition of other

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[2] FAO STAT 2002.

countries like Turkish that considered the largest competitor, standard characteristics that has to be existed in exported product, large distances between Syria and those countries, high transportation cost includes high fee to pass neighboring countries .

Table 1.3. Quantities and values of exported Syrian orange, 2002

Destination country	Quantity (ton)	Value (000SP)
Jordan	10,044	189,860
Saudi Arabia	9,366	174,185
Kuwait	2,446	45,057
United Arab Emirate (UAE)	1,782	33,379
Qatar	1,584	28,713
Oman	601	11,381
Bahrain	478	8,651
Egypt	79	1,497
Holland	44	803
Turkey	36	679
United Germany	21	382
Bulgaria	17	314
Lebanon	10	203
European Union	6	108
United Kingdom	4	204
Sudan	3	94
Japan	3	62
Romania	1	32
Afghanistan	1	14

Source: FAOSTAT/database

The general objective of this study is assessing the comparative advantage and the efficiency of using the country's domestic resources to produce oranges and process them to orange concentrate, the effects of trade globalization, and the constraints and challenges facing the Syrian Agricultural Export of oranges.

Chapter 2- Description of the Commodity System

Figure 2.1 gives an overview about the orange commodity system.

Figure 2.1. The orange commodity system, 2002
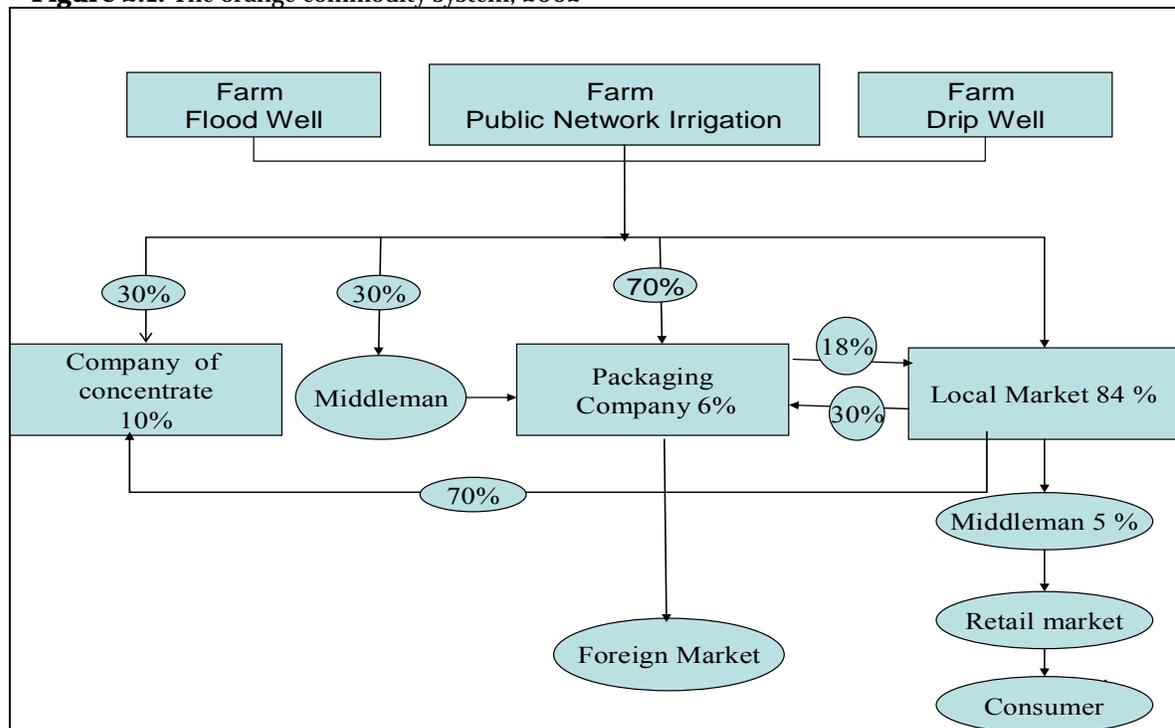
Source: Author elaboration.

2.1. Description of the main cropping systems

Location of citrus production

Citrus production concentrates mainly in Coastal Region, especially in Lattakia and Tartous Governorates. In 2002, the share of irrigated orange area in these two governorates is 82% and 17% of total irrigated orange area respectively, and of irrigated orange production is 81% and 17% respectively. Besides, the other governorates produce orange in small amounts (figure 2.2).

Figure 2.2. Distribution of orange area by Governorate, 2002

Distrupution of Orange by Governorate
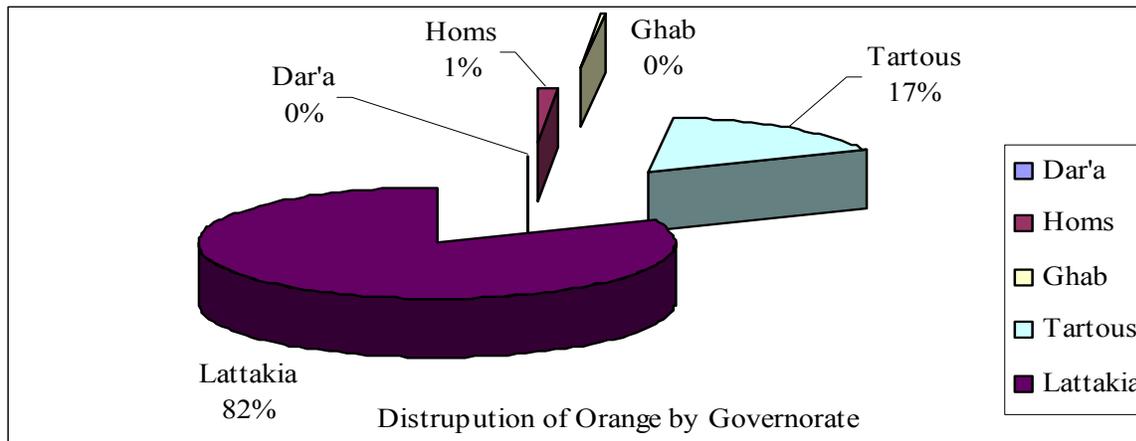
Types and varieties of citrus

According to the information from Citrus Board, in Lattakia in 2002, the total citrus area was 28,211 ha, the number of citrus trees was 10 million trees, and the average yield is 97 Kg/tree or 35 ton/ha.

Citrus in Syria is considered very important for family farming. However, the small holding size makes specialized farming a too difficult task to attain. Moreover, there is no farm specialized with specific type and variety. This causes difficulties to the exporters by gathering the required exported quantities from many farms. Table 2.1 illustrates the total production of citrus by type and variety in 2002.

The total orange production was 427,148 tons. Lemon production was 84,900 tons, and the production of the other citrus was 234,100 tons. Thus, orange has the highest contribution to the citrus sector accounting for 57 %; Lemon share is 11 %; mandarin and grapefruit share is 32%. Recently, farmers are replacing the local varieties of orange by high yielding varieties that were purchased from abroad. The Citrus Board has been responsible for supplying citrus seedling since 1987**.** The state price is 12 SP/seedling while the private price is 50 SP/seedling.

Cropping system

All required information, on farm level, had been done by Farming System Study (FSS). This team consists of six members who made interviews with the farmers and gathered all the required information to calculate the budget on farm level. The main criteria that had been taken into consideration in this study were cropping pattern (the main crops according to the importance of this product and its planted area in each Mantika and governorate), irrigation techniques (flood, drip, spring), source of water (well, public irrigation network, river, rainfed), stabilization zones (there are five agricultural settlement zones depending on rainfall), administrative border, and household type (large, medium, small).

Indeed, the total area cultivated with orange in Lattakia and Tartous are allocated in the first settlement zone. The total cultivated land of orange is 12,249 ha in Lattakia and 2,590 ha in Tartous. According to gathered data by FSS, all the cultivated land of orange is irrigated. The total numbers of gross margins (farm budgets) of citrus collected are 15 in Lattakia and 6 in Tartous. The main cropping pattern in the north of coastal region is citrus especially navel and yaphawy orange. While in the south of coastal region is sour Lemon. The main sources of water are public irrigation network and private wells. The share of public irrigation network and

private wells in Lattakia accounts for 76% and 15 %, respectively, while in Tartous 43 % and 44 %, respectively[3]. The adopted irrigation techniques in the two governorates are flood and drip.

Table 2.1. Production of citrus by type and variety, 2002

Type		Variety	Production *ton*	Period of maturity	Juice %
Orange	**Table Varieties**	Navel	131,148	Early Oct, Nov, Dec	52
		Yafawy	200,000	Mid Feb, March	42
		Maurdi	15,000	Mid Feb, March	52
	Juice Varieties	Baladi & Khatmali	26,000	Mid Jan, Feb	49-56
		Valencia	55,000	Late April, May, June	53
		Total Orange	**427,148**		
Lemon		Mayer	30,500	During the year	
		mix	54,400		
		Total Lemon	**84,900**		
Mandarin		Satsuma	70,000	early Sept, Oct, Nov	61
		Clementine	100,000	Mid Nov, Dec, Jan	63
		Late varieties	37,100	Feb, March, April	58
		Total Mandarin	**207,100**		
Grapefruit		Red & pink	10,000	Early Oct, Nov, Dec, Jan	40-58
		White	17,000	Mid Dec, Jan, Feb	47
		Total Grapefruit	**27,000**		
		Total of Citrus Production	**746,148**		

Source: Ministry of Agriculture and Agrarian Reform/ Citrus Board.

2.2.   Marketing and processing technology

In 2002, the total orange production was 427,148 tons, out of which 84 % is for the local market, 6 % for export and 10 % for juice market.

Gathering the orange for the local market is done by either the farmers' family or hired labor according to the farm size. Then the owners transfer their products to local market where there are middlemen who sell the farmer's product and take a commission of 5 %.

The exporters of orange prefer to buy the product directly from the farms since they can select the best type and quality directly from the tree, (based on key informant estimates, 70% of the exported oranges are collected under this way). Some exporters buy complementary quantities from local market, which is 30%. If the exporters buy the product directly from the farms, the purchase is done either when the product is still green on the trees, this procedure is very limited and constitutes only 10% of the purchase, or during the season (90% of the purchase); but if they buy through middlemen, they have to pay a service fee of 0.25-0.50 Sp/Kg. After sorting, grading, and packaging in packing house, the oranges inappropriate for export are sold to the local market (18% to 19 % of the total purchase volume by the exporters). Indeed, collection of exported oranges has to be done in a technical way without falling on the ground; therefore the exporter or the owner of packaging company sends a monitoring man to control the gathering operations. Then, the oranges are filled in plastic boxes and sent to the packaging company.

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[3] MAAR 2002. The Annual Agricultural Statistical Abstract.

2.3.   Selected representative systems

There are three systems of representative farms according to the water technique

First system: **Irrigation from public networks by flood (IPNF)**

The representative farm is an average of 11 samples. This system represent the highest share (more than 70 %). Therefore, the following systems were adopted at farm level:

- PAM of fresh orange by network irrigation to regional markets (Gulf countries) abbreviated PAMNIG. The shipment to these countries is done by land (road) transportation. Saudi Arabia represents the Gulf countries.

- PAM of fresh orange by network irrigation to European markets (PAMNIE). The shipment to these countries is done by sea.

- PAM of orange concentrate by network irrigation at current (actual) capacity (PAMNICC).

- PAM of orange concentrate by network irrigation at normal capacity (PAMNICN).

Second system: PAM of fresh oranges by flood irrigation from wells (PAMWF). The representative farm is taken as an average of 6 samples called "23 PAM orange fresh well flood".

Third system: PAM of fresh orange by drip irrigation from wells (PAMWD). The representative farm is taken as an average of 4 samples called "24 PAM orange fresh well drips".

Once the representative systems have been identified, the preparation of the cropping calendar - a time line that identifies the various tasks in crop production, such as land preparation, planting, fertilization, pest control, and harvesting- have to be done. This information is often available from extension units or secondary data.

Furthermore, the total cost of extracting one cubic meter of water differs according to the water system as the following:

1- Public net irrigation technique**:** the beneficiaries from public net irrigation system are paying a fee yearly to recover some of the operation and maintenance cost, which is 3500sp/ha. This fee has been determined under the decision no. 5 of 21/11/1999 issued by the prime minister. While, the actual cost of establishing and maintaining the irrigation network per one hectare is 9000 SP/ha (Varela Ortega and Sagardoy 2001). Therefore, the private cost of water is 3500 SP/ha which illustrates what the farmer pay actually to government, indicating a kind of subsidy to encourage the farmers. Whereas, the social price is 9000 SP/ha which represents the total cost of investing the irrigation network by the government for one hectare.

2- Well irrigation technique by flood (gravity): according to the Agricultural Water Study, the fixed cost of well is 270 thousand SP, and each well irrigates only 7 hectares. So the used up value will be 0.14 SP/cm, and the lifetime of well is 50 years. Thus, the cost to extract one cubic meter of water, not the price of water, is 2.7 SP. So it was easy to know the private cost of water by multiplying 2.7 with the number of cubic meters for each crop. Whereas, the social cost of water will be the same as the private one except taking into consideration all the political interventions as imposed tax and the distortion in exchange rate for tradable water equipments.

3- Well irrigation technique by drip: this system is exactly the same as well irrigation by flood, but the fixed cost of the pipe is added which is 90200 SP/ha of field crops and 45000 SP/ha of fruit trees (Varela Ortega and Sagardoy 2001), and its life time is 5 years.

Accordingly, only two representative systems of PAM are adopted namely: one is for packaging fresh orange and the second is for concentrate taking into account the water technique. It is worth noting that this study didn't consider the orange delivered to the local market although its

share is more than 80% since the main objective is to assess the comparative advantages of the exported orange as depicted in figure 2.3.

Figure 2.3. The commodity chain of exported fresh oranges, 2002
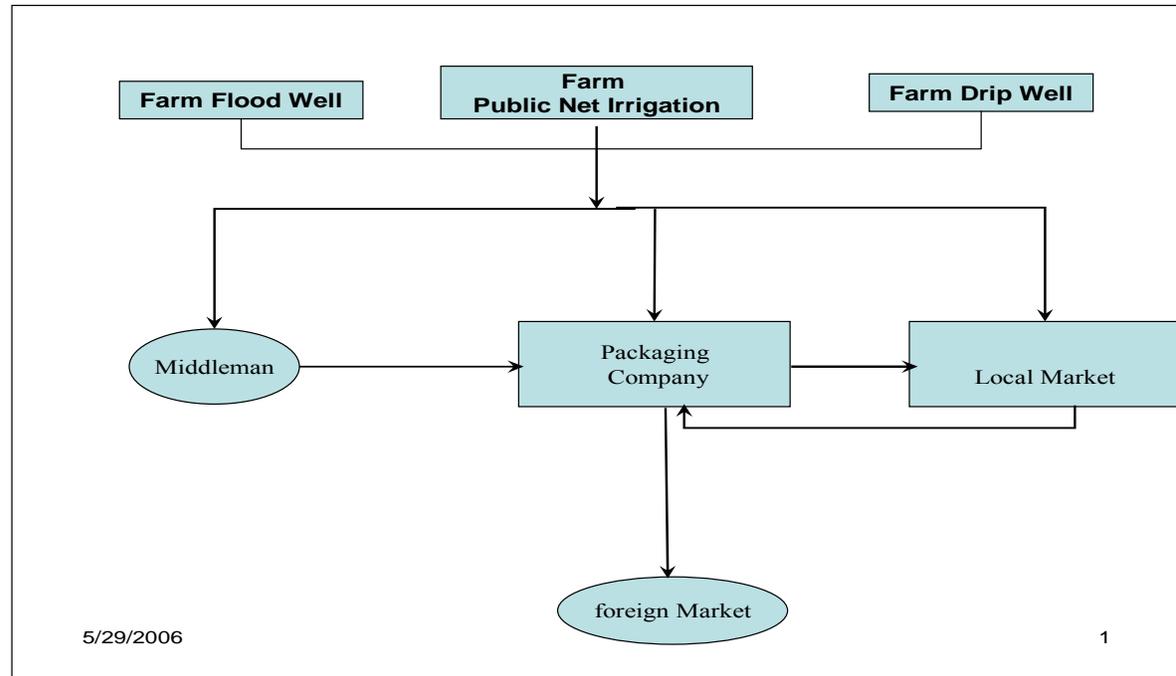
Source: Author elaboration

Sorting and packing operations of fresh orange

This operation starts with receiving the orange's boxes. First, the product moves into washing part to clean it with cold water and chemicals. Second, the product passes through brushes to draw the water and moves toward the first sorting. The first and high quality oranges roughly 80% go to export, the second and third qualities roughly 18-19 % are sold in the domestic market and the waste is about 1-2%. Third, the product goes to canal for a primary cold drying, then into waxing part and during this operation, the processor puts fungicides as TBZ and emazilin. Then the product goes into hot drying whereas large fans reduce their temperature. Oranges are sorted by size; there are 6 to 8 sizes depending on the imported country. For example, the Saudi and United Arab Emirate markets prefer the medium size, while the Jordan market prefers the large size. Finally oranges are manually packed in special plastic boxes containing 6 to 8 Kg, that are piled on pallets (a pallet contain 80 to100 boxes or 700 to-800 Kg)) to be loaded into trucks and export vehicles.

Orange concentrate

Figure 2.4 illustrates the commodity chain of orange concentrate from farm till the local market.

The processing of oranges into concentrate for bottling companies faces several constraints, leading to high cost:

- Farmers produce more than one variety of oranges and other citrus in their orchard, which increases the cost of gathering the raw material for processing.

- Most of the orange varieties are table oranges (81%) which are not suitable for juice because their extraction rate is just 30- 40 %. while the extraction rate of juice oranges is 70 %.

Figure 2.4. The commodity chain of orange concentrate, 2002
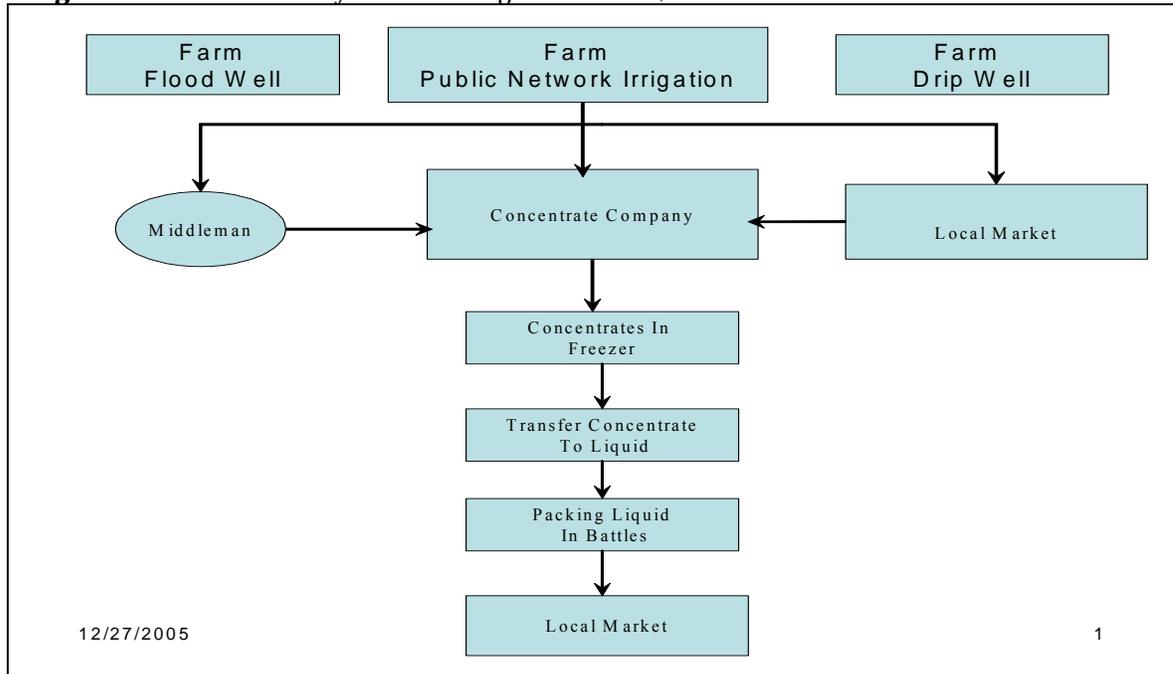
Source: Author elaboration

- The orange varieties for juice are Baladi, Khatmali, and Valencia. The Valencia forms the highest share (68 %), while the Baladi & Khatmali account only for 32 %. The Valencia is a very late variety where the harvesting time is in April, May, and June and during this period the orange supply in the market is limited and its price is very high. So it is not economically efficient to the owner of the concentrate company to process the excess of oranges to produce concentrates since the price of producing one ton of concentrate locally is 1800-2000 $ whereas the international price varies from 1000 to 1200 $. Furthermore, the exporters prefer to store this variety since it is bearing the storage for 3 months after the harvest where the market price is very high resulting in a substantial profit.

- High taxes are imposed on imported orange concentrates to protect the high domestic prices. Therefore beverage producers prefer to produce flavored gaseous drink instead of natural juice to adjust to consumers' purchasing power.

Gathering the Product

The company prefers to purchase its raw material from the wholesale markets (70%) rather than from the farms (30%). This is because most of the orange are for fresh consumption and the collection at the farm requires a preliminary sorting that is done by traders and packager downstream. Therefore, the company purchases oranges of lower quality (small size,...) that are inadequate for either export or domestic market requirements.

The buying operation is done by direct purchase from local market. In the case of buying from farms, it is done either by middleman or directly by the owner of the processing company where the owner gives the farmers special bags or large plastic boxes with a capacity of 20 Kg to fill the oranges and facilitate the delivery.

Processing operation

This operation starts with receiving the fresh orange, where there is a roller to reach the orange into washing pan, then the fruit is removed into monitoring bed where there are manual clean out to pick up the damaged fruit. After that the fruits go to citrus juice extraction part, where there is a machine to make a light peeling to remove the bitter test, and an extraction machine equipped with a cutter to cut the orange into two parts and a presser to extract the juice. Peels are collected into special silos to extract the oil and to process it into livestock feed or fertilizer; there are stainless steel pipe for collecting juice from citrus juice extraction machine to collecting silo; then the juice enters a micro-filter machine to be filtered twice. Later, the product goes to the pasteurization part, where the temperature rises up to 95 º c for 30 second then suddenly cools to 20 º c. Centrifugal pump works under circulation and pressure to remove the water away and then to increase the juice density (perix) from 14 to 65. Ultimately, the concentrate is filled in a large blue barrel which has a capacity of 200 Kg and is stored in a cool room at 25 to 30º c. Finally, at the packing line, the concentrate is filled either in tetra bags (unreturnable) in tow capacities (0.25 or 0.5 liter) or in glass bottles.

Chapter 3 -Agent Characteristics

3.1. Source of information

All the required information at farm level was gathered by Farming System Study (FSS). The sources of data are secondary data (collection/interviews from institutional sources) and primary data collected through cross-section survey at farm level and filling questioners by interviewing farmers in Lattakia and Tartous Governorates. The data for post-harvest activities were gathered through four interviews with middlemen of wholesale market of citrus in Lattakia who are responsible for shipping the product from wholesale market in Lattakia to local market in other governorates, five interviews with middlemen of packing houses (three of them in Lattakia and the others in Damascus); three interviews with middlemen of processing companies of juice orange (two in Lattakia and one in Damascus), three interviews in Lattakia and fives in Damascus with the owners of packinghouses of fresh orange, who are considered the main exporters of fruit and vegetables and three interviews with the owners of processing companies of citrus juice and concentrate, which are located in Homes, Lattakia, and Damascus.

In general, most of the agents of the commodity chain were very closed and non-cooperative. In addition there were some gaps of information so it was very necessary to go back to the secondary data of official sources like documentations of Ministry of Agriculture and Agrarian Reform (MAAR) and Ministry of Economy and Trade, Central Bureau of Statistical, The Annual Agricultural Statistical Abstract, and many reports belong to FAO project in the National NAPC (Varela Ortega and Sagardoy 2001, and Westlake 2000).

3.2. Producers (budget at farm level)

Standard budget is prepared for the main types of orange production systems. The budget was conducted for one hectare of orange, assuming that only one type of citrus is produced on the orchard. The budget includes the following items:

Fixed costs

Fixed cost, is in principle based on the equipment's actual value, equipment's life time, equipment's salvage value, capital depreciation (% used of this machine for main line), and the theoretical and actual capacity of the line. The valuation of fixed and capital equipments inputs requires information on life and salvage value of the equipment. Capital recovery factors are applied to determine the annual equivalent costs of the fixed inputs. Then the costs are multiplied by the share of total annual use (for example, hours per hectare divided by hours per year) to derive the fixed input cost for the activity budget.

Machinery such as tractors, plows, harrows, planes, and wagons needs to be identified individually as well. But it's assumed that all the required operations to cultivate the land and mechanized labour on the farm level are services and considered as variable cost. Because it is time consuming and difficult to know the used up value or the share of each mechanized operations for each crop since the farmers follow the agricultural rotation and may plant more than one crop in the same land in the same period, it's assumed that all the mechanized

operations are rented to calculate the cost of one hour and the required hours of each operation for each crop. However, some costs are considered fixed cost like the pipe of drip irrigation.

Indeed, the orange trees are perennial crops and have production life of 20-30 years. The budget represents the costs and returns of the activity in a year of full production (commonly, it extends nine or ten years after initial stage). There are four production stages, as illustrated in table 3.1. The first three periods are considered as the establishment period. Therefore, they are considered as fixed cost and called the establishment cost of the investment; whereas, the full production period is the variable cost stage.

Table 3.1. Stages of orange production

Period of production	Beginning year	End year
Establishment period	1	1
Before production period	2	4
Early production period	5	9
Full production period	10	30

Source: NAPC, FSS

Direct labor

Direct labor includes all the hired labor used to serve one hectare or one orange tree and family labor is valued at the market wage for each type of agricultural operation. For direct labour, intermediate inputs, and outputs, the quantities and price information are sufficient to calculate the private cost. Because each input is evaluated at both social and private prices, inputs have to be identified with a high degree of specificity. Labour is often divided into two categories skilled labour (qualified QL) and unskilled labour (non qualified NQL) because these types of labour usually have private market wages and social opportunity costs.

Intermediate inputs

Intermediate inputs include seeds and seedlings, chemical inputs, mechanized labour paid as service, water delivery costs, and output value for the main product and by-product.

The opportunity cost of the land was considered as a share of production (yield) due to the absence of a comprehensive data set of the cost and returns for all type of crops which makes it also difficult to estimate the costs of land per type of land at both market price (current observed price) and social price (price that would be prevailed without ant policy or market induced distortions on the factors and output markets). However, available estimates of land rent will be used to assess the profitability of the selected systems at the aggregate level, by comparing them with the value of the profit. Annex table 1 shows in detail the budget for oranges at market price.

Figure 3.1 presents the share of each type of cost in the total cost at farm level (fixed cost, direct labour, intermediate inputs). For example, the highest share of fixed cost in total cost is for well drip (15%), against 10% for net irrigation; and 8% for wells by flood. The highest share of direct labour is allocated for both net irrigation (26%) and wells by flood (23%); this is normal since flood irrigation requires a lot of labour services. While the labour cost share is just 13% in wells drip irrigation. The highest share of intermediate inputs is for both well drip (72%) and wells by flood (69%), while it is 65% in net irrigation.

Figure 3.2 shows the distribution of domestic factors at farm level of each irrigation system. It is clear that non-qualified labor represents the highest share of the cost in both net irrigation system (32%) and well flood (29%), while well drip is 19%. The share of qualified labor is almost too small at farm level since skilled labour is not needed at this stage and it accounts approximately for 2%. The highest share of capital is in net irrigation (43%), and well drip (41%) because of the cost of well and pipe. While it accounts for 39% in well flood.

Figure 3.3 summarizes the total distribution of the tradable and non-tradable costs for different irrigation systems. The highest share of domestic factors is allocated in net irrigation system (76%). While it's 69% in well flood and 62% in well drip. On the contrary, the highest share of tradable inputs is in both well drip (38%) and well flood (31%), but it's only 24% in net irrigation system.

Figure 3.1. Share of cost according to water source, 2002 (%)
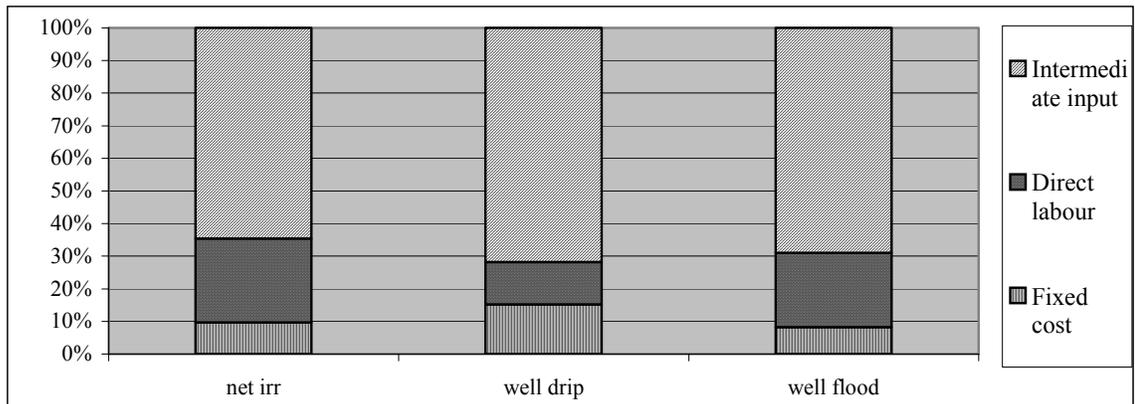
Source: Author elaboration.

Figure 3.2. Share of each cost item according to water system, 2002 (%)
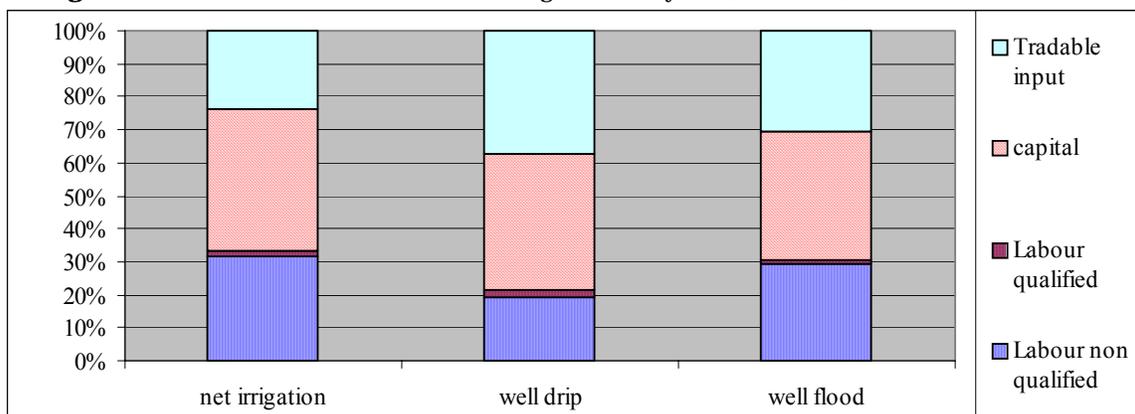
Source: Author elaboration.

Figure 3.3. Shares of domestic and tradable inputs by water system, 2002 (%)
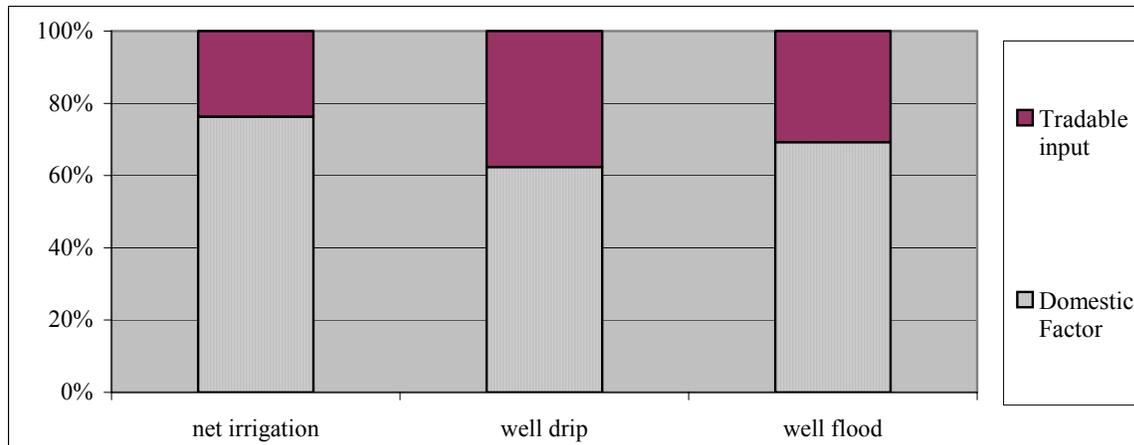
Source: Author elaboration.

3.3. Processing

Post-farm budgets

The PAM here uses only three levels of post farm budgets: a farm processing activity that includes transportation and bulking of farm product, a processing activity that includes processing costs and storage of both the processed and farm product, and a processing market activity that includes transportation and delivery costs to the wholesale point.

Post farm budget data differ from those of the farm production activities. A typical orange system should have farm-to-processor costs denominated per metric ton of farm product (field orange), whereas processing and processing market costs would be measured per metric ton of final main output (exported orange). Conversion ratios – number of kilograms of exported orange per kilograms of field orange- are necessary to convert each unit used in each budget into a common numeraire in order to avoid any bias in the aggregation of the costs at the system level. For example, the conversion rate of 1 metric ton of high quality of raw product (field fresh orange) is 800 kg of main output (exported fresh orange) and 200Kg of by-product (low quality of fresh orange that goes to local market for local consumption).

Another crucial issue for the computation of the processors budget is the evaluation of the actual capacity use, which will determine the value of the fixed cost per unit of output. This can be estimated on the basis of several indicators (number of processing line, number of month of operation per year, number of days and hours per day, average number of tons stored per year, and hourly processing capacity such as the number of metric tons per hour) compared with the annual total output declared by the owner of the processing unit.

Labour, fuel and lubricants, electricity, repair services, and packaging material are variable inputs; while building and storage facilities, trucks, and processing machinery are fixed cost.

The technologies of post farm activities require relatively few labor inputs. Labour needs include unskilled manual labour (packer) and skilled labour (driver, managers of warehouses, and merchants). Fixed input requirements are limited to warehouses, processing machinery, building and storage facilities, equipment to handle and transport raw material and processed commodity, trucks, and machinery for loading and unloading. Intermediate input cost includes working capital: fuel, energy and water, communication cost, processing material, maintenance and repairs on transportation equipment, and sacks or other handling materials (containers). Detailed prices and quantities for inputs and outputs of processing budget of fresh orange are illustrated in annex table 2.

Figure 3.4 depicts the respective shares of the major budget items of the processor of fresh orange, and reports the shares of the fixed cost (29%), direct labour (10%), and intermediate inputs (61%).

Figure 3.5 represents the distribution of tradable and non-tradable factors at processor level for fresh orange. Where, the shares of tradable input is 59% and domestic factors are 59% and 41% respectively(the share of NQL 9%, QL 8%, and capital 23%).

Figure 3.4. Shares of the processing budget components for fresh Orange, 2002 (%)

Source: Author elaboration.

Figure 3.5. Share of each item of the processing budget of fresh orange, 2002 (%)
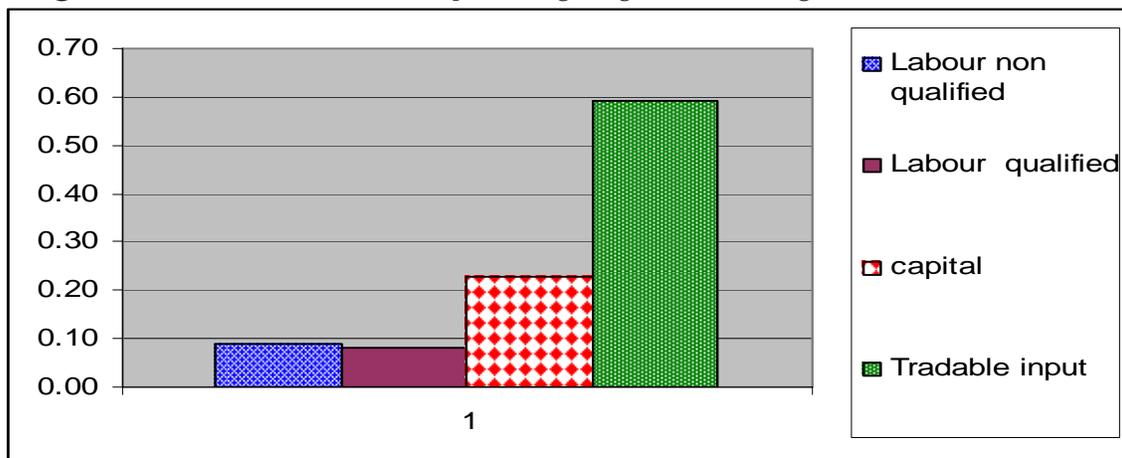
Source: Author elaboration.

Chapter 4 - Comparative Advantages of the Representative Systems

4.1. Macro economic environment

The aggregate macro-price used in the computation of the PAM is derived from the information collected from various sources with the assistance of policy analysts from the Ministry of Agriculture and Ministry of Finance. The interest rate of capital is based on the current deposit rate offered for private saving by the Syrian banks, i.e. 5.5%; the opportunity cost of the capital at social price is estimated at 3 % a bit above the current rate applied in Europe, the main trading partner of Syria, to take into account higher transaction costs and higher financial risks. This rate is also close to the rate applied on deposits in US Dollar in Lebanese bank (source: Quarterly Bulletin of the CBL).

Given the increasing integration of the former multiple exchange rate regime, the SP to USD exchange rate of private transaction is applied as the nominal exchange rate valued at SP51.5. Given the relative stability of this rate in the past year, it is eventually assumed to take the same rate as the real exchange rate.

For labour market, it is assumed that there is no distortion and that the current wages correspond to the real value of the labor. A correction factor of 22.5 is applied to the value of skilled labour to take into account the effect of pension and health insurance fee on the value of this domestic factor.

For major tradables such as agricultural inputs, the latest uniform duty is used to compute the social price after deduction of the taxes applied whenever imported. For composite good or services, such as building or mechanized labor a weighted rate is computed using the standard budget developed to compute the disaggregation coefficient. For energy a comparison between the current market price for fuel in Syria and the one prevailing on the international market result in difference of 40% to the benefit of the Syrian operators. It means that there is a transfer of 40% from the oil-producing sector to the other sectors of the economy corresponding to the losses of this sector incurred by not selling its products abroad.

Parity price for tradable outputs is the price that equals to the international or border price at the parity point[4] adjusted for domestic transportation, processing, and marketing costs. The resulting farm gate prices are called import parity prices or sometimes border price equivalents. They are computed in the following steps: first, find an international price for the commodity. Second, the computation of import parity prices using international market sources is conducted with the F.O.B (free on board) price at the border of the reference country, usually a major exporter. Third, insurance and freight are added to obtain C.I.F (cost, insurance, and freight) price to move it from the point of export to the harbor of the importing country. Fourth, on the contrary, the computation of export parity prices using international market sources is

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[4] The parity point is being the point where local supply of the main output competes with the imported one or its substitute. This point is allocated at farm gate or the processing factory gate.

conducted with the C.I.F (cost, insurance, freight) price at the border of the reference country, usually a major Importer. Fifth, insurance and freight are subtracted to obtain F.O.B price to move it from the point of import to the harbor of the exporting country.

Information of the international price is taken from the FAOSTAT database. Moreover, to calculate the export parity price of fresh orange to Saudi Arabia market, the product parity point, the place where to compare the local price with international price, was at house packing gate. Annex table 3 reports the export parity price of fresh orange to Saudi Arabian market.

On the other hand, the import parity price of orange's concentrate is calculated from the main country that produces the concentrate, where the product point is orange concentrate and the parity point is at factory gate of concentrate in Lattakia or Damascus. Annex table 4 reports the import parity price of concentrate.

4.2 PAM for fresh orange

The Policy analysis matrix (PAM) is a tool that assists policy makers to determine what specific part of the agricultural sector has the best advantage in relation to international competitors and assesses the comparative advantage potential. Comparative advantage analysis is the framework, which allows determining the economic profitability of an activity. It allows the estimation of revenue and cost independent of all market distortions, either subsidization or taxation. This tool can be applied not only at farm level but also for the entire commodity chain (producers, processors, traders) in a coherent manner to determine the level of profitability. It allows also making an interesting comparison among a number of commodities or production systems to determine which one has the strongest comparative advantage (CA) and more profit. CA refers to changes in three categories of economic parameters namely: the world price of tradable outputs and inputs, opportunity costs of domestic factors of production (labour, capital, land), and production technologies used in farming and marketing. These three parameters together determine the social profitability and comparative advantage.

Table 4.1 illustrates the budget summary at market price for producing one ton of exported fresh orange. This table presents the aggregated value of revenue (main output and by product), total costs of tradable inputs and domestic factors, and the profit for the whole commodity chain.

Table 4.1. Budget summary of fresh orange at market price, 2002 (SP/ton)

| | | ----VALUES AT MARKET PRICE---- | | | | |
	FARM	Budget #2	Budget #3	Budget #4	POST FARM	Repre System
1.TOTAL REVENUES	36667	14375	21000	18000	21000	45167
Main final ouput	12500	14375	18000	18000	18000	18000
By-products	24167	0	3000	0	3000	27167
2. TOTAL COST	28094	13802	16515	18000	15942	31536
A. Commodity in process		12500	14375	18000	12500	
(tax+,subsidy-)				0	0	0
B. Tradables	6666	304	1269	0	1572	8238
C. Domestic Factors (QL, NQL,K)	21428	998	872	0	1870	23298
Unskilled Labor	8920	848	198	0	1045	9966
Skilled Labor	478	34	174	0	208	686
Capital	12030	117	500	0	617	12646
PROFIT BEFORE TAXES	8573	573	4485	0	5058	13631
Dircet taxes	0	0	0	0	0	0
PROFIT AFTER TAXES	8573	573	4485	0	5058	13631

Source: Author elaboration.

Figure 4.1 reports that there is inequality in term of cost and profit among each agent of the whole system; indeed, almost all costs are allocated at farm level. For example, the cost of tradable inputs accounts for 80% at farm level and only 20% at post farm level. Domestic factors (QL, NQL, K) represent the highest share at farm level accounting for 92 % of the whole system

and only 8 % at post farm level. Unskilled labour represents the largest share at farm level mounting to 89% of the whole system while it accounts for only 11% at post farm level. Skilled labour is 69% at farm level and 31% at post farm level. Capital is 95% at farm level, while it is only 5% at post farm level. Concurrently, the highest share of profit is at farm level accounting for 63 %, whereas only 37 % at post farm level are achieved.

Figure 4.1. Distribution of domestic factors and tradables of each agent, 2002 (%)
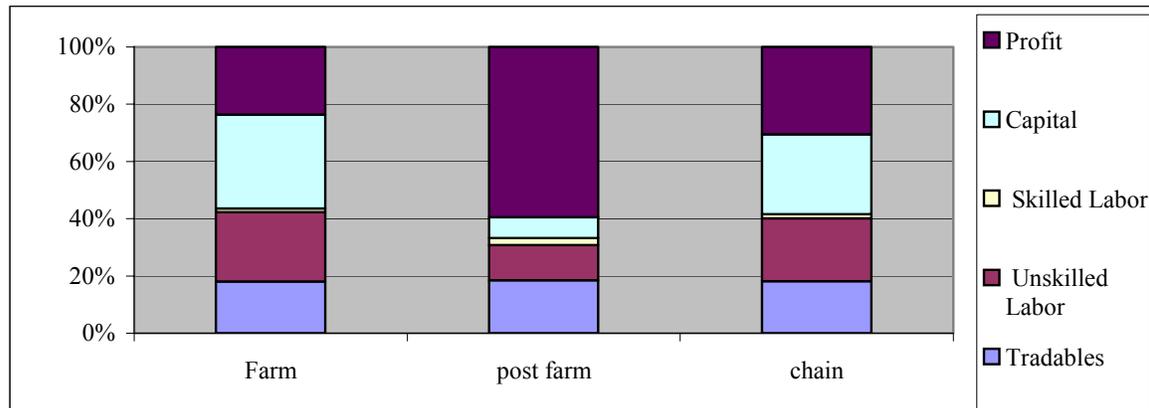
Source: Author elaboration

Presentation of the PAM for fresh oranges to regional market

Table 4.2. represents the PAM of exported fresh orange to regional market.

Table 4.2. The PAM of exported fresh orange to regional market, 2002 (SP/ton)

Item	Revenue		Costs				Profit	
			Tradable input		Domestic factor			
Private price	A	44,333	B	8,051	C	22,766	D	13,516
Social price	E	42,213	F	7,882	G	26,952	H	7,378
Divergences	I	2,121	J	169	K	4,186-	L	6,138

Source: Author elaboration

D measures the *private profitability* and is defined as the difference between total revenues (A) and costs of production (B+C). This private profitability demonstrates the competitiveness of the commodity under current policies at actual market prices. When the observed value of the revenue (A) exceeds the total cost of production (B+C), it means that the private profits of exported oranges are positive indicating the competitiveness of this sector. This will lead to the future expansion of the number of farms, processors, farmers, and traders working in the fresh orange.

H measures the *social profitability* and is defined as the difference between total revenues (E) and costs of production (F+G) at social prices. This social profitability demonstrates the comparative advantage of the commodity under opportunity costs. The value of revenue (E) is higher than the total cost of production (F+G), so the exported fresh oranges have positive *social profit* implying that this sector uses the scarce resources efficiently and has a comparative advantage in the production of fresh orange.

The third row of the PAM contains the difference between the values in the first and second row. The values in the third row express the whole effect of policy and other distortions (taxes, subsidy). The difference between private and social values is considered as transfer. For example, I has positive value meaning that the value of revenue at market price (A) exceeds the

value of revenue at social price (E). As a result, there is a transfer from the economy to the fresh orange sector by I value.

J illustrates the divergence of tradable inputs (J=B-F). The value of the divergence for tradable input is mainly due to the effect of exchange rate distortion, either overvaluation or devaluation, and duties. In our example, J has positive value meaning that there is a transfer from orange sector to the rest of the economy by J value, and the value of tradables locally (B) is higher than that in social price (F), meaning that there is a tax imposed on tradable imports, and there is devaluation of the SP (making imports more expensive).

K has a negative sign concerning the divergence of domestic factors. This means that the cost of domestic resources to produce one unit of the main output locally (C) is lower than social cost (G). This means that there are no difficulties to access the international market for this activity and there is a net transfer by K from the economy to support this sector.
L represents a positive value meaning that there is a net transfer from the economy to the orange sector by L value.
Accordingly, the PAM provides a range of indicators for assessing the efficiency and the comparative advantage of a system as presented in table 4.3. However, the interpretation of the ratios is easier and more meaningful when it is done by comparing various commodities chains.

Table 4.3. Policy analysis indicators of fresh orange to regional market, 2002

1. Financial Profitability (FP)	[D = A - B - C]	13,516
2. Financial Cost-Benefit Ratio (FCB)	[C / (A - B)]	0.627
3. Social Profitability (SP)	[H = E - F - G]	7,378
4. Domestic Resource Cost (DRC)	[G / (E - F)]	0.785
5. Social Cost-Benefit Ratio (SCB)	[(F + G) / E]	0.825
6. Transfers (L)	[L = I + J + K]	6,138
7. Nominal Protection Coefficient (Including By-product) (NPC)	[A / E]	1.050
7a. Nominal Protection Coefficient (Main Final Output Only) (NPC*)	[A* / E*]	1.134
8. Effective Protection Coefficient (EPC)	[(A - B) / (E - F)]	1.057
9. Profitability Coefficient (PC)	[D / H]	1.832
10. Producers Subsidy Ratio (PSR)	[L / E]	0.145
11. Equiv. Producer Subsidy (EPS)	[L / A]	0.138

Source: Author elaboration

- Financial profitability (FP) illustrates the value of the profit generated by packaging fresh orange to regional market.
- Financial cost-benefit ratio (FCB) <1, indicating the competitiveness of this system.
- Social profitability (SP) illustrates the value of the profit generated by packaging fresh orange to regional market at social price.
- Domestic resources cost (DRC) <1, meaning that Syria has comparative advantage with packaging fresh orange to regional market.
- Transfers (L) has a positive value, meaning that there is a net transfer from the economy to this sector.
- Effective protection coefficient (EPC)>1 meaning there is a protection for the system.
- Profitability coefficient (PC) >1 indicating there is a net transfer from the economy to this system.
- Producers subsidy ratio (PSR) has positive value which means there is a net transfer from the economy to this system and the producer is subsidized.
- Equivalent producer subsidy (EPS) has a positive value, meaning that the producer is subsidized or the consumer is taxed.

Presentation of the PAM for fresh oranges to European market

Table 4.4 presents the Policy Analysis Matrix per one ton of exported fresh orange to Europe.

Table 4.4. The PAM of fresh orange /Europe, 2002 (SP/ton)

| Item | Revenue | Costs | | Profit | |
		Tradable input	Domestic factor		
Private Price	A 44,333	B 8,051	C 22,766	D 13,516	
Social Price	E 44,873	F 7,882	G 27,624	H 9,366	
Divergences	I 540-	J 169	K 4,858-	L 4,150	

Source: Author elaboration

- D>0 meaning there is a private profit of this system by D value and this system is competitive.
- H>0 meaning there is a social profit of this system by H value and this system has comparative advantage.
- I has a negative value which means there is a tax on producer, and a subsidy to consumer by the value of I.
- J has a positive value which means there is a tax on tradable inputs by the value of J and there are transfers from this sector to the economy.
- K has a negative value which means there is a subsidy for domestic factors by the value of K.
- L has a positive value which means there are net transfers by L value from the economy to this sector.

Accordingly, table 4.5 shows the indicators of the PAM to European markets.

Table 4.5. The policy analysis indicators of fresh orange to Europe, 2002

1. Financial Profitability	[D = A - B - C]	13,516
2. Financial Cost-Benefit Ratio	[C / (A - B)]	0.627
3. Social Profitability	[H = E - F - G]	9,366
4. Domestic Resource Cost	[G / (E - F)]	0.747
5. Social Cost-Benefit Ratio	[(F + G) / E]	0.791
6. Transfers	[L = I + J + K]	4,150
7.Nominal Protection Coefficient (Including By-Product)	[A / E]	0.988
7a. Nominal Protection Coefficient (Main Final Output Only)	[A* / E*]	0.971
8. Effective Protection Coefficient	[(A - B) / (E - F)]	0.981
9. Profitability Coefficient	[D / H]	1.443
10. Producers Subsidy Ratio	[L / E]	0.092
11. Equiv. Producer Subsidy	[L / A]	0.094

Source: Author elaboration

- FP illustrates the value of the profit generated by packaging fresh orange to Europe.
- FCB<1, meaning that this system is competitive.
- SP illustrates the value of the profit generated by packaging fresh orange to Europe at social price.
- DRC <1, meaning that this system has comparative advantage with packaging fresh orange to Europe.
- L has a positive value, meaning that there is a net transfer from the economy to this sector.
- NPC <1, meaning that the sector is not protected.
- EPC <1, meaning that there is no protection for the system (taxation).

- PC >1, indicating there is a net transfer from the economy to this system.
- PSR has a positive value which means there is a net transfer from the economy to this system and the producer is subsidized by the economy.
- (EPS) has a positive value indicating that there is a producer subsidy or consumer tax.

Comparison between the systems:

Table 4.6 summarizes the values of all indicators of fresh orange. It is clear that the irrigated system by public network irrigation has a higher profitability than the other two system (well net and well flood) which is shown by the Financial Cost-Benefit Ratio.

Table 4.6. Summary for the indicators of fresh orange, 2002

Indicatores		net irr regional market	net irr urope	well net	well drip
1. FINANCIAL PROFITABILITY	[D = A - B - C]	13,516	13,516	9,225	6,753
2. FINANCIAL COST-BENEFIT RATIO	[C / (A - B)	0.627	0.63	0.70	0.70
3. SOCIAL PROFITABILITY	[H = E - F - G]	7,378	9,366	1,807	1,739
4. DOMESTIC RESOURCE COST	[G / (E - F)]	0.785	0.75	0.93	0.91
5. SOCIAL COST-BENEFIT RATIO		0.825	0.79	0.95	0.94
6. TRANSFERS	[L = I + J + K]	6,138	4,150	7,418	5,014
7. NOMINAL PROTECTION COEFFICIENT [A / E] (Including byproduct)		1.05	0.99	1.05	1.07
7A. NOMINAL PROTECTION COEFFICIENT [A* / E*] (Main final output only)		1.134	0.97	1.13	1.14
8. EFFECTIVE PROTECTION COEFFICIENT [(A - B) / (E - F)]		1.057	0.98	1.13	1.16
9. PROFITABILITY COEFFICIENT	[D / H]	1.832	1.44	5.10	3.88
10. PRODUCERS SUBSIDY RATIO	[L / E]	0.145	0.09	0.19	0.16
11. EQUIV. PRODUCER SUBSIDY	[L / A]	0.138	0.09	0.18	0.15

Source: Author elaboration

At social price value, by DRC and SCB ratios it's clear that the irrigated system by public network irrigation is also more efficient with a higher profit, and has more comparative advantage in producing orange.

The irrigated system by public network irrigation has less distortion since the transfer (L) from economy to this sector is less than the other two systems.

NPC are approximately the same for all the systems of fresh orange, but EPC is less for net irrigation which means less protection and distortion induced by the public network irrigation.

Producers Subsidy Ratio (PSR) reports that the producers of public network irrigation system receive the lowest support by the economy, while it is higher in the other systems; (see figures 4.2, 4.3, 4.4 and 4.5).

Figure 4.2. Financial cost benefit ratios (FCB), 2002
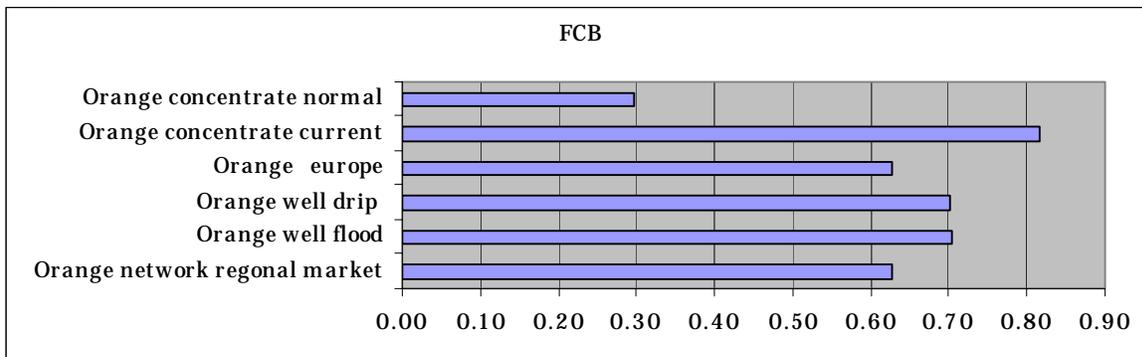
Source: Author elaboration.

Figure 4.3. Domestic resource cost (DRC) ratios, 2002
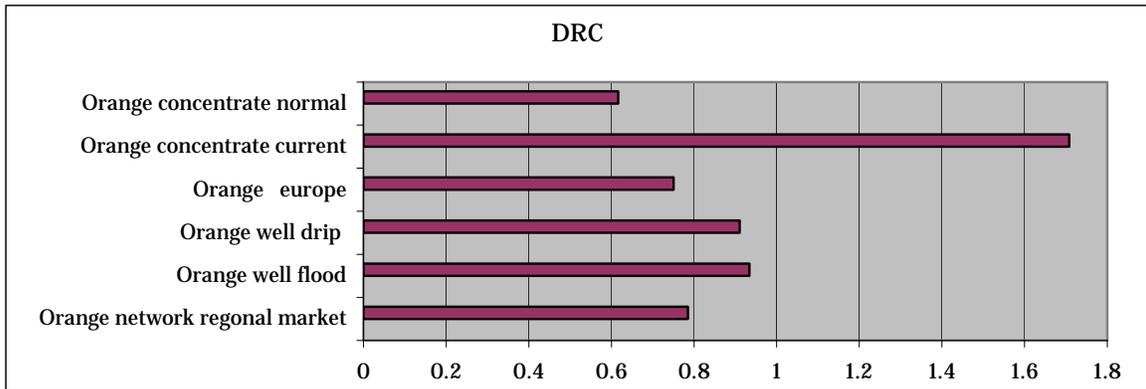
Source: Author elaboration.

Figure 4.4. Effective protection coefficients (EPC), 2002
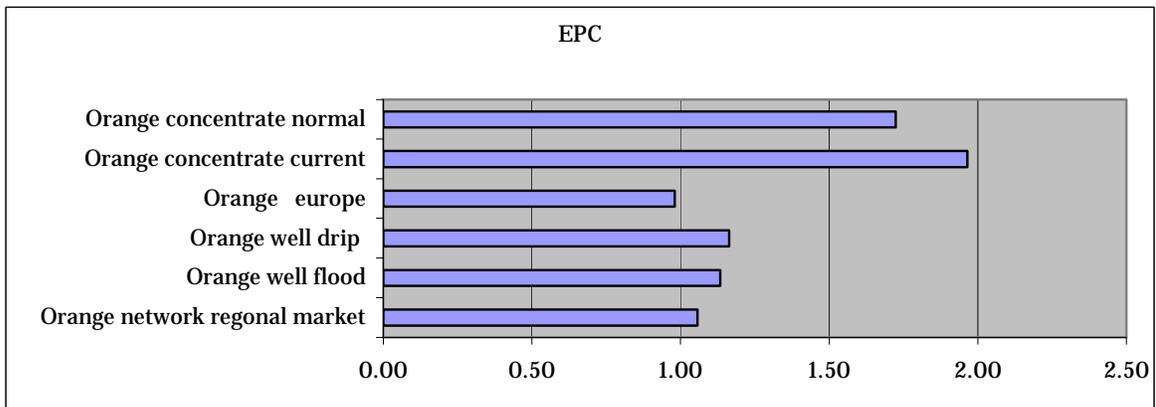
Source: Author elaboration.

Figure 4.5. Producer subsidy equivalents (PSR), 2002
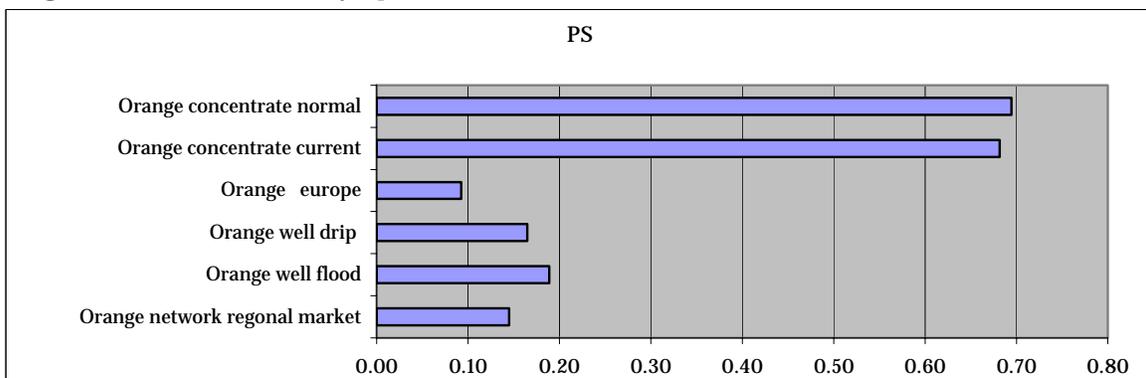
Source: Author elaboration.

Factors determining the comparative advantage

After completion of the data entry and the basic calculations a sensitivity analysis have to be conducted. The objective of conducting such analysis is to assess the relationship between the PAM indicators and a selected number of variables to determine the factors that have the substantial impact on the PAM's results.

The PAM variables that can be taken as a reference in the sensitivity analysis are Financial Cost Benefit Ratio (FCB), Domestic Resources Cost Ratio (DRC), Effective Production Coefficient (EPC), and Producer Subsidy Ratio (PSR). The basic variables that, by experience, have a large effect on these indicators are yield, party price for the main output, conversion factor from the raw to main output at the processing level, exchange rate and conversion factor from nominal exchange rate to real exchange rate. Moreover, an analysis of the complete cost structure of the system has to be carried out to identify cost items that represent a substantial share of the total cost (more than 5 %).

Accordingly, table 4.7 below depicts the break-even points (profit =0, FCR = 1 and DRC = 1) of the PAM for fresh orange to regional market. Relying on the results of this table, profit equals to zero and DRC equals to one if:

- The yield is reduced by 8% at market price;

- The price of the main output is reduced by 20% at market price;

- The cost of post farm harvesting is reduced by 3.5%;

- The cost of domestic factors increases by 1.6%.

Table 4.7. The break-even point of the PAM for fresh orange to regional markets, 2002

	At Market price	At social price
Yield	9 . 4	10 . 2
	0 . 8	0 . 8
Final Output Price	4 , 484	8 , 501
	0 . 2	0 . 5
Post Harvest Cost	11 , 900	10 , 573
	3 . 5	3 . 3
Domestic Factors Cost	36 , 282	34 , 330
	1 . 6	1 . 3

Source: Author elaboration.

Moreover, the sensitivity analysis of fresh orange can be conducted by computing the linear elasticity of the selected variable to the PAM indicator that allows comparing the sensitivity of the selected respective variables. Negative sign of the elasticity means there is a negative correlation between the PAM indicator and the selected variable, which means if the selected variable increases by one unit, the PAM indicator decreases by a such amount. A positive sign means there is a positive correlation which means if the selected variable increases by one unit, the PAM indicator increases by a such amount.

For yield, figure 4.6 illustrates that DRC and SCB, which are the basic indicators of comparative advantage, are more flexible to the change in yield. For example, when the yield increases, DRC and SCB decreases which means a stronger comparative advantage. PSR has no such flexibility. Besides, EPC shows a slight movement to yield change.

Figure 4.6. Sensitivity analysis of yield, 2002
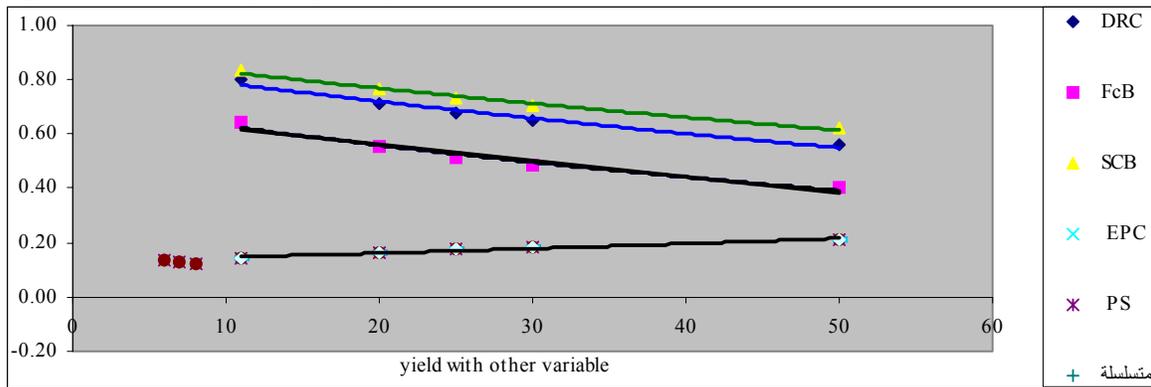
Source: Author elaboration.

For conversion rate (figure 4.7), when the conversion rate increases by one unit DRC, SCB and FCB decrease since the total cost of production (tradable and domestic) to produce one unit of the main output will be less which means a stronger comparative advantage. Moreover, the cost of domestic recourses to generate one unit of value added will be less which indicates an efficient use of domestic resources.

Figure 4.7. Sensitivity analysis of conversion rate, 2002
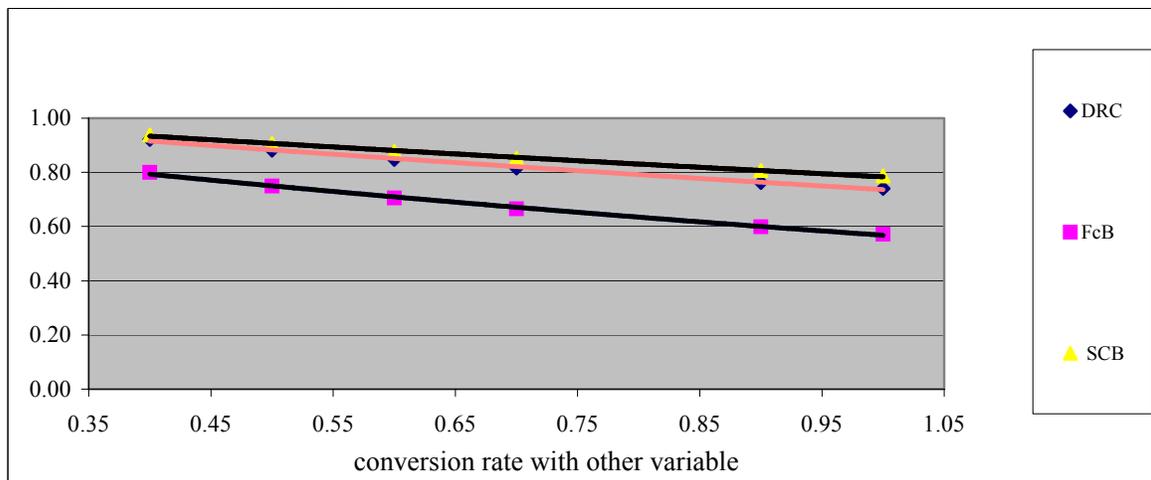
Source: Author elaboration.

For divergence of exchange rate (figure 4.8), exchange rate (ER) has a substantial affect on the social row of the PAM. Figure 4.8 shows that FCB and SCB will not be affected by the change in ER. The most affected variable is EPC which illustrates the policy intervention in place. If the divergence of ER<1 means that the social price will be lower than the private one, A-B> E-F; and the price of the main output and tradable inputs at private price will be higher than the social price which means there is a domestic tax on tradables, and the value of EPC will be high, which indicates there is a devaluation of SP which promotes export. While if ER>1 means that the social price will be higher than the private one, A-B< E-F. Thus, the price of the main output and tradable inputs at private price will be lower than at social price which means there is a subsidy on tradable inputs and EPC will be low, which indicates there is an overvaluation of SP which means imports are less expensive.

Figure 4.8. Sensitivity analysis of exchange rate, 2002
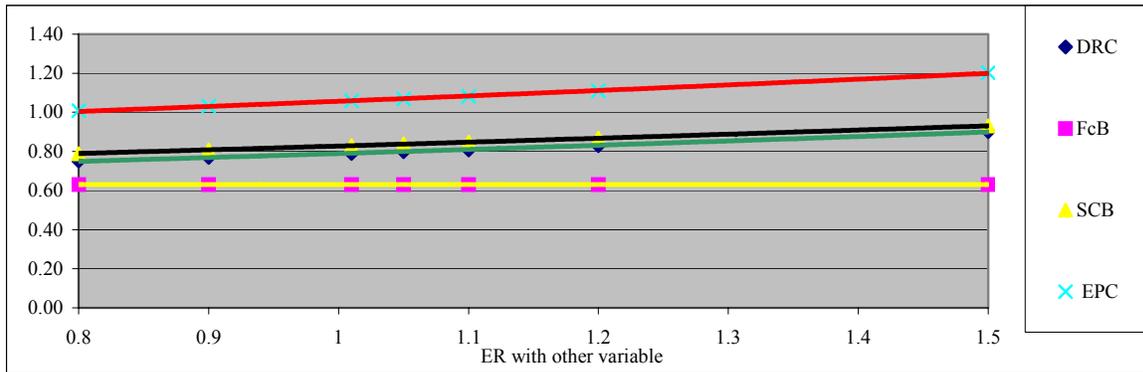
Source: Author elaboration.

For parity price, figure 4.9 reports that when the international price of fresh orange increases by one unit, DRC and SCB decrease which means more comparative advantage. When world price becomes 200 \$/ton DRC and SCB will be =1 which indicates no comparative advantage.

Figure 4.9. Sensitivity analysis of parity price, 2002
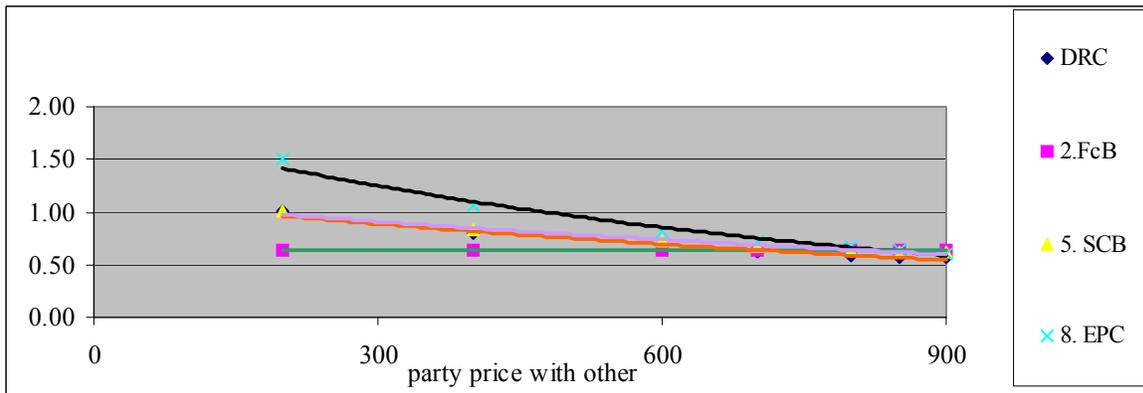
Source: Author elaboration.

4.3. PAM for orange concentrate

Concentrate with current capacity

Table 4.8 illustrates the budget summary at market price in Syrian pound to produce one ton of concentrate at current capacity. This table includes the value of the total revenues, of the main products and by products, the total cost (tradable and non-tradable cost) and the profit of the whole commodity chain.

Table 4.8. Budget summary of concentrate with current capacity at market price, 2002 (SP)

| | | ---- VALUES AT MARKET PRICE ----- | | | | |
	FARM	Budget #2	Budget #3	Budget #4	POST FARM	Repre . System
1.TOTAL REVENUES	98361	98361	110823	110725	110823	110823
Main final ouput	98361	98361	110725	110725	110725	110725
By -products	0	0	98	0	98	98
2. TOTAL COST	62969	98375	130216	110725	130231	94839
A . Commodity in process		98361	98361	110725	98361	
(tax +,subsidy -)				0	0	0
B . Tradables	16371	0	7498	0	7498	23869
C . Domestic Factors (QL, NQL,K)	46598	15	24357	0	24372	70970
Unskilled Labor	33836	0	4114	0	4114	37950
Skilled Labor	1133	0	5150	0	5150	6283
Capital	11629	15	15093	0	15108	26737
PROFIT BEFORE -TAXES :	35392	-15	-19392	0	-19407	15985
Dircet taxes :	0	0	0	0	0	0
PROFIT AFTER -TAXES :	35392	-15	-19392	0	-19407	15985

Source: Author calculation.

Figure 4.10 shows that the highest share of tradable and domestic costs to produce one ton of concentrate is allocated at farm level, where the share of tradable inputs at farm level is 69 % and only 31% at post farm level. Domestic factors share is 66 % at farm level and only 34% at post farm level.

Figure 4.10. Distribution of domestic factors and tradables of each agent under current capacity, 2002
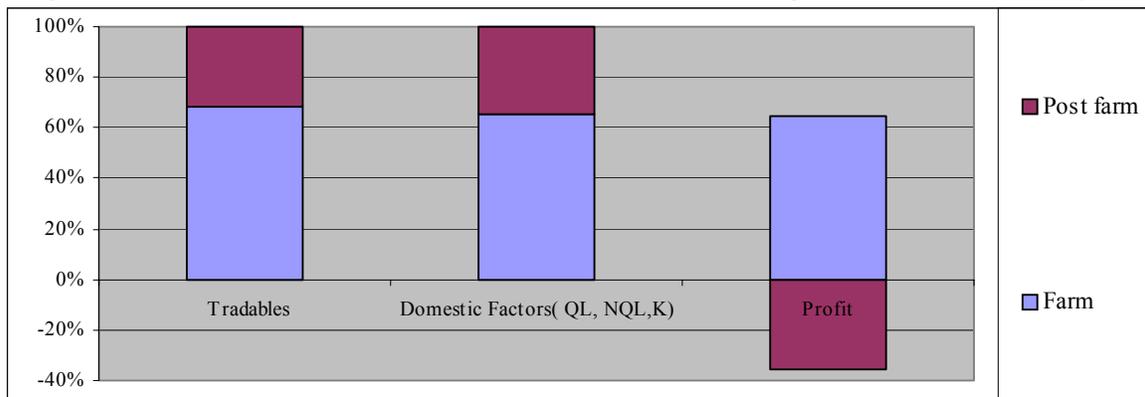
Source: Author elaboration.

Figure 4.11 presents that unskilled labour represents the highest share at farm level (89%), while it accounts only for 11 % at post farm level. On the contrary, both skilled labour and capital represent the highest share at post farm accounting for 82% and 57% respectively. Whereas, they are 18% and 43% at farm level, respectively. Thus, the most profit belongs to the farm level (221%), while the processor can't make any profit and he losses.

Figure 4.12 illustrates the share of each item for each agent's budget. It is clear that the share of the cost of tradables at farm level is 17% of the whole farmer budget (including cost and profit), while it accounts for 15% of the post farm budget and 22% of the whole system. Unskilled labour has the highest share at farm level (34%), but it is only 8% at post farm level and 34% of the whole system. Skilled labour accounts for 8% at post farm and only 1% at farm level. Most of the capital is at post farm level (31%), while it is only 12% at farm level and 24% of the whole system.

Figure 4.11. Distribution of domestic factors and tradables for each agent under current capacity, 2002
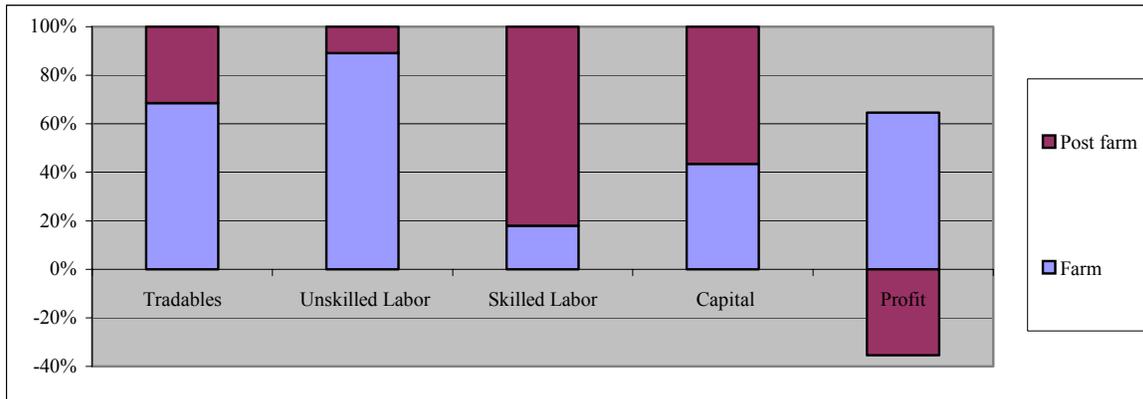
Source: Author elaboration

Figure 4.12. Distribution of each budget item under current capacity, 2002
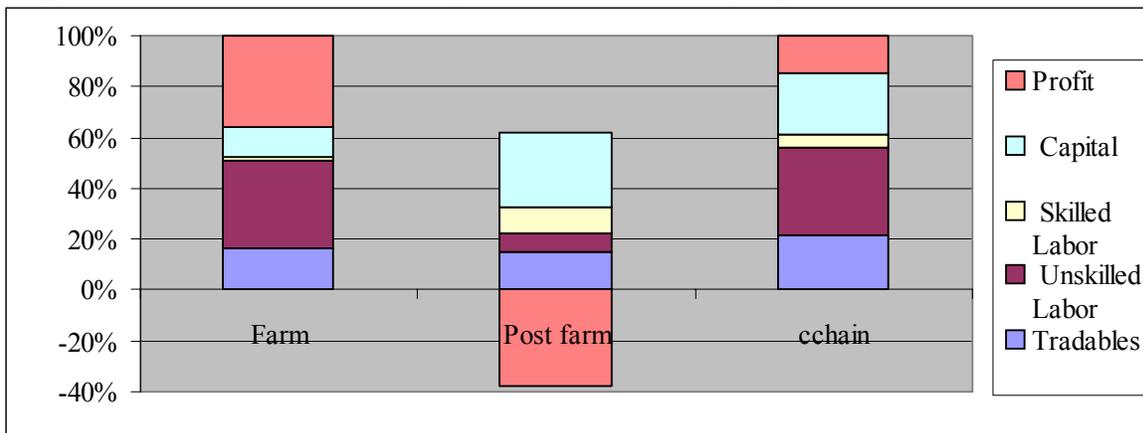
Source: Author elaboration

Assuming the company of concentrate works under normal capacity, which means it receives a specified quality of juice orange instead of table orange, and the conversion factor from orange to juice is too high, 120 kg of concentrate from each ton of fresh orange instead of 60 kg of concentrate are obtained. Besides, there is enough supply of juice orange in the market and the firm can work with high capacity and produce 508 tons concentrate/year instead of only 129 tons /year under current capacity. Table 4.9 illustrates the budget summary for producing one ton of concentrate under normal capacity at market price. Accordingly, there is an increase in the cost at farm level and a decrease at post farm level. Figure 4.13 illustrates that the cost of tradables at farm level is 78% of the whole commodity system and 22% at post farm level. While the cost of domestic factors is 80% at farm level and 20% at post farm level. Most of the profit is allocated at processor level (74%), and it is only 26% at farm level of the whole commodity system.

Table 4.9. Budget summary of concentrate under normal capacity at market price, 2002

		---- VALUES AT MARKET PRICE -----				
		Budget	Budget	Budget	POST	Repre .
	FARM	#2	#3	#4	FARM	System
1.TOTAL REVENUES	50000	50000	110775	110725	110775	110775
Main final ouput	50000	50000	110725	110725	110725	110725
By -products	0	0	50	0	50	50
2. TOTAL COST	32009	50008	58313	110725	58321	40330
A . Commodity in process		50000	50000	110725	50000	
(tax+,subsidy -)				0	0	0
B . Tradables	8322	0	2289	0	2289	10611
C . Domestic Factors (QL, NQL,K)	23687	8	6024	0	6032	29719
Unskilled Labor	17200	0	948	0	948	18148
Skilled Labor	576	0	854	0	854	1430
Capital	5911	8	4222	0	4230	10141
PROFIT BEFORE -TAXES :	17991	-8	52462	0	52454	70445
Dircet taxes :	0	0	0	0	0	0
PROFIT AFTER -TAXES :	17991	-8	52462	0	52454	70445

Source: Author elaboration.

Figure 4.13. Distribution of domestic factors and tradables of each agent under normal capacity, 2002
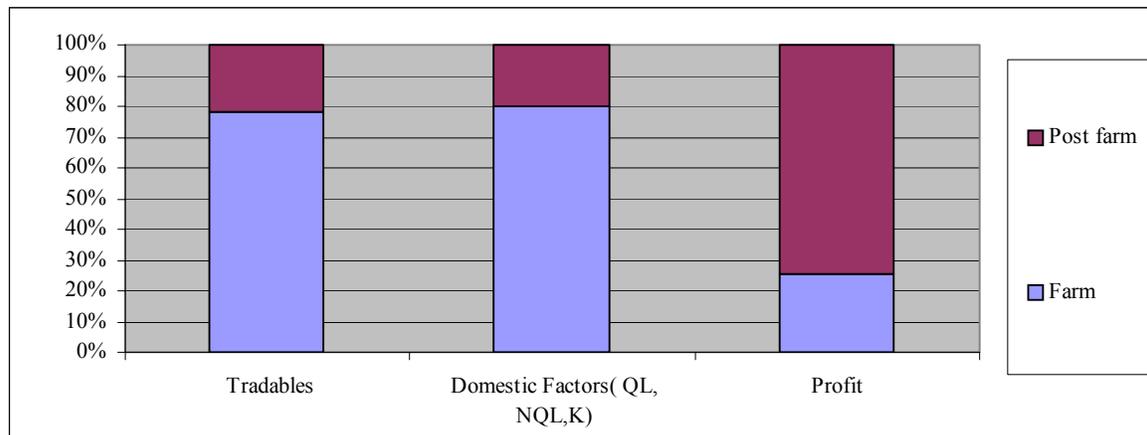
Source: Author elaboration.

Figure 4.14 shows the distribution of each budget's item among the commodity chain agents under normal capacity. For example, unskilled labour represents 95% at farm level, and 5% at post farm level of the whole commodity system. Capital is 58% at farm level and 42% at post farm level. Table 4.10 compares the total cost to produce one ton of concentrate under current and normal capacity. For instance, the cost of tradables under normal capacity is 78 % at farm level instead of 69 % under current capacity, and 22 % at post farm level instead of 31 % respectively. Consequently, the most profit is allocated at farm level (221%) under current capacity, while the processor losses (-121%). On the contrary, under normal capacity both farmers and processors make a profit, but most of the profit is allocated at processor level (74%).

Figure 4.14. Distribution of each budget item under normal capacity, 2002
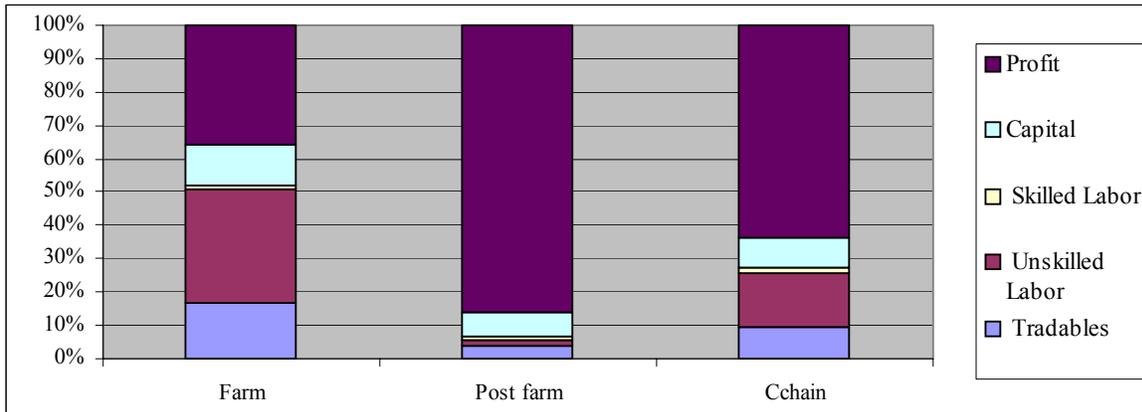
Source: Author elaboration.

Table 4.10. Comparison of budget items under normal and current capacity, 2002

Item of budget	Current capacity		Normal capacity	
	% Farm	% Post farm	% Farm	% Post farm
Tradable	69	31	78	22
Unskilled labor	89	11	95	5
Skilled labor	18	82	40	60
Capital	43	57	58	42
Profit	221	-121	26	74

Source: Author elaboration.

Presentation of the Policy Analysis Matrix (PAM)

Table 4.11 illustrates the PAM per one ton of concentrate under current capacity.

Table 4.11. The Policy Analysis Matrix per ton of concentrate under current capacity, 2002 (SP)

Item		Costs			
	Revenue	Tradable input	Domestic factor	Profit	
Private price	A 110,823	B 23,869	C 70,970	D 15,985	
Social pice	E 69,408	F 25,151	G 75,588	H 31,331-	
Divergences	I 41,415	J 1,282-	K 4,619-	L 47,315	

Source: Author elaboration.

- D >0, meaning there is a private profit for this system by D value which indicates competitiveness.
- H has a negative value, meaning there is no profit at social price for concentrate under current capacity.
- I has a positive value, indicating there is a subsidy on producer by the value of I. This policy intervention shows a prevention of importing the orange concentrate.
- J has a negative value which means there is a subsidy on tradable inputs by the value of J.
- K has a negative value, meaning there is a subsidy on domestic factors by the value of K.
- L has a positive value, meaning there is a net transfer from the economy to this sector by the value of L and this system is subsidized.

Accordingly, table 4.12 includes of the PAM for orange concentrate under current capacity.

Table 4.12. The policy analysis indicators of orange concentrate under current capacity, 2002

1. Financial Profitability (FP)	[D = A - B - C]	15,984
2. Financial Cost-Benefit Ratio (FCB)	[C / (A - B)]	0.8
3. Social Profitability (SP)	[H = E - F - G]	(31,330.8)
4. Domestic Resource Cost (DRC)	[G / (E - F)]	1.7
5. Social Cost-Benefit Ratio (SCB)	[(F + G) / E]	1.5
6. Transfers (L)	[L = I + J + K]	47,315
7. Nominal Protection Coefficient (Including By-product) (NPC)	[A / E]	1.6
7a. Nominal Protection Coefficient (Main Final Output Only)	[A* / E*]	1.6
8. Effective Protection Coefficient (EPC)	[(A - B) / (E - F)]	2.0
9. Profitability Coefficient (PC)	[D / H]	-0.510
10. Producers Subsidy Ratio (PSR)	[L / E]	0.682
11. Equiv. Producer Subsidy (EPS)	[L / A]	0.427

Source: Author elaboration.

- FP illustrates the value of the profit generated by one ton of concentrate at private price.
- FCB <1, meaning competitiveness of this system.
- SP is negative and illustrates that producing one ton of concentrate causes loss at social price by 31,330 SP.
- DRC >1, meaning there is no comparative advantage with concentrates under current capacity.
- L has a positive value, meaning that there is a net transfer from the economy to this sector by L value and this sector is subsidized.
- NPC >1, indicating that the system benefits from protection (this benefit is illustrated in prevention of the import of concentrate).
- EPC >1, indicating there is a protection for the system and this protection is illustrated as a tax on tradable inputs.
- PC <1, meaning the system benefits from a net transfer from the economy.
- PSR has a positive value which means the producer is supported by the economy.
- EPS has a positive value, indicating that the producer is subsidized.

Table 4.13 illustrates the PAM for one ton of orange concentrate under normal capacity.

Table 4.13. The PAM per one ton of orange concentrate under normal capacity, 2002 (SP)

Item	Revenue	Costs		Profit
		Tradable input	**Domestic factor**	
Private price	A 110,775	B 10,611	C 29,719	D 70,445
Social price	E 69,360	F 11,252	G 35,822	H 22,285
Divergences	I 41,415	J 641-	K 6,104-	L 48,160

Source: Author elaboration.

- D >0, meaning there is a private profit for this system by D value which indicates competitiveness.
- H >0, meaning there is a social profit for this system which indicates comparative advantage.
- I has a positive value, meaning there is a subsidy on producer by the value of I.
- J has a negative value, meaning there is a subsidy on tradable inputs by the value of J.
- K has a negative value which means there is a subsidy on domestic factors by the value of K and the access to this activity is attractive.
- L has a positive value, meaning there is a net transfer from the economy to this sector by the value of L and this system is subsidized.

Accordingly, table 4.14 shows the derived PAM indicators for orange concentrate under normal capacity.

Table 4.14. Policy analysis indicators of orange concentrate under normal capacity, 2002

1. Financial Profitability (FP)	[D = A - B - C]	70,445
2. Financial Cost-Benefit Ratio (FCB)	[C / (A - B)]	0.30
3. Social Profitability (SP)	[H = E - F - G]	22,285
4. Domestic Resource Cost (DRC)	[G / (E - F)]	0.62
5. Social Cost-Benefit Ratio (SCB)	[(F + G) / E]	0.68
6. Transfers (L)	[L = I + J + K]	48,160
7. Nominal Protection Coefficient (Including By-Product) (NPC)	[A / E]	1.60
7a. Nominal Protection Coefficient (Main Final Output Only)	[A* / E*]	1.60
8. Effective Protection Coefficient (EPC)	[(A - B) / (E - F)]	1.72
9. Profitability Coefficient (PC)	[D / H]	3.16
10. Producers Subsidy Ratio (PSR)	[L / E]	0.69
11. Equiv. Producer Subsidy (EPS)	[L / A]	0.43

Source: Author elaboration.

- FP illustrates the value of the profit generated by one ton of concentrate under normal capacity at private price.
- FCB <1, meaning competitiveness of this system.
- SP illustrates that there is a profit for concentrate at social price.
- DRC <1, meaning that there is comparative advantage for concentrates under normal capacity.
- L has a positive value, meaning that there is a net transfer from the economy to this sector by L value and this sector is subsidized.
- NPC >1, indicating that the system benefits from protection (this benefit is illustrated by the prevention of the import of concentrate).
- EPC >1, indicating that there is protection for the system and this protection is illustrated as a tax on tradable inputs.
- PC >1, meaning that the system benefits from a net transfer from the economy.
- PSR has a positive value which means the producer is subsidized.
- ESP has a positive value which means the producer is subsidized by this value.

Comparison of the results of concentrate under both current and normal capacity

At farm level, the same system of public network irrigation is prevailing for the two systems of orange concentrate. But the difference is with the capacity and conversion rate. it can be noticed that the system with normal capacity has a higher financial profitability (70,445 SP/ton) than that under current capacity (15,984 SP/ton). Also FCB shows that less domestic factors (0.30) to produce one unit of the value added are used under normal capacity than under current capacity (0.82), which explains that the domestic recourses are not used efficiently under current capacity.

At social price, the system under normal capacity has a profit (22,285 SP/ton), while under current capacity there is a loss (31,330 SP/ton). Both DRC and SCB ratios illustrate that normal capacity utilization is more efficient by using the domestic resources, and has more comparative advantage in producing the concentrate. DRC>1 for current capacity means that there is no comparative advantage in producing the concentrate and domestic factors are used inefficiently.

Current capacity system, however, has less distortion since the value of transfers (L) from the economy to this sector under current capacity (47,315) is less than that under normal capacity

(48,160). NPC is approximately the same for the two systems and there is a protection from government for both systems, but EPC is less for normal capacity, which means a less protection/distortion is induced. PSR indicates that the producers under current and normal capacity receive a support from the economy.

Factors determining the comparative advantage

Figure 4.15 illustrates the sensitivity analysis of yield for concentrate.

Figure 4.15. Sensitive analysis of yield for concentrate under current capacity, 2002
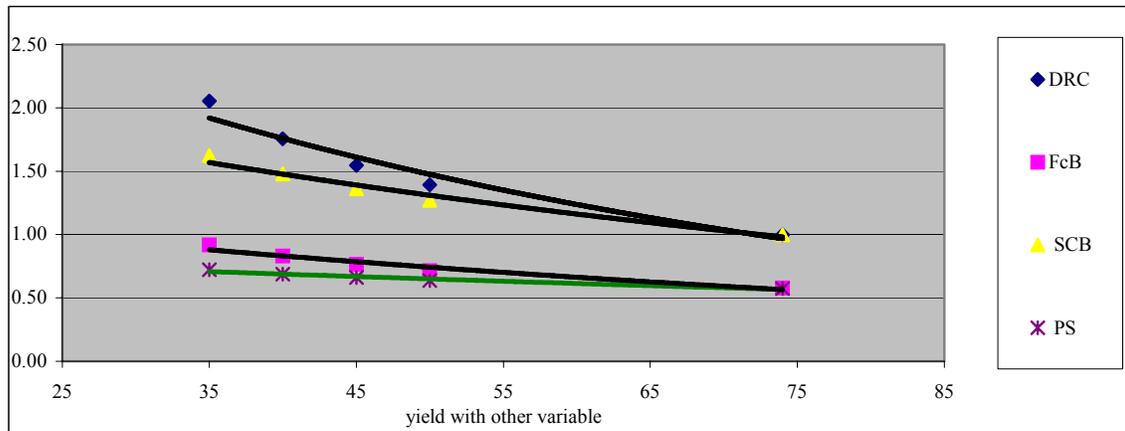
Source: Author elaboration.

When the yield increases up to 74 ton /ha, the system just starts to have comparative advantage where DRC and SCB will be =1. Higher comparative advantages (e.g. DRC =0.7) requires increasing the yield up to 120 ton/ha which is not a reasonable assumption in reality. Therefore, the conversion rate has to be improved through planting high squeeze quality oranges. Another factor to determine comparative advantages is the world price of concentrate which is ranging between 800 and 1200 $/ton of concentrate. The domestic prices (1500-2000 $/ton) are always above world price which emphasizes the absence of comparative advantages under current capacity.

Chapter 5- Conclusions and Recommendations

Results:

- Syria has comparative advantage in the production of fresh table oranges.
- World prices play a crucial role in attaining the Syrian oranges to the international markets, which necessities the reduction of costs and the improvement of performance on the entire commodity chain.
- There is a substantial competition from other countries, which produce efficiently the same product. This requires a high degree of chain coordination to reduce costs, improve performance and remove constraints.
- It is necessary that the processing capacities should comply with the available quantities of juice orange.
- It is necessary to develop new orange varieties that have high juice share and high quality for marketing (multiple goals).

Recommendations:

- Introducing meters for the measurement of irrigation water by public schemes to increase the efficiency of water use and to minimize disease created by over use of water;
- Supporting the current extension units to give advices to farmers about harvesting and marketing structure;
- Replacing old trees that exceed 30 years with young trees to increase yield.
- Improving the irrigation methods to save water and reduce the cost at farm level;
- Introducing high quality varieties with high productivity to be able to compete and to supply the processing units with adequate oranges;
- Expanding the biological pest control which is desired currently.
- Improving the sorting efficiency at farm gate by diversifying into: grades for export, grades for sale to domestic market, and grade for processing into juice.
- Taking into account the quality issues by complying to the required standards, since every country has its specific standards that should be adopted by the exporting country;

- Conducting studies on all potential markets to adjust to their needs with a specific attention given to the improvement of product's quality to maximize profitability. Special attention should be given to European markets;

- Releasing the importation of refrigerated trucks that are less than five years old;

- Removing the constraints concerning the establishment and operation of packing houses;

- Establishing packing houses in the area of production to reduce the cost of transportation and loss.

- Removing the fuel fees imposed on the Syrian trucks that pass through Jordan.

- Trying to reduce the custom fees on the Syrian refrigerated trucks.

The indicators of comparative advantages (PAM indicators) show that the domestic production is insufficient to cover the current processing capacity, which makes the processing sector uncompetitive. Therefore, there are many adjustments required to improve the processing sector as follows:

- Improving this sector, not only as family planting, but also as a new agro food industry to benefit from economies of scale;

- Introduce new machineries with a high capacity to receive large amounts of raw products and with a high conversion rate;

- Limit the license for juice factories according to the availability of juice orange.

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Annex

Table 1. Budget for orange at market price according to water source, 2002

BUDGET # 1 - FARM LEVEL	net irr	well drip	well flood
B 1 . FIXED INPUT	market price		
Establisment cost	26 , 059	20 , 894	21 , 140
well	0	2 , 278	2 , 278
pipe	0	10 , 538	0
TOTAL	26 , 059	33 , 710	23 , 418
B 1 . DIRECT LABOR			
Land preparation	3 , 923	1 , 797	4 , 697
Levelling	0	0	476
Planting	0	0	0
Fertilization	2 , 282	792	3 , 851
Chemicals	1 , 144	2 , 108	713
Irrigation	23 , 844	1 , 513	18 , 680
Cultivating / weeding	5 , 696	1 , 362	9 , 512
Harvesting	11 , 617	11 , 959	12 , 523
Pruning	20 , 937	9 , 033	13 , 992
Post - harvesting	0	0	0
	0	0	0
TOTAL	69 , 444	28 , 565	64 , 444
B 1 . INTERMEDIATE INPUT			
Seed / Seedling	667	0	333
Manure	9 , 595	9 , 762	9 , 378
Chemical fertilizers :	0	0	0
Nitrogen	4 , 996	3 , 523	4 , 561
Phosphate	3 , 712	3 , 850	4 , 185
Potash	5 , 611	5 , 075	5 , 011
Other (liquid)	4 , 094	3 , 075	2 , 167
Chemicals :	0	0	0
Pesticides	9 , 265	1 , 200	4 , 565
Herbicides	812	3 , 950	1 , 083
Fungicides	596	3 , 354	1 , 654
Machinery :	0	0	0
Ploughing	2 , 067	1 , 188	2 , 133
Levelling	258	0	0
Planting	0	0	0
Fertilizing	0	0	0
Other	1 , 260	817	2 , 196
Harvesting	0	0	0
Animal Draft	0	0	0
Packing materials	20 , 651	20 , 500	20 , 500
Transport to	14 , 500	14 , 350	14 , 350
Water Requirements	0	0	0
Irrigation 1	3 , 500	22 , 916	36 , 506
Vlaue of water	0	0	0
Land rent	88 , 000	59 , 450	80 , 975
Other	273	0	0
Other	0	0	0
Other	0	0	0
mantanance of the pipe	0	2 , 634	0

Interest : on Revolving Fund	4 , 340	3 , 199	5 , 434
TOTAL	174 , 198	158 , 844	195 , 033
B 1 . REVENUES			
highquality orange	120 , 000	123 , 000	123 , 000
Low quality orange	232 , 000	114 , 800	200 , 900
	0		0
TOTAL REVENUES	352 , 000	237 , 800	323 , 900
TOTAL COST	269 , 701	221 , 119	282 , 895
PROFIT (BEFORE TAXES)	82 , 299	16 , 681	41 , 005
B 1 . DIRECT TAXES	0	0	0
	0	0	0
TOTAL	0	0	0
PROFIT (AFTER TAXES)	82 , 299	16 , 681	41 , 005

Table 2. Budget of post-harvest activity and processing of fresh orange, 2002

Policy Analysis Matrix for representative system						Orange yield	41					
						Rejected at the farm level	0.3					
MAIN FINAL OUTPUT	Exported Orange					----------------Irrigation----------------------						
SYSTEM	Flood network irrigation		Total yield	41		Social	Ratio to	Applied	Social in			
REFERENCE YEAR	2002		share of exp	0.3		cost	nominal	ratio	PAM			
VERSION	July 2004					9000	2.571	2.500	9018			
BUDGET #I FARM LEVEL												
FARM MAIN OUTPUT	High quality oranges					CURRENCY	sp		AREA MEASUREMENT			
LENGTH OF PRODUCTION CYCLE	1 Year					PRODUCTION UNIT	ton					PLOT SIZ
Budget I computed in sp by Ha of High quality oranges												
------TOTAL ANNUAL CAPITAL COST						Capital	----Disaggregation at market-price					TOTAL
	Life	Used up	Capital Cost		Initial	Salvage	Recovery	L	L			Market
Bl. FIXED INPUT	Time	Value	Market	Social	Cost	Value	rate	NQ	Q	K	TI	Price
Establisment cost	24	1	5.5%	3.0%	342723	0	0.076	0.24	0.02	0.50	0.24	2605
		1	0.0%	0.0%	0	0	0.000	0.00	0.00	0.00	0.00	0
		1	0.0%	0.0%	0	0	0.000	0.00	0.00	0.00	0.00	0
TOTAL								6185	462	13047	6365	2605
BUDGET #II FARM LEVEL							Revolving					TOTAL
			-------Budget information-------					----Disaggregation at market-price				Market
Bl. DIRECT LABOR		Unit	Price	Quantity	Freq	TOTAL	Fund	L-NQ	L-Q	K	TI	Price
Land preparation		hours	3984	98	1	3923	1.00	1.00				3923
Levelling		hours	0.00	0	1	0	1.00	1.00				0
Planting		hours	0.00	0	1	0	1.00	1.00				0
Fertilization		hours	4076	56	1	2282	0.66	1.00				2282
Chemicals		hours	4231	27	1	1144	0.66	1.00				1144
Irrigation		hours	3880	615	1	23844	0.50	1.00				23844
Cultivating weeding		hours	4272	133	1	5696	0.33	1.00				5696
Harvesting		hours	4006	290	1	11617	0.00	1.00				11617
Pruning		hours	8845	237	1	20937	0.00	1.00				20937
Postharvesting		hours	0.00	0	1	0	0.00	1.00				0
			0	0	0	0	0.00	1.00				0
TOTAL						145606		69444	0	0	0	69444
BUDGET #II FARM LEVEL							Revolving					TOTAL
			-------Budget information-------					----Disaggregation at market-price				Market
Bl. INTERMEDIATE INPUT		Unit	Price	Quantity	Freq	TOTAL	Fund	L-NQ	L-Q	K	TI	Price
Seed Seedling		kg	200	3.333	1	667	1.00	0.05	0.05	0.10	0.80	667
Manure		kg	1.1	887879	1	9500	1.00	0.07	0.05	0.17	0.72	9592
Chemical fertilizers					1	0	0.66	0.05	0.05	0.10	0.80	0
Nitrogen		kg	7.5	67000	1	4996	0.66	0.05	0.05	0.10	0.80	4996
Phosphate		kg	8.1	45879	1	3712	0.66	0.05	0.05	0.10	0.80	3712
Potash		kg	114	4.9030	1	561	0.66	0.05	0.05	0.10	0.80	561
Other (liquid)		kg	570	7.182	1	4094	0.66	0.05	0.05	0.10	0.80	4094
Chemicals					1	0	0.50	0.05	0.05	0.10	0.80	0
Pesticides		kg	2143	4.33	1	9265	0.50	0.05	0.05	0.10	0.80	9265
Herbicides		kg	9241	0.88	1	813	0.50	0.05	0.05	0.10	0.80	813
Fungicides		kg	1519	3.92	1	596	1.00	0.05	0.05	0.10	0.80	596
Machinery					1	0	1.00	0.33	0.05	0.17	0.45	0
Ploughing		hours	2222	9.30	1	2067	1.00	0.33	0.05	0.17	0.45	2067
Levelling		hours	3091	0.83	1	2581	1.00	0.33	0.05	0.17	0.45	2581
Planting		hours	0.0	0.00	1	0	1.00	0.33	0.05	0.17	0.45	0
Fertilizing		hours	0.0	0.00	1	0	0.66	0.33	0.05	0.17	0.45	0
Other		hours	3932	3.21	1	1260	0.66	0.33	0.05	0.17	0.45	1260
Harvesting		hours	0.0	2.27	1	0	0.00	0.33	0.05	0.17	0.45	0
Animal Draft		?	0.0	0	1	0	1.00	0.40	0.00	0.30	0.30	0
Packing materials		box	100	2071	1	20651	0.00	0.05	0.05	0.10	0.80	20651
Transport to....		kg	0.5	29000	1	14500	0.00	0.33	0.05	0.17	0.45	14500
Water Requirements					1	0	0.50	0.22	0.05	0.09	0.64	0
Irrigation fee		Ha	3500	1.00	1	3500	0.30	0.22	0.05	0.09	0.64	3500
Vlaue of water		cm	3.0	1500000	1	45000	0.30	0.00	0.00	0.00	0.00	0
Land rent		SP/Ha	88000	1.00	1	88000	0.30	0.00	0.00	1.00	0.00	88000
Other		unit	0.9	31909	1	273	1.00	0.30	0.20	0.20	0.30	273
Other		unit	0.0	3.64	1	0	1.00	0.30	0.20	0.20	0.30	0
Other		unit	0.0	0.00	1	0	1.00	0.30	0.20	0.20	0.30	0
			0	0	0	0	1.00				1.00	0
Interest on Revolving Fund		at market	5.5%	78916	1	4340				1.00		4340
		at social	3.0%	96095	1	2883				0.00		0
TOTAL			rate	amount	year			100055	4129	102440	57624	174194
BUDGET #II FARM LEVEL												TOTAL
Bl. REVENUES		Unit	Price	Quantity		TOTAL						Market
High quality oranges		ton	10000	12		120000						120000

Table 3. Computation of export parity price of fresh orange

	Unit	Source of infor.	Value at Market Price	Value at Social price
Product	Exported Orange			
Quality	1 ton			
Parity point	Al Hadithah in Sudia			
CIF to FOB				
CIF price at importing country(Sudia)	USD/t	Data	400	400
custom fee at Al hadithah (sudia porder)	USD/t		6	6
unloading shipment from Syrian truck to sudian	USD/t		1	1
transport cost to reach to target market	USD/t		0	0
Commission of sudian trader	USD/t		21	21
unloading shipment	USD/t		4	4
fee in Jorden border	USD/t		14	14
transportation cost (driver + fuel+ declaration)	USD/t		46	46
FOB price at Syrian border	USD/t	Data or comp	308	308
Exchange rate R -> SP		Data	51.5	51.50
FOB price (= factory gate price)		Computed	15879.2	15879

Table 4. Computation of the import party price of orange concentrate

Computation of Imported parity price of orange concentrate	Unit	Source of infor.	Value at Market Price	Value at Social price
Product	concentrate			
Quality	1 ton			
Parity point				
Wholesale market margin	%	Hypothèse	0.0%	0.0%
FOB to CIF			275	
FOB price at exporting country	$/t	Data	1000	1000
shipment fee from Italy	$/t		32.5	32.5
Insurance	$/t		5	5
CIF Price in Syria	$/t		1037.5	1037.5
Exchange rate			51.5	51.5
CIF price in SP	sp/ton		53431.25	53431.25
Duties				
Variable		Data or comp		
Import tax estimated on the gap between local price market and parity price	%	Data	106%	0.00
fixed		Computed		0
Exporting agents commission (0.2%)	sp/t		107	0
custom fee at port	sp/t	26093	200	0
ship agency	sp/t		35.7	0
unloading shipment	sp/t		200	200
commitment exchange	sp/t		15	0
custom treatment	sp/t		100	0
total			659	200.00
PRICE at harbor before custom			110625	53631.25
transportation cost to port	sp		100	100
party price at company			110725	53731.25